ARMENIA

Chemical Risks Assessment
Nairit Chemical Plant - Yerevan

September 2017

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Yerevan, Nairit Chemical Plant, August 28, 2017

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*The fire and rescue service of Yvelines department (**SDIS 78**) from the **French Civil Protection** is responsible of fire, first aid and specific responses as chemical hazards.*

Executive Summary

Following a fire of lacquer ethynol tanks, which occurred in Nairit Chemical Plant in Yerevan, Armenia on 28 August 2017, a team of experts, was sent to the site, upon the request of the Ministry of Emergency Situations of the Republic of Armenia to assess the remaining chemical risks. The team was mobilized with support of UN Environment and the UN Office for the Coordination of Humanitarian Affairs, through their Joint Unit (JEU). Experts were provided through the Swiss Agency for Development and Cooperation as well as from Sweden and France, with support of the (European) Union Civil Protection Mechanism.

They spent two weeks in Yerevan and confirmed that the risk of additional incidents pertains, if the hazards remain present. Nonetheless, this risk can be reduced by the following proposed measures:

Measure	**Cost**	**Implementation**
Identifying and labelling chemicals properly	USD 5,000	Immediate
Repacking the chemicals in need	USD 0.5 to 1 million	Immediate
Centralised storage	USD 100,000	Immediate
Recycling/Treatment/Dumping	Up to USD 10 million, depending on ability to find maximum of buyers and reduce quantities to be treated	Follow logical order: • Gas (Chlorine, Ammonia) • Liquids • Pulverulent solids • Solids

Once the chemicals are safely packed, treated or sold, it is strongly recommended to:

- Commission a study to conduct a thorough assessment of legacy environmental issues of the plant in order to remedy them and allow for environmentally sustainable decommissioning.
- Implement an environmental clean-up.
- Implement a communication campaign on this sensitive issue, in order publicise the information, arguments and justifications behind its decision.
- Operate in respect with the international best practices regarding the Health and Safety Executive (HSE) measures to protect workers and the surrounding population.

Advancing on the above recommendations will require strong political and financial engagement, where it is recommended that the process be started as soon as possible.

List of abbreviations, acronyms and glossary of terms

ABC	Atomic – Biological - Chemical
BLEVE	Boiling liquid expanding vapour explosion
CAS	Chemical Abstracts Service
CMEA	Council for Mutual Economic Assistance
ECHO	European Commission's Humanitarian Aid and Civil Protection Directorate General
GHS	Globally Harmonised System (Refers to chemical hazards)
HSE	Health, Safety and Environment
IBC	Intermediate Bulk Container
IR	Infrared
ISBL	In Side Battery Limit
JEU	UN Environment/OCHA Joint Unit
MES	Armenian Ministry of Emergency Situations
MSDS	Material Satefy Data Sheet
NGO	Non-Governmental Organization
OCHA	(UN) Office for the Coordination of Humanitarian Affairs
PCR	Polychloroprene Rubber
PPE	Personal Protective Equipment
SDC	Swiss Development and Cooperation Agency
SHA	Swiss Humanitarian Aid Unit
UCPM	(European) Union Civil Protection Mechanism
UN	United Nations
UNDP	United Nations Development Programme
USSR	Union of Soviet Socialist Republics
MSB	Swedish Civil Contingencies Agency

An environmental emergency is defined as a sudden onset disaster or accident resulting from natural, technological or human-induced factors, or a combination of these, that cause or threaten to cause severe environmental damage as well as harm to human health and/or livelihoods.
UNEP/GC.22/INF/5, 13 November 2002

1. Mission background and scope

An explosion followed by a subsequent fire occurred at the Nairit Chemical plant at 01:10 pm on 28 August 2017 (see front page picture). A similar accident was also recorded on 15 May 2009, at the same location.

The Nairit factory is a synthetic rubber plant commissioned in Yerevan in 1939. It has been the flagship of the chemical industry in Armenia and in the Union of Soviet Socialist Republics (USSR) and was employing several thousands of people, covering more than 130 ha.

In 1989, the factory was closed for environmental consideration, as well as due to the collapse of the Council for Mutual Economic Assistance (CMEA) business model. Various attempts to revive Nairit only prolonged a slow decline which ended with the declaration of bankruptcy on 30 November 2016. A bankruptcy administrator was then appointed by the Ministry of Justice.

Nairit Plant Closed Joint-Stock Company (CJSC) has accumulated over 150 types of chemicals that are stored in different places and conditions all across its territory.

In order to prevent further perilous incidents at the plant, the Minister of Emergency Situations requested assistance from the UN, namely UNOCHA and the JEU, to assess the chemical risks and threat posed by Nairit storages.

A mission consisting of three experts was subsequently mobilized:

- Laurent Nicole, Switzerland, deployed through the Swiss Agency for Development and Cooperation (SDC)
- Melviana Heden, Sweden, deployed through the (European) Union Civil Protection Mechanism (UCPM), with support of the Swedish Civil Contingencies Agency (MSB)
- William Cruz-Morey, France, deployed through the UCPM, with support of Yvelines Fire and Rescue Service (Department)

The initial scope of the mission, given in Annex 1, was discussed with the Minister of Emergency Situations during the first day of mission and can be summarized as:

- Assessing the chemical and environmental risks posed by the chemical storages in Nairit premises;
- Developing recommendations to allow reducing and managing the risks;
- Developing proposals to eradicate the risks.

1.1 Context

General site history

The Nairit Chemical Plant complex occupies a large plot, around 130 ha, to the south of Yerevan city centre, within the industrial park area. Originally, the site was located away from residential areas however, with the passage of time, it has now been absorbed and is currently within the city limits. Thus, the health, safety and environmental performance of the site has a direct impact on the health and welfare of Yerevan's residents.

The production started in 1940[1], based on the calcium carbide route to acetylene (now largely abandoned everywhere, except in China), which was then hydrochlorinated to chloroprene monomer, from which the main synthetic Polychloroprene Rubber (PCR) was obtained.

[1] Assessment of Technical and Financial Viability of Nairit Chemical Plant Operation, WB, June 2015

Over the years the production was expanded, first to 14 kta of PCR in 1942 and then up to 45 kta of PCR in 1961. Due to the expansion of the city towards the site and the environmental impact of acetylene production from calcium carbide, the site switched to the natural gas route to acetylene and, in 1965, the acetylene production from natural gas was launched. This, together with a revamp of the chloroprene production unit, allowed further expansion of acetylene-based PCR production to 75 kta.

In parallel, a new Acetic Acid (AA) unit, based on the British Distillers process, using light naphtha as a feedstock, under a BP Chemicals licence, was started up in the 1970s, but only achieved design capacity in early 1980s.

Picture 1: Overall view of Yerevan, Nairit site shown in red

Likewise, due to the poor safety record of the chloroprene production from acetylene, a parallel 75 kta chloroprene-from-butadiene production process was set up under licence from BP Chemicals. The plant was started up in 1983, and reached design capacity in 1987. In addition, a new PCR line based on a DuPont technology was installed in 1986, so as to allow production of up to 50 kta of PCR.

During the Soviet times the plant accounted for a large share of the world global synthetic rubber production. Specifically, in 1987, the plant accounted for 15% of the global supply.

These changes allowed a shutdown of chloroprene production from acetylene, improving the inherent process safety, as well as decommissioning of the old PCR lines in 1988.

The demise of the USSR and the resultant logistics issues for the site resulted in the supply of both light naphtha and butadiene from the newly formed Russian Federation being either cut or greatly reduced, due to a break out in hostilities elsewhere in the Caucus mountains region and revised feedstock pricing.

The plant was first shut down in 1989 and restarted operations at a smaller capacity in 1993.

Several attempts were made to attract investors and re-commission the plant to its full capacity, yet all of these attempts failed, given the underlying economics, i.e. the costs

associated with importing the feedstock butadiene from Russia, as well as the high cost of process energy, given increasing gas import costs.

In June 2015 a World Bank report[1] stated that: The Nairit plant is an unsustainable liability for the Government and continues to be a major drain on the Government[2], as the plant was not anymore operational since 2011 when the private owner abandoned it and was in major financial distress. Bankruptcy was finally declared on 30 November 2016.

The liabilities of the plant exceed AMD 121 billion (USD 250 million), including the sovereign guaranteed loan from the Commonwealth of Independent States (CIS) Inter-state Bank, which has not been repaid. The company has not generated any revenues and relied on borrowing from Yerevan TPP to finance the salaries and maintenance costs since 2010. The total debt of the company to Yerevan TPP is AMD23 billion (USD 48 million).

The book value of assets is less than 50% of the outstanding value of debts and payables. This means that the company's assets are not sufficient to meet its liabilities and a substantial share of equipment has significantly deteriorated.

The World Bank expert's conclusions were, amongst others, that the condition of Nairit Chemical Plant assets is such that the plant cannot be easily brought back into operation without significant capital cost investment, regardless of which scenario is chosen.

The liquidation process should include a detailed environmental assessment of the plant. The Government should commission a study to conduct a thorough assessment of legacy environmental issues of the plant in order to remedy them and allow for environmentally sustainable decommissioning.

Present situation

Today, solely around 110 persons, namely key management staff, storekeepers and guards are left on the Nairit premises, when at the top of its glory several thousands of workers were active on-site.

Picture 2: Empty avenues

[2] The responsibility for the Nairit plant falls under the Ministry of Energy and Natural Resources, and it became a financial burden for the power sector.

For almost seven years, the plant's activities have been stopped and nature has reclaimed its place. An impressive silence hits the visitors of such an enormous industrial skeleton.

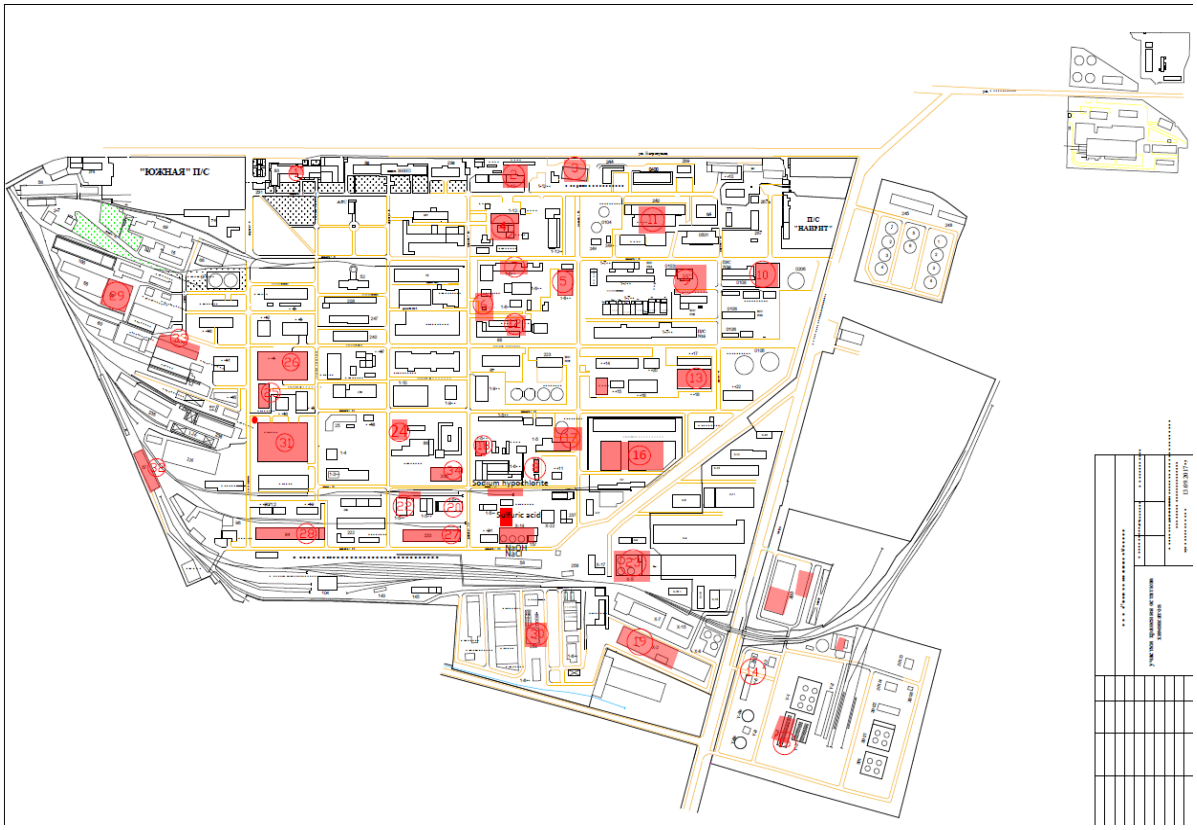
Picture 3: Slow corrosion

Picture 4: Growing trees

Picture 5: Abandoned corroded installations

Picture 6: Ghost buildings

The progressive halt of the plant during the past twenty-five years left many chemicals stored in different conditions all around the site. The following maps shows the location of the main storages. Annex 5 analyses each storage in details, showing the content, the conditions of storage and packaging, as well as the chemical reactivity of each chemical.



Picture 7: Nairit Chemical Plant main storage locations

Chemicals are packed in containers between half a kilo to several tenths of tons. The package conditions range from totally destroyed to almost untouched.

Picture 8: Storage 29

Picture 9: Storage…..

Some of the chemicals are stored mainly outside, in large tanks of different shapes.

Picture 10: Storage…..

1.2 Sensitivity of the context

Beside the technical description given above, it must be underlined that the Nairit Chemical Plant case is particularly sensitive in Armenia for both political and economic reasons. Many promises had been made and broken, and hope has vanished.

Ex-employees are protesting in town on a regular basis, for the many years of unpaid wages. In the meantime, the overall debt of the bankrupt company is placing a toll on the Armenian state budget.

1.3 Methodology

A team of three experts was sent to Yerevan by the JEU to carry out a chemical risks assessment of the Nairit plant, after the 28 August 2017 incident.

The team was composed of the following experts:

- A firefighter, Regional advisor on chemical risks, Head of a French Emergency Centre specialist of industrial chemical risks;
- An environmental-development engineer, specialist of waste and hazardous waste management;
- A chemical engineer, specialist of hazardous material and industrial site assessment.

The chemical risks assessment of Nairit plant has been organised in steps:

- Existing data collection
- History of past incidents
- Detailed site visits
- Nairit employees interviews
- Chemicals identification, quantities estimate, location mapping, IR pictures of tanks
- Chemicals list update
- Chemicals hazards and compatibility table
- Chemicals risk analysis

In order to support the risk assessment, a set of recommendations along with a general strategy of action has been developed.

1.4 Encountered difficulties

The recent history of Nairit and its turbulences make the data collection tributary of the few remaining staff. The reliability of the data showed some weakness and needed serious crosschecking.

Aside from the language barrier which was overcome thanks to the strong support received from the MES's international relations team, the identification through old trade or brand names, familiar terminology or local names, as well as aligning these to international terminology required serious efforts.

The support provided by the present plant management was appreciated and tremendously helpful. Nonetheless, limited proactivity slightly complicated the investigation.

2. Findings

As a consequence of the slow agony of the Nairit Chemical Plant, only part of the installation has been properly emptied and cleaned from its chemicals.

Picture 11: Installation partly dismantled (Sept. 2017)

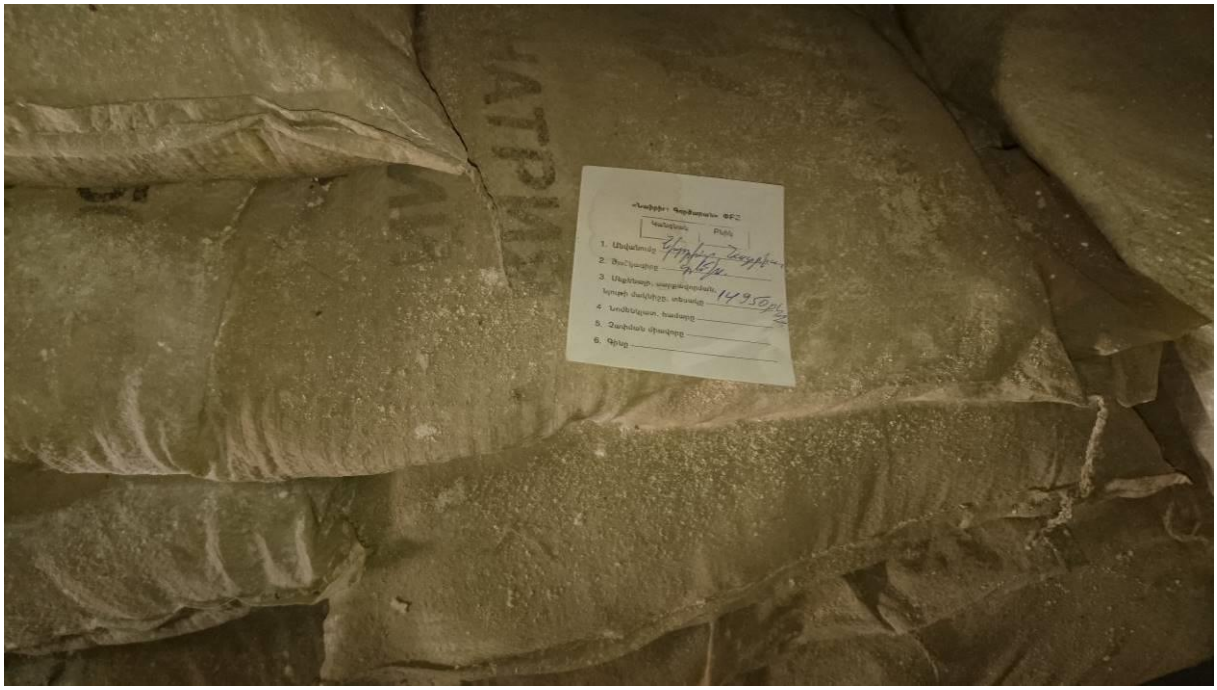
In the meantime, part of the installations has been dismantled during the past two decades and the process is still on-going.

Picture 12: Sulfuric acid pumping station being dismantled (Sept. 2017)

Chemicals are mainly stored or deposited in more than thirty-five main areas, all across the site. Storage sites are various in type and quality, from appropriate to fully inappropriate.

Picture 13: Storage ……. (Sept. 2017)

Despite storekeepers seeming to know the content of the storages, the identification of chemicals and the level of compatibility is never mentioned or indicated.



Picture 14: Typical chemical identification in Nairit Chemical Plant (Sept. 2017). No indication of hazards, no indication on compatibility, etc.

Number of chemicals are not identified, containers are deeply corroded, and the readable indications on the container do not correspond with the chemical inside.

No Material Safety Data Sheet (MSDS) was found for the stored chemicals. It has been part of the mission to collect the most suitable ones, given in Annex 8

Picture 15: Highly corroded container, storage 29 (Sept 2017)

In terms of fire prevention and protection, only a few fire extinguishers were observed and no detector nor monitoring procedure could be identified.

An important parameter which seems to be underevaluated is the presence of asbestos in various areas of the plant. The most problematic will be the thermal insulation of pipes and seals on reactors openings, pipes connections, etc.

Picture 16: Potentially containing asbestos seal (Sept 2017)

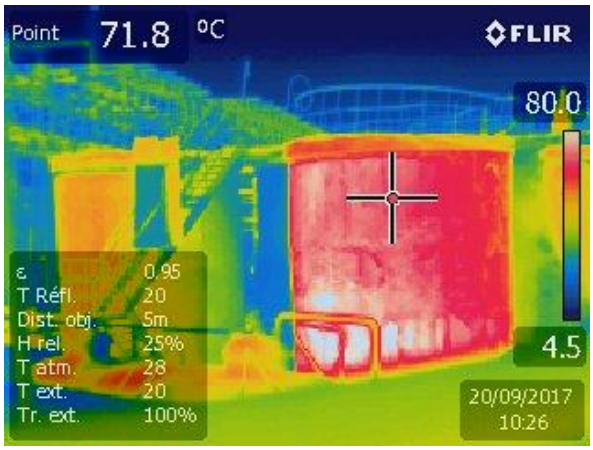
Picture 17: Potentially containing pipe insulation being cut (Sept 2017)

Picture 18: The lowest pipe is covered with a fibered cement potentially containing asbestos, the other pipes seem to be covered with glass wool material. (Sept 2017)

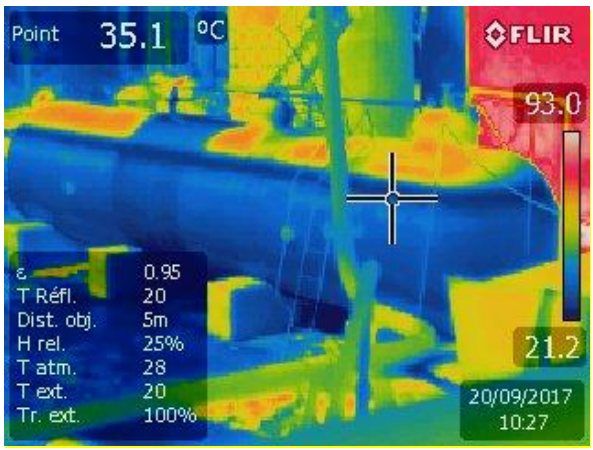
Cement fibered roofing material and wall covering material is also to be considered and handled according to best practices. As asbestos is strongly bound in cement it presents less of a risk.

Picture 19: Reactor insulation potentially containing asbestos

The fire which destroyed one of the storages of lacquer-ethynol had not been fully extinguished, instead was kept under control to avoid collateral damages. It was still carbonizing almost 4 weeks after the incident with varying intensity as detected by the IR camera.



Picture 20: The lacquer-ethynol storage still burning on September 20th, 2017



In addition, one would notice that the tank located immediately beside the silo on fire, is keeping an acceptable temperature. Observation also shows that the shy water cooling on the top has a limited impact.

Several other lacquer-ethynol tanks can be found in storage area 16.

The lacquer-ethynol can be found dissolved in toluene or solidified due to more than 20 years of storage.

Picture 21: Example of IR tank analysis

3. Risk analysis

The risk analysis has been oriented towards the chemical risks more than the potential environmental impact. The latter should be subjected to separate detailed environmental assessment**.**

To define a risk of incident, scenarios can be organised in six main categories:

- **Corrosion: old containers exposed directly to corrosive chemicals or meteorological conditions.** A table has been drawn to show the hazards of each stored chemical and its compatibility with other chemicals or its container (see Annex 3). A proper organised storage with repacked identified chemicals will reduce this risk drastically for chemicals in small packaging (below one ton). For large containers, tanks and silo, case by case study is still needed, in terms of condition of the content, container, retention pool, etc.

  The analysis of the causes for the fires of the lacquer-ethynol tanks have not been received at the present stage of report preparation, neither for the last incident dated 28 August 2017, nor for the fire recorded in May 2009.

- **Carelessness: while dismantling or during storage operations, especially when chemicals are not clearly identified on tanks.** Once the chemicals are properly identified, labelled, packed and stored, the risk of a man-made accident will be significantly reduced, allowing more time to find a proper solution to eliminate, recycle or dump the chemicals.

- **Malicious ac**t: An intentional act has many unpredictable origins, from terrorism to revenge. Proper storage with the necessary security measures and close controlling of access to the site will reduce that risk significantly. The sensitive elements being the dispersed tanks and silo still containing chemicals.

- **Natural hazard:** Seism risk is the most likely hazard, due to the impact earthquake aftermaths may have on the old structures, causing further incidents.

- **Electrical incident:** If a large part of the plant has been de-energized, some networks may still be under tension. This could be a source of short-circuit and a consequent fire ignition. Isolation of the still functional networks will prevent that risk.

- **Asbestos air contamination:** Brittle asbestos fibered cement used for thermal insulation of pipes running across Nairit site implies a chronical contamination of air and therefore a permanent threat on people walking across the site.

Picture 22: Old leak du to corrosion on acid tank

A simplified causes and aftermaths analysis of chemical dispersion is summarized in the diagram below:

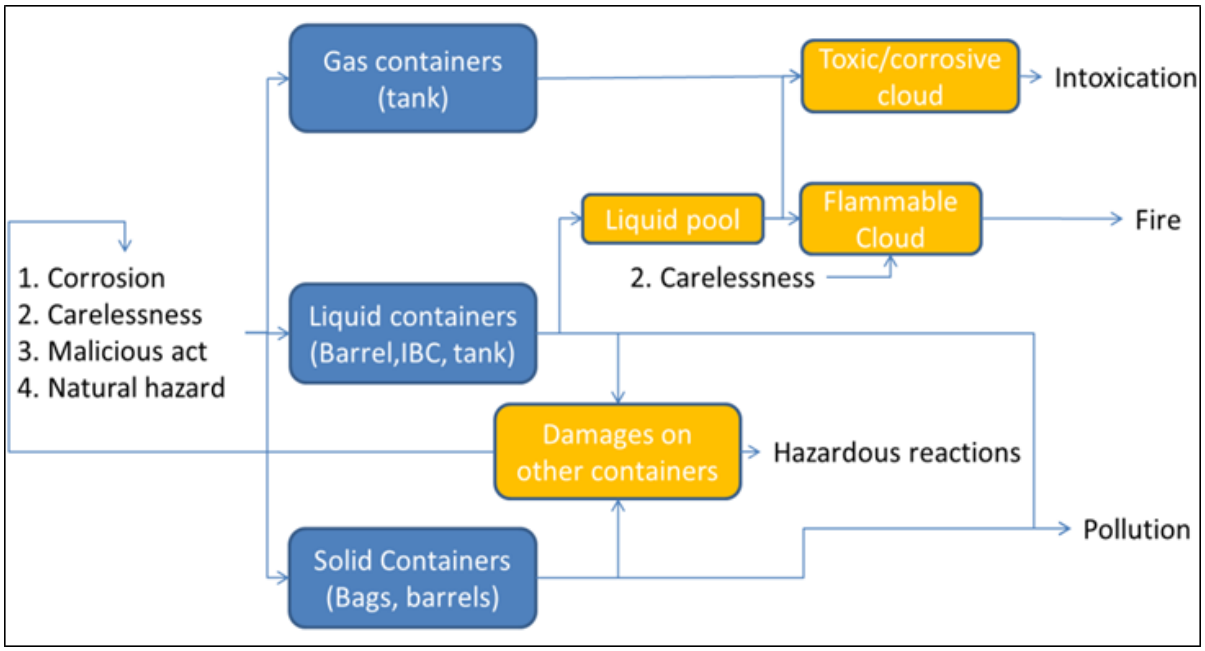


Figure 1: Simplified diagramme

Asbestos is clearly a separate cause of concern present throughout the plant. Release of fibres can happen anytime, as damages have been, and are still, caused to asbestos-containing structures. Observations show that insulation can also fall down due the age of the material or the disaggregation of the reinforcing metal net. One of the difficulties with assessing asbestos risk is the latency time. In effect, 40 years may pass before symptoms of asbestos exposure are observed in humans.

Three main scenarios can be identified based on above explanations:

SCENARIO 1: Ammonia leak, storage 11

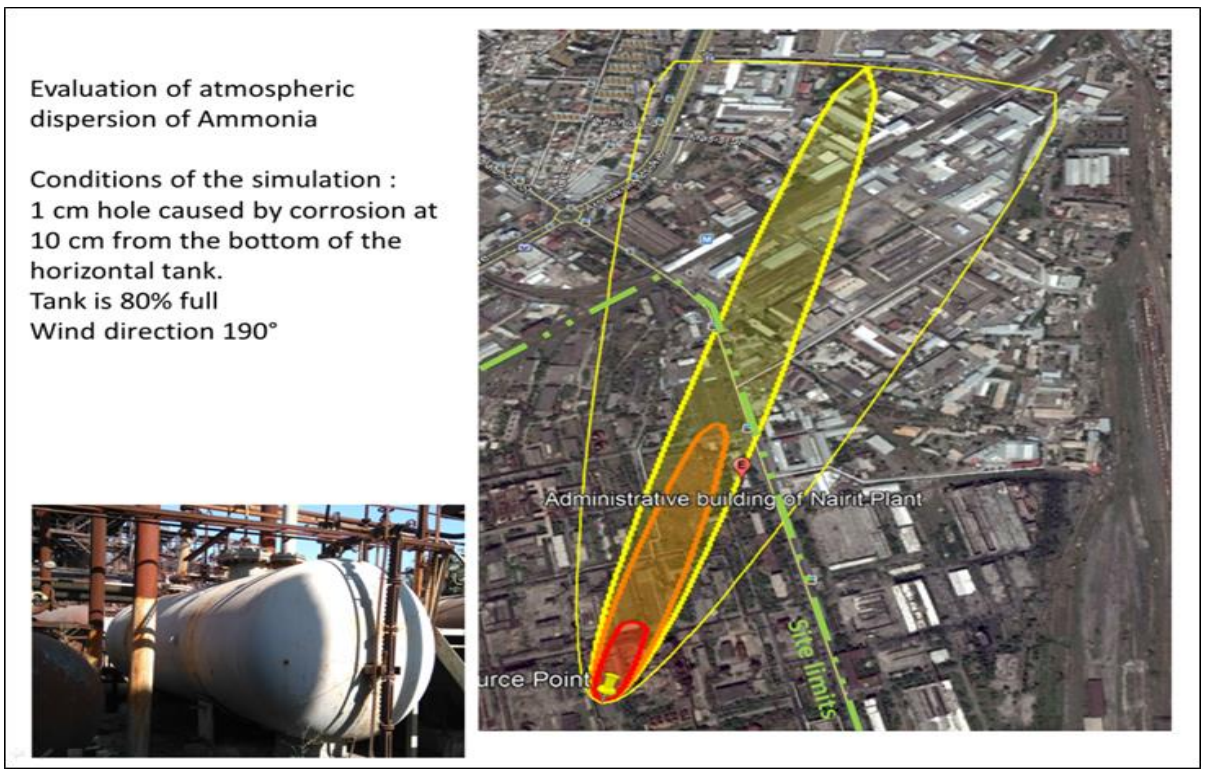


Figure 2: Evaluation of atmospheric dispersion of NH_3

The limits of threat zones are established using the AEGL1-2-3* for 1 hour of exposition. This simulation shows that several damages for heath may only occur inside the limits of Nairit.

However, it is crucial to keep in mind that "notable discomfort, irritation, or certain asymptomatic non-sensory effects" may be felt outside. Those effects are not disabling and are transient and reversible upon cessation of exposure. Such an event requires public rescue teams and will have a mediatic and political impact.

SCENARIO 2: Fire puddle, storage 16

A spill of the content of a toluene tank may create a flammable puddle of approximately 300m^2. The simulation shows that thermal radiation of that puddle fire would not have several effects outside the site.

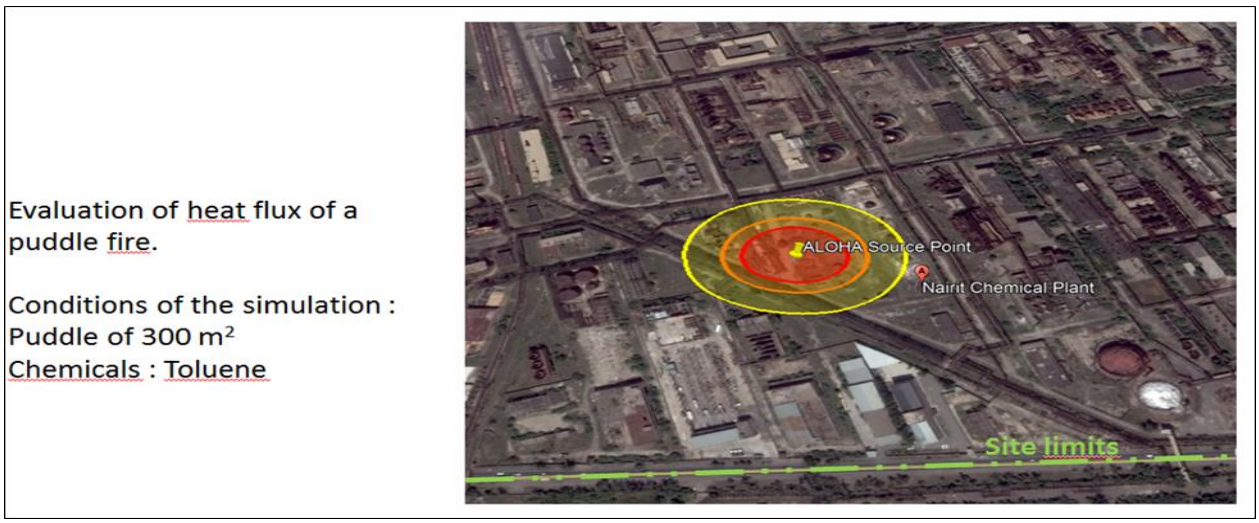


Figure 3: Evaluation of heat flux

SCENARIO 3: BLEVE of a tank, storage 16

In case of a fire puddle, a tank could be exposed for a long time period, creating a BLEVE (boiling liquid expanding vapour explosion). A BLEVE could have lethal effect (orange limit) and several burns (yellow limit) outside the limit of the site.

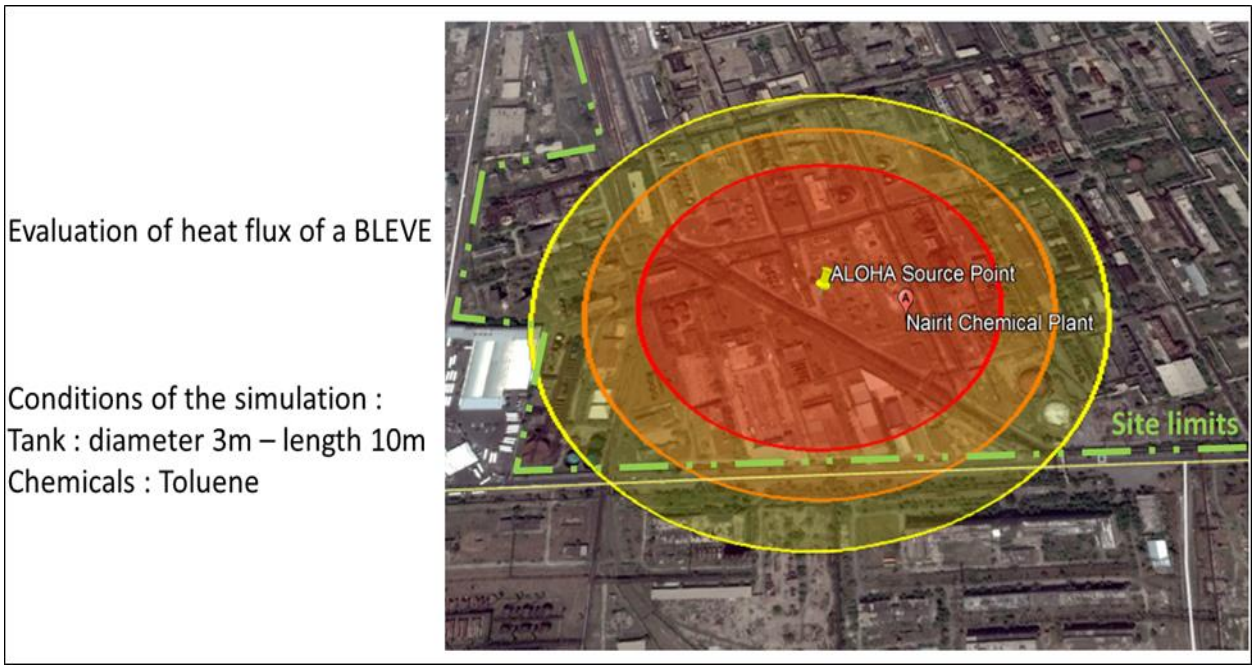


Figure 4: Evaluation of heat flux of a BLEVE

In conclusion, scenarios 1 and 2 correspond to the worst case with a higher probability of occurrence. Albeit no severe impact being forecasted, firefighters will still be needed to contain the effect of the incident.

Scenario 3 is a consecutive effect of scenario 2 (domino effect) in case of non-adequate response, showing the importance of securing a sufficient water flow as well as a proper emulsifier supply.

3.1 Storage conditions

Approximately 35 different storages area are scattered all around the site which can be classified into 2 categories:

- Storages with a unit capacity less than 1000 kg or litres (from bags of 20 kg to IBC) containers can be moved easily,
- Storages with a unit capacity greater than or equal to 1000 kg or litres: chemicals are stored in fixed tanks and need to be transferred in a mobile tank or repacked in smaller containers prior to removing them from the site.

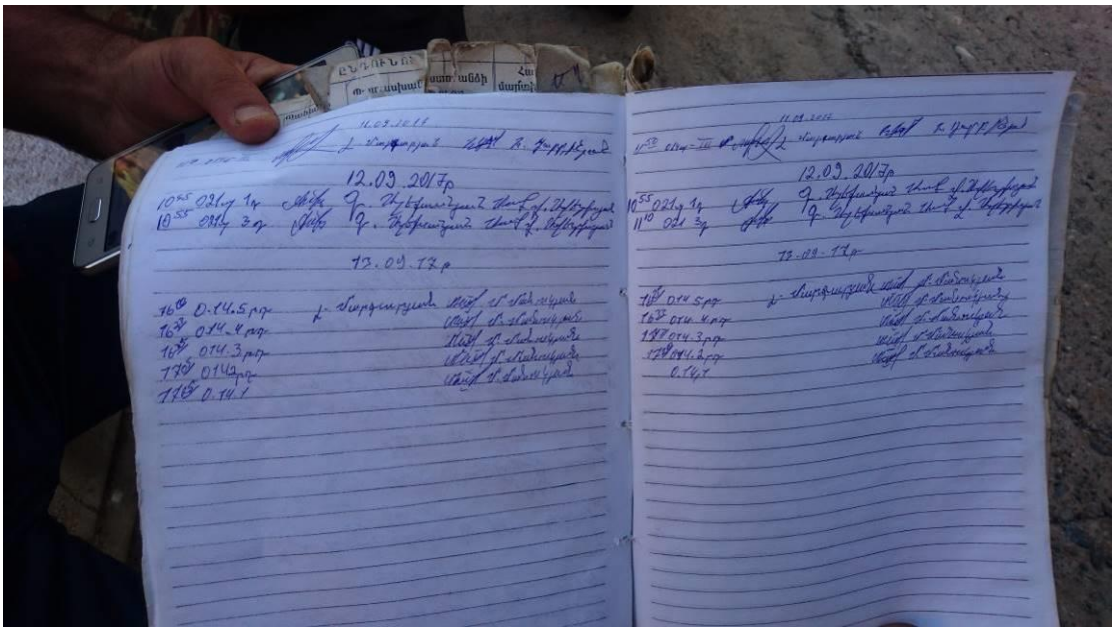
3.1.1 Storage up to 1000 kg

Chemicals stored in “small” packaging, from 0.5 kg to IBC, are mainly stored in 3 buildings (Storage 27, 28, 29 on the map). Many other smaller storages exist on the site.

The principle of grouping is clearly relevant but the ways of grouping and storing need to be improved:

Positive

- Access is sealed by padlocks;
- A log book is kept by the storekeeper recording all entries made;



Picture 23: Log-book showing the opening of each storage door

Negative

- Identification of chemicals is usually limited to a piece of paper with the name and quantity of the product
- No identification of hazards

- Incorrect indications as to which chemicals are contained in a container;
- No protection against rain
- No consistency in method of storage, in terms of identical chemicals being stored in different places and types of containers
- No suitable fire and emergency response model (especially fire protection equipment)
- No retention tray for liquids
- No separation of incompatible chemicals
- Exposure to the sun
- Loose security measures on access to the grounds (E.g. accessible windows)

Picture 24: Storage 29, from the window at the ground level

3.1.2 Storage over 1000 kg

The stored volumes are consequent and reach thousands of litres per tank. Tanks can be located on the ground, underground (not buried), in superstructures or on rails.

Picture 25: Used oil storage

Picture 26: Sulfuric acid on rails

The large tanks are mainly made of steel, with or without protecting inside layer. Some are or have been insulated with glass wool, mainly gone today. Tanks are exposed to climate conditions without maintenance for decades and showing significant traces of corrosion.

Picture 27: Storage 15, valves are blocked….

As the valves are oftentimes blocked, the content transfer will require specific case-by-case solutions.

Positive

- ……..

Negative

- No product or hazard identification
- Only rare indication of level (IR camera will be useful)
- In several cases, unknown content has been noted as a side-product of processes
- Valves blocked or sealed by corrosion
- Structural weakness due to corrosion
- Some initially liquid chemicals turned into solid across the time (E.g. lacquer-ethynol)

4. Protection and prevention measures

4.1 General measures

Despite the site no longer being in operation and being dismantled, minimum protective measures must nonetheless exist as long as chemicals remain stored on-site.

A clear smoking ban must be applied in the vicinity of storages of flammable materials. The hazard panel contributes to the correct application of this directive. Staff instruction is equally needed.

Work by hot spots, (cutting with blowtorch, angle grinder, etc.), numerous during dismantling must be the subject of preventive measures which, in Europe, would be:

- Daily work permit delivered by the site management

- Control of explosimetry
- Dedicated fire protection means in the direct vicinity
- Specific personal protective equipment (PPE) for workers
- After-work monitoring, ensuring no hot spot has been left behind
- Etc.

Lightning remains one of the main causes of ignition on storages of flammable products outdoors. This study did not particularly analyse this point as lightning rods are visible across the site. Nevertheless, particular attention must be paid to this.

Extinction water, in case of an incident, should be contained in order to be treated as not directly compatible with environment. Therefore, sewage networks should be equipped with isolation valves and extinction water collection pools.

4.2 Warehouses

Constructive measures

- Natural ventilations must exist in each room with low air inlets and air outlets in the upper part. These ventilations must be sized to also evacuate smoke from fire. Upper openings of 1m^2 per 200m^2 of floor space should be sufficient.
- Building doors and windows must be properly closable and kept closed.
- Full compartmentation of the concrete structure must ensure chemicals separation and reduce the fire spread probability.
- Liquid products must be stored on slatted floor in a retention tray.

Organizational measures

- Storage at a single height helps reducing the potential heat exposure to a fire start, thus reducing the risk of a major incident.
- Access must be restricted to authorized and trained personnel. PPE must be worn for handling operations (Eyewear, Type 4 protective suit, FFP2)

Fire protection equipment

- A stock of absorbent material must be provided near the compartment (dry sand as a minimum requirement)
- ABC Powder Extinguishers (due to the incompatibility of some products with water) must be placed close to the access area with one 9 kg extinguisher per 200 m^2 of floor space.
- Each compartment containing flammable liquids must have 2 additional ABC 9 kg extinguishers. (Usual European rules)

4.3 Outdoor storage

The situation of each storage must be specially analysed.

Constructive measures

- Clear identification of tanks still in use
- Decommissioning of tanks not in use
- Retention tray must exist under each tank
- Chemicals, capacity and hazard identification must be clearly indicated according to international standards

Assessment of water and foam concentrate supplies

- Water and emulsifier capacities must be present. The extinction of a polar liquid fire such as toluene requires the use of polyvalent foam-based foam according to NF EN 1568-1 to 4 standards.
- With an operational application rate of 20 l/m²/min, considering the reference scenario 2,6000 l/min are needed.
- Considering the absence of internal emergency services and an automatic extinguishing system, it is advisable to consider an extinction time of 2 hours.
- The water requirement is therefore 720 m³ per 2 h.
- The need for foam concentrate based on a conventional foamer used at 3% for polar liquids is 21,600 litres (estimated cost USD 80,000).

The capacity of the existing hydraulic network could not be clearly determined, but the 28 August incident clearly proved its inadequacy.

Number of existing empty tanks could be used, after inspection and proper decommissioning (Storage 16 for instance) for extinction water storage to meet the above-mentioned objective.

Adequate pressure and flow of a fixed network would allow a faster intervention (possible re-use of existing network?). Connections in sufficient numbers must be made available for the fire vehicles. The tanks need access from the top.

Similarly, a good distribution of the foam concentrate stocks, in the vicinity of flammable liquids storages must be envisaged (Lacquer-ethynol, toluene ...)

The equipment for injecting foam concentrate and spraying the foam must be at the disposal of the fire brigade. The use of Firedos ® devices or equivalent would be appropriate.

Such materials have the advantage of being robust and accurate without electronics. They can, depending on the model, be used on fixed installations as well as with hoses.

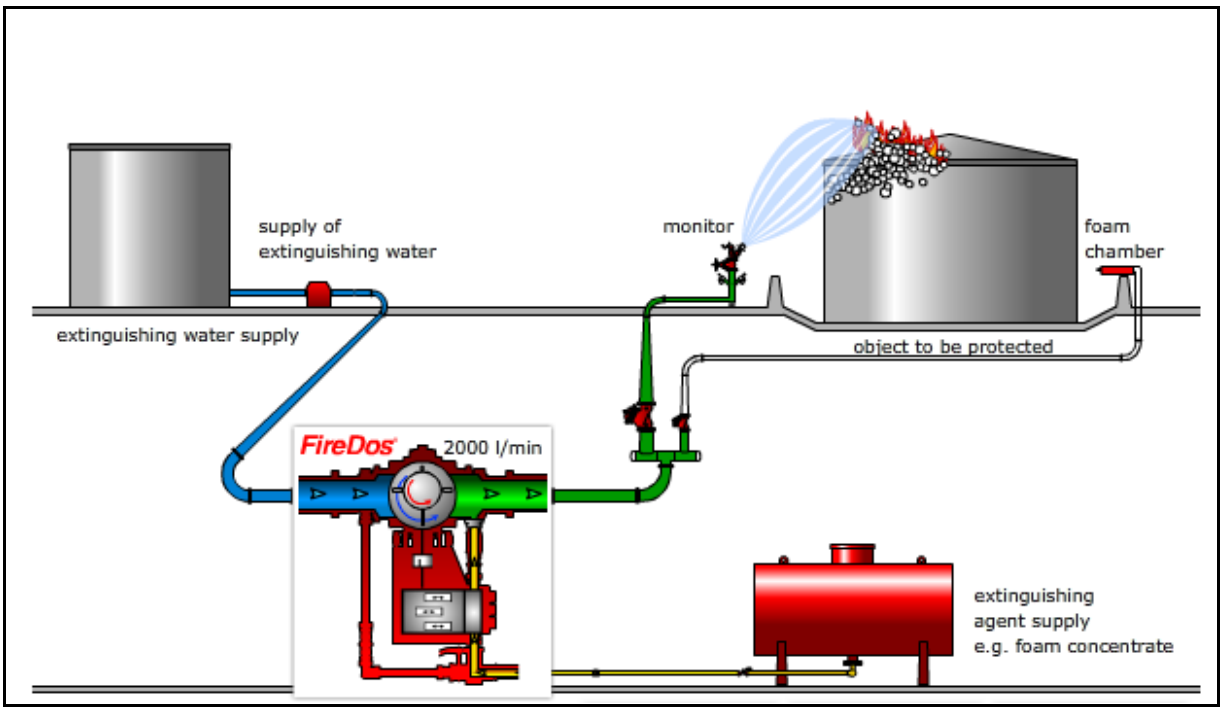


Figure xx: Sample for Firedos® installation (rate could be higher than 2000 l/min)

All these measures must be drawn up and validated with the Ministry of Emergency Situations.

5. Recommendations

In order to mitigate the risk of incident in Nairit Chemical Plant in the shorter possible delay, the following action should be started immediatel:

1. Labelling of all chemicals
2. Repacking chemicals packed in poor conditions
3. Properly conducting temporary storage
4. Chemical / waste management

Point four needs to be further studied where a study on this can be immediately initiated.

5.1 Labelling

5.1.1 Storage up to 1000 kg

The identification of chemicals follows two major safety objectives:

- Informing on hazards, to enable workers and rescue services to protect themselves and adopt the right course of action,
- Avoid storage errors: incompatibility of products, unsuitable container, etc.

Most chemicals have been stored for many years. The important task of grouping, identifying and quatifying chemicals has already been completed. Nevertheless, the system put in place, as shown in the Chapter Findings, is strongly relying on the remaining storekeepers' memory, and is hardly comprehensible by any other person.

By using the knowledge of the storekeepers and the international identification of hazard, given in Annex 3 for all identified chemicals, the proper labelling must replace the "flying" labels with a sustainable solution properly fixed to the container or group of containers (pallets) (PP-film or similar). The size of the label must not be smaller than 20 cm x 20 cm.

The use of simplified labels from the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) is strongly recommended.

These labels must include at least:

- Place and date
- Hazards pictograms
- Chemical name in English and Armenian
- CAS number
- Quantity

Labels must be plastic-coated to avoid degradation.

This action can be initiated immediately, before repacking and/or moving chemicals from one storage to another. The attached table (Annex 3) gives all the elements required for chemical labelling, including the associated MSDS[3].

[3] The Material Safety Data Sheet MSDS given in annex are given as example for a given product.

The labelling operation will not require more personnel than the on-site existing one. The cost will therefore be limited to the manufacture of laminated labels and can be estimated to be around USD 5,000.

Warning: Despite the care taken in translating and searching the corresponding CAS numbers, some products with no labelling, apart from handwritten paper, identification errors are possible. Only laboratory analysis can guarantee perfect identification.

It is wise to consider moving and isolating oxidizer products immediately

5.1.2 Storage over 1000 kg

The tanks must be identified as any other chemical, as described in Paragraph 5.1.1.

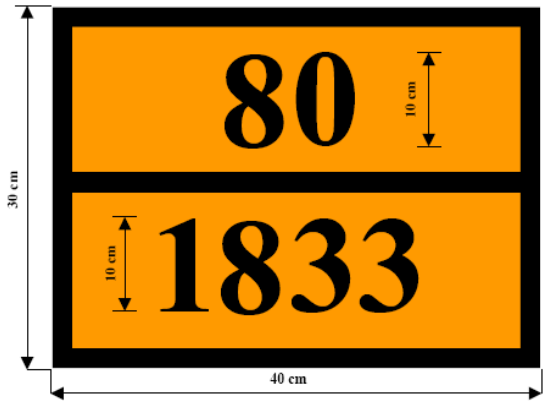
These labels must include at least:

- Place and date
- Hazards pictograms
- Chemical name in English and Armenian
- CAS number
- Quantity

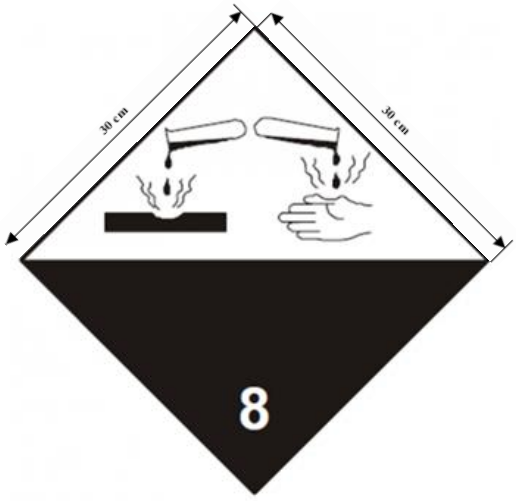
Labels must be plastic-coated to avoid degradation.

In the case of flammable products, the surrounding zone must be labelled prohibiting smoking, producing flames or spurts. The dimensions of the panels must allow a reading at ten meters.

In addition, using the UN number associated with the hazard code and pictograms will be a good solution, adding information.



Example: Sulfuric acid



5.2 Repackaging

To ensure storage in good conditions while awaiting a treatment solution, many products must be repackaged.

Repackaging must be optimized to allow storage, handling, transport and easy treatment solution. It seems appropriate to choose small containers of about 50-60 litres.

- The container material must be compatible with its chemical content. For details refer to the Annex 8 MSDS, or to the chemicals storages mapping Annex 5
- For liquids, manual transfer between two containers should be avoided and replaced by the use of transfer pump compatible with the chemical, or drained by gravity through suitable piping. For flammable liquids, earthing of the system is imperative.
- The operations must be done in well-ventilated space.

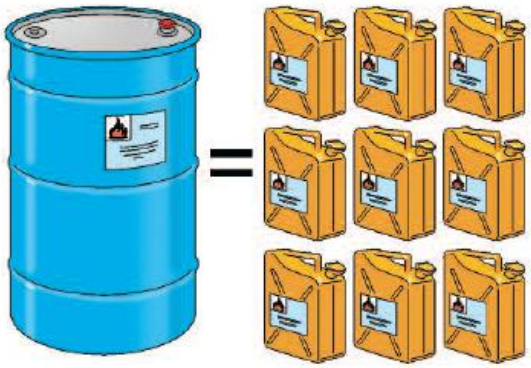
In the case of flammable products, the packaging must be earthed.

- Suitable PPE should be worn (suit, filter mask, gloves, boots).



Type 3 PPE, with a broad-spectrum cartridge mask (A2, B2, E2, K2, P3), is sufficient for all operations, except for ammonia and nitric acid, which requires PPE type 1 (gas tight).

- Secondary containers must be labelled after filling with the same labels as initially.



The attached table and MSDSs provide guidance for proper storage.

Cost is estimated between USD 0,5 and 1 million for purchasing containers, PPE, etc.

A proper quick formation of Nairit Chemical Plant workers could be sufficient to launch this.

5.3 Temporary storage

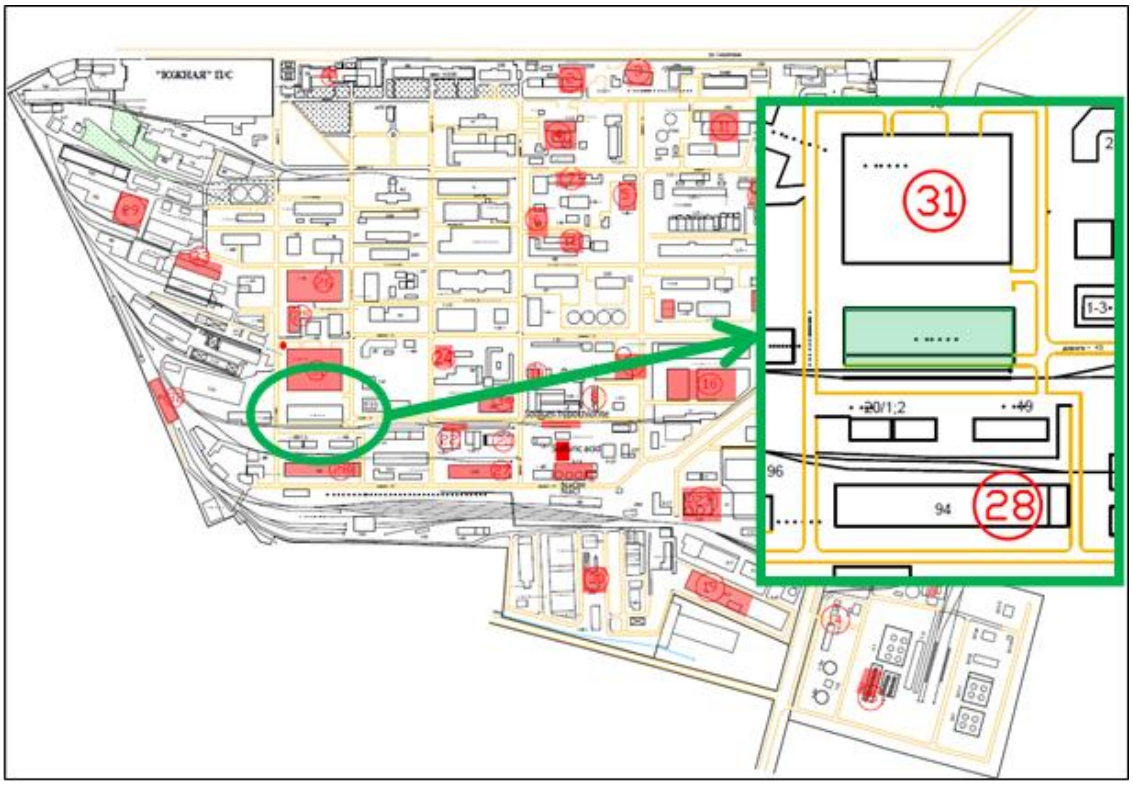
5.3.1 Packaging below 1'000 kg

In order to rapidly reduce the risk of incidents, a reorganisation of the storages is needed, considering the compatibility of chemicals, type of containers, needs of specific conditions, etc. The very first indication will be to concentrate the chemicals (in movable containers) in one or two storages rather than more than 30.

The specification for the storage can be summarised as:

- Strong building with proper doors and no accessible windows, about 4,000 m^2
- Natural ventilation
- Distance from the limits of the site
- Building accessible from 3 sides
- Easy to ensure security
- Storage by categories and compatibilities (Acid – Caustic – Oxidant – Flammable – etc.)
- Only one level
- Liquids stored in retention pools with adequate absorbent stored beside
- Dry sand and ABC extinguisher adequately positioned.

A building has been identified within the premises of the plant: the P3 on the main plant map nomenclature.



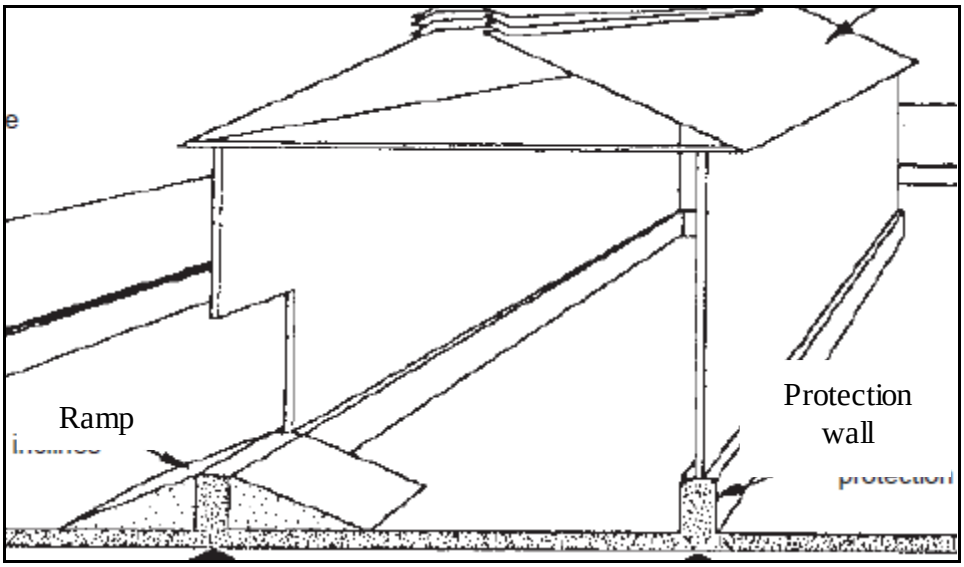
Map 2: Location of the suitable building P3

Picture 28 : Building P3, exisiting ventillation

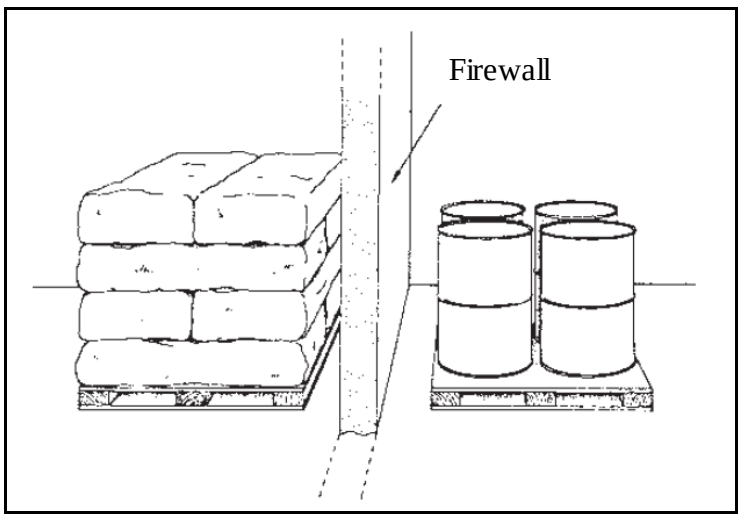
Picture 29 : Building P3, loading zone

In terms of construction, the building should be prepared following these recommendations:

- Side protective wall
- Access ramps when needed;



- Fire resistant separation walls;



- Observe the fire safety recommendations detailed in paragraph 4 (ventilation, absorbent, fire extinguishers, etc.)
- Have a safety shower or equivalent device to treat a contamination accident (Dipotérine ® sprayer)

As previously mentioned, all flammable liquid transfesr must be secured with proper earthing, regardless of the size of the containers. Therefore, the earthing connection must be prepared adequately.

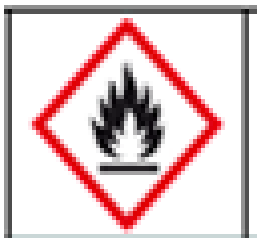
A rapid cost estimate of the rehabilitation of the building, ensuring waterproofing, closing, compartment for different types of chemicals, etc., equates in around USD 100,000.

Work for an approximate amount of USD 100,000 would make the building suitable for temporary storage of chemicals while awaiting evacuation site.

5.3.2 Temporary storage organization

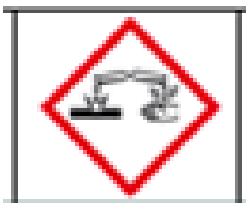
Five different types of compartment must be created:

- Flammable products



- Oxidizers

- Corrosive products by physically separating the acids and bases



- Products harmful to health and environment

The table below shows the intercompatibilities of these different classes of products.

Some chemicals may not fit into this categorization. It should refer to the MSDS and table in Annex 3 to verify the absence of incompatibility.

- It is recommended to store the products at ground level and avoid overlaps.
- Retentions are necessary under liquid storage.

General table of compatibility

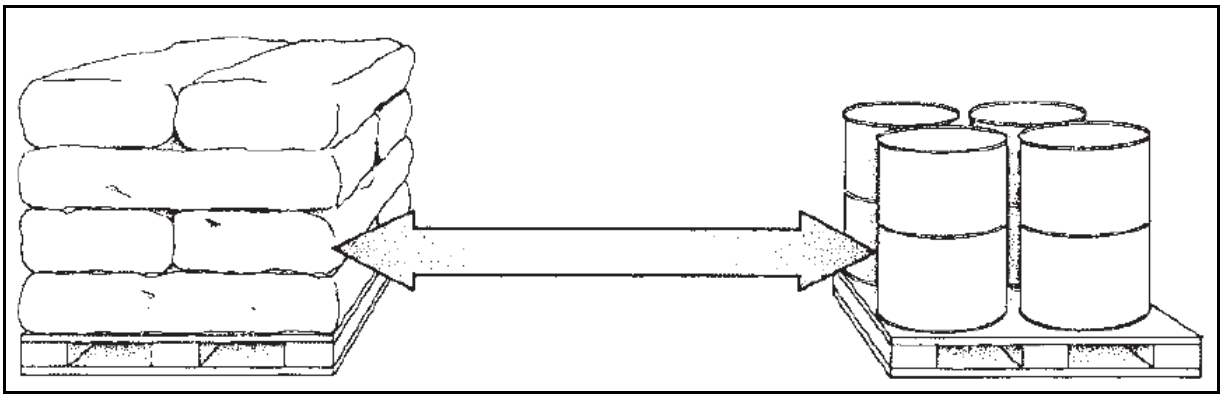
	0							+	
		+						+	
			+	0					
			0	+	0				
				0	0	0	0	0	0
					0	+	+	+	+
					0	+	+	+	+
	+	+			0	+	+	+	+
					0	+	+	+	+

+ Products can be stored together

0 Products can be stored together only if certain conditions are applied,

■ Product can't be stored together

Sufficient spaces must exist between different products to allow their manipulation. All identical products are stored together.



5.3.3 Storage over 1000 kg

The quantities involved forbid repackaging of products. A case-by-case study should be conducted to verify safety conditions, in terms of corrosion, quality of the chemicals (possible degradation or polymerisation, etc.).

In the case of the lacquer-ethynol solidified inside tanks, the material must be sampled with care to determine its flammability and hardness in order to determine the methodology to implement to empty the tanks. One of the possible techniques could be a water high pressure cutter.

These storages must be earthed if it is not already done.

Retention must be effective under different storage conditions.

The most hazardous chemicals, in terms of possible incident, such as ammonia or lacquer ethynol, should be evacuated as early as possible.

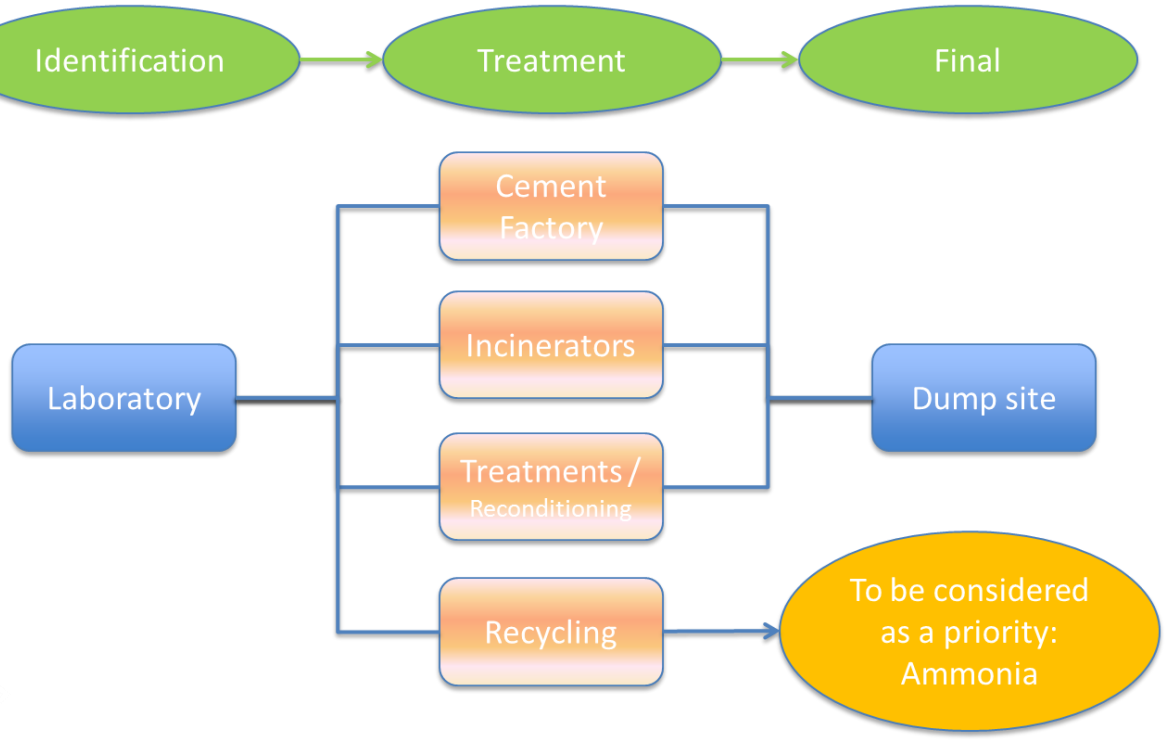
Products stored in wagons (sulfuric acid and sodium hypochlorite), which do not have retention, should also be evacuated quickly.

5.4 Chemicals and waste management

During the process of labelling and properly identifying the chemicals, large-scale market research must be conducted in order to identify potential buyers for some of the products or companies able to recycle or retreat them, with a focus on the national as well as international market.

The general table given in Annex 3 proposes a selection of products which should find clients.

Summarized diagramme of the overall process:



Some of the chemicals have a calorific value which should show some interest for cement factory but potentially also for thermal plants.

In less favourable cases, chemicals will have to be incinerated in specific installations, corresponding with the best practice in terms of air and waste emission.

Finally, in the worst case, chemicals will be considered as hazardous waste and will have to be prepared in order to be dumped in a specifically well-prepared dumpsite.

As the most problematic loss of confinement is the one of the more mobile products, it is recommended to follow a logical way and handle them in this order:

- Gas (Chlorine, Ammonia)
- Liquids
- Pulverulent solids
- Solids

5.5 Other recommendations

Visible chemicals are of course only one part of the threat posed by Nairit Chemical Plant. After decades of operations, different type of incidents, changes of ownership, management and finally bankruptcy, the environmental impact and difficulties of proper decommissioning and dismantling cannot be neglected. In order to address these issues, the mission recommends:

- Commissioning a study to conduct a thorough assessment of legacy environmental issues of the plant in order to remedy them and allow for environmentally sustainable decommissioning.
- Implementing an environmental clean-up.
- Implementing a communication campaign on this sensitive issue, in order to publicise information, arguments and justifications behind its decision.
- To operate in respect with the international best practices regarding the HSE measures to protect workers and the surrounding population.

The hazardous waste / chemical management is a serious issue at the country level. In-depth reflection must be conducted in order to develop a national strategy, and subsequently a masterplan on hazardous waste management, including:

- Industrial waste produced now
- Industrial waste heritage from the past
- Obsolete pesticides and fertilisers
- Domestic hazardous waste ending in the domestic dumpsite
- Hospital and medical waste
- It is strongly recommended to broaden the vision in order to integrate at least a country wide view if not a regional one.
- A Nairit Chemical Plant specific solution might be out of reach in terms of costs and might not find a political justification

- In this sense, it might be useful to link the Nairit case with running projects such as the elimination of obsolete pesticides (POP).
- In the same way, other projects linked with PCBs forth-coming and might be associated with this.

6. Conclusion

The time allocated to the Nairit Chemical Plant's assessment has not been enough to conduct detailed and exhaustive revision of each and every corner. The mission focused on the chemical risks and believes to have seen the major storages across the site.

If the hazards are present, the risk of a major catastrophe, impacting the neighbouring population, is limited but real nonetheless. This calls for immediate mitigations.

The proposed measures can be implemented immediately and will significantly reduce the risk of an incident.

The solutions for eradicating the chemical risk in Nairit Plant must be studied carefully, considering a sustainable business model and including a country wide approach at minimum.

Advancing on the above recommendations will require strong political and financial engagement, where it is recommended that the process be started as soon as possible.

Annexes

Annex 1.	Request for assistance and mission TOR
Annex 2.	Team composition
Annex 3.	Chemical inventory details and characteristics
Annex 4.	Last existing processes
Annex 5.	Chemicals location mapping
Annex 6.	MSDS
Annex 7	Presentation delivered on September 22, 2017

ANNEX 1

Request for assistance and mission Terms of Reference

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«31» 08 2017 թ. № 1/17.4/9633-17

ՄԱԿ-Ի ՄՇՏԱԿԱՆ ՀԱՄԱԿԱՐԳՈՂ ԵՎ
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Հարգելի պարոն Բուզետտո

Ձեզ եմ ներկայացնում Նաիրիտ գործարանում քիմիական նյութերի և միացությունների կուտակման արդյունքում ստեղծված իրավիճակի գնահատման և հետագա քայլերի պլանավորման համար տեխնիկական և փորձագիտական աջակցություն հայցելու վերաբերյալ գրությունը:

Առդիր՝ 1 թերթ:

Հարգանքով՝ ԴԱՎԻԹ ՏՈՆՈՅԱՆ

Կատարող՝ ՀՀ ԱԻՆ ՓԾ ԲՊԱՀՎԿՎ
փ/ծ մայոր Գուրգեն Մարտիրոսյան
Հեռ.՝ 31-77-73/ 11-73

Request for assistance

Herein I express my concern over the emergency in "Nairit factory", which is an object representing high risk for technological disaster, expecting your support in conducting professional examinations for reducing the risks related to the hazardous chemical materials stored and accumulated since the soviet times.

A striking evidence of that was the fire incident occurred on August 28, initiated after self-ignition of lacquer ethylene, resulting to 300sq.meters of burned volume and spread of the byproduct of the chemical combustion towards Yerevan city. The fire was extinguished by the great efforts of the rescue forces of the Ministry of Emergency Situations, avoiding a massive chemical disaster. This accident became just another impulse proper examination of the given issue.

The Nairit Factory is an artificial rubber producer in Yerevan, founded in the Soviet Union in 1939. In 1989, the factory was closed for environmental considerations. During operation Nairit Plant CJSC has accumulated about 150 types of chemicals that are kept in different places and conditions. The most dangerous of them are lac ethinol 1273,128 tones, blend of monocarboxylic acids 95-97% 310 m^3, liquid chlorine 99,9% 1,600 tones, chlororganic waste 100,89 tones, dichlorides (1-4; 3-4 DBB) 21 tones, Tolulol (absorbent) 11% DUA 142,756 tones, stabilizer (tollol + pirocatechin + water) 4 tones.

In the lights of the above mentioned I request assistance of UN OCHA for conducting the relevant assessment and draw the recommendations on chemical substances risk prevention and mitigation solutions.

UN Environment / OCHA Joint Unit

Terms of Reference
Advisory mission, Armenia
Assessment of chemical risk and mitigation measures in relation to the fire at Nairit chemical plant

Background

The Nairit factory is an artificial rubber producer in Yerevan, founded in the Soviet Union in 1939. In 1989, the factory was closed for environmental considerations. During its operations Nairit Plant CJSC has accumulated about 150 types of chemicals that are kept in different places and conditions (see official request letter for more details).

On August 28, a layer of lacquer ethylene self-ignited, resulting in about 300 sq. metres of burned waste and spread of chemical fumes towards Yerevan city. The fire was extinguished by the rescue forces of the Ministry of Emergency Situations (MoES) which avoided a massive chemical disaster.

There is now an urgent need to conduct a detailed assessment of the situation at the Nairit plant, looking both at the baseline situation at the plant which led to the event, but also evaluating the risk posed by remaining chemical substances, and develop proposals for appropriate mitigation measures.

Following the official request from the Government of Armenia to the United Nations office in Armenia on 1 September, the UN Environment / Office for the Coordination of Humanitarian Affairs (OCHA) Joint Unit (JEU) is looking for **chemical emergency experts** to support an advisory mission in response to the chemical accident at the Nairit plant.

Responsibilities

The overall objective of the advisory mission is to review the situation which led to the emergency at the Nairit plant and assess the impacts of the emergency, and additionally to identify and evaluate the current risk posed by the Nairit plant and to develop recommendations for the prevention and mitigation of chemical risk.

The mission will be conducted in close collaboration with the MoES of Armenia, the OCHA Regional Office for Central Asia and the Caucaus and the United Nations Development Programme in Armenia, as well as with other actors and experts with knowledge in the area of chemical risk assessment and mitigation. The involvement of international and national public health actors will also be considered.

The overall responsibilities of the mission will be to, in collaboration with national actors:

- Review the overall context which led to the fire at the Nairit plant
- Support the national authorities in evaluating the impacts to human health and environment from the incident (sampling was conducted immediately after the incident and analysis results should be consulted as part of the mission)

- Identify remaining chemical hazards located at the Nairit plant, and conduct a rapid risk assessment of associated risks
- Identify and prioritize areas for mitigation of chemical risk at the Nairit plant, with focus on the remaining chemicals and associated risk factors
- Advice on possible need for further sampling and analysis, to be be conducted by national counterparts,
- Support relevant actors in the first steps to implement concrete risk mitigation measures, and the linking of these into the overall response and governance structures of the country
- Identify any outstanding expertise or equipment needs to address any immediate risks and impacts to humans and the environment
- Advise the UN on key issues and possible support required from the international community
- Communicate rapidly and regularly all findings of the analysis to national authorities, as well as UN in country and the JEU, emphasizing the possible need for additional specialized expertise and/or additional equipment as required;
- Identify, where applicable, pre-existing contributing environmental factors contributing to the water pollution (e.g. chemical pollution/composition, aquatic diseases, deforestation, lack of prevention and preparedness);

Note: Contact with media, including interviews, will only be undertaken with consent of the UN Resident Coordinator.

The mission is expected to deploy as soon as possible and stay in Yerevan for 2-3 weeks.

Education and work experience

- Solid background in chemical emergency / industrial accident preparedness and response
- University degree in natural sciences, engineering, applied sciences or similar
- Experience in conducting chemical risk assessments at industrial facilities
- Experience in developing chemical emergency preparedness plans and mitigation measures
- Ability to distinguish immediate response actions from medium to long-term mitigation, rehabilitation and reconstruction activities;
- Familiarity with chemical emergency rapid sampling & assessment methodologies, knowledge of the Flash Environmental Assessment Tool
- Ability to coordinate with international and local agencies involved in disaster response;
- Ability to rapidly assess basic needs and local capacities;
- High motivation, coupled with an ability to improvise effectively in rapidly changing situations with minimal guidance and support;
- Team skills required for working in a multi-disciplinary, multi-national team in field conditions of hardship with an ability to assume authority as and when needed;
- Availability for short-notice mobilization (within 6 to 48 hours) and must be able to stay in the field for up to 3 weeks;
- Availability for additional follow-up, collaboration and editing of mission report after the official mission deadline, if required
- Knowledge of MS Windows and MS Office and ability to operate standard IT and communications equipment
- Knowledge of Russian is preferred, but not mandatory

ANNEX 2

Team composition

- **Laurent Nicole**, Switzerland, Chemical engineer EPF-SIA, Health and Safety Engineer CFST,deployed through the Swiss Agency for Development and Cooperation (SDC);
- **Melviana Heden**, Sweden, Environmental specialist, deployed through the (European) Union Civil Protection Mechanism (UCPM), with support of the Swedish Civil Contingencies Agency (MSB);
- **William Cruz-Morey**, France, Regional advisor on chemical risks, Head of the French Emergency Centre SDIS78, specialist of industrial chemical risks, deployed through the European Union Civil Protection Mechanism (UCPM);

ANNEX 3

Chemicals inventory details and characteristics

Chemical inventory details

N°	Ծածկագիր (Nairit Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր Unit	Քանակ weight / vol										Incompatibility Materials	Condition to Avoid
1	2600502280	4-Մեթիլ-2.6դի-տրետ-բուտիլֆենոլ	128-37-0	4-méthyl-2,6-di-tert-butylphénol		S	Kg	140.0										Acid chlorides, Acid anhydrides, Oxidizing agents, Bases, Brass, Copper	-
2	2600110200	Ալդոլ-ալնաֆտ		Aldol-alnaf			Kg	50.0											
3	2600102501	Ալյումինի սուլֆատ	10043-01-3	Aluminum sulphate		S	Kg	2,000.00										Incompatible with strong bases and oxidizing agents., Ammonia, Water, Amines. Avoid: Air Exposure to moisture	Air Exposure to moisture
4	2600106900	Մաքուր ամոնիումի քլորիդ	12125-02-9	Pure ammonium chloride			Kg	5.0										Strong acids, Strong bases, Strong oxidizing agents, Strong reducing agents	Exposure to moisture may affect product quality
5	2600111300	Ֆտալովային անհիդրիդ	85-44-9	Phtalic anhydrid		S	Kg	1,000.00										Strong acids, Strong bases, Strong oxidizing agents, Strong reducing agents	Avoid moisture
6	2600110300	Անիլին	62-53-3	Aniline		L	Kg	25.0										Oxidizing agents, Iron and iron salts., Zinc	Heat, flames and sparks
7	2600114500	Անիոնիտ		Anionite		S	Kg	2,763.00			NH	NH	NH	NH	NH	NH	NH		
8	2600102920	Հակաօքսիդանտ	732-26-3	Antioxydant			Kg	0.8										Bases, Acid chlorides, Acid anhydrides, Oxidizing agents, Brass, Copper	-
9	2600118700	Հակաօքսիդանտ 22-Մ-46	119-47-1	Antioxydant 22-M.46			Kg	4,500.00										Strong oxidizing agents	-
10	2602500102	Ացետոն	67-64-1	Acetone		L	l	15.0										Bases, Oxidizing agents, Reducing agents, Acetone reacts violently with phosphorous oxychloride.	Heat, flames and sparks.
11	2600200500	Ազոտական թթու (50-55%)	7697-37-2	Nitric acid	50-55%	L	Kg	5,168.00										Acids, Reducing agents, Alcohols, Acetic anhydride, Acrylonitrile, Acetonitrile, Organic materials, Alkali	
12	2600107200	Ամոնիակ	7664-41-7	Ammonia	100%	G	Kg	53,368.00										Most common metals are not affected by dry ammonia. However, when combined with water vapour, ammonia will attack copper, zinc, or alloys containing copper as a major alloying element. Therefore, these materials should not be used in contact with ammonia	Heating of cylinders, as the increase in pressure bears a direct relationship to increase in temperature. When the gas is exposed to temperatures in the range 449°C at 101,325kPa, dissociation will occur, with the release of nitrogen and hydrogen. The hydrogen could then form explosive gas/air mixtures. Never use cylinders as rollers or supports, or for any other purpose than the storage of ammonia.
13	2300400100	Աղաթթու[a] 28-29 %	7647-01-0	Hydrochloric acide	29-29%		Kg	40,000.00										Bases, Amines, Alkali metals, Metals, permanganates, e.g. potassium permanganate, Fluorine, metal acetylides, hexalithium disilicide	
14	2600113110	Նատրիումի բիքրոմատ	10588-01-9	Sodium dichromate		S	Kg	1,850.00										Reducing agents; Organic materials, Readily oxidizible materials	Heat, flames and sparks. Moisture.
15	2600201200	Բորաթթու	10043-35-3	Boric acid		S	Kg	43.0										Moisture sensitive.	Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
16	2600100400	Ցելիոզոլ բութիլ	111-76-2	Butylcellosolve		L	Kg	6,580.00										Strong oxidizing agents	Heat, flames and sparks.
17	2600109800	Տեխնիկական բորակ	1332-07-6	Technical borate			Kg	9.8										Strong oxidizing agents, Strong reducing agents	-
18	2600100800	Հեքսամետիդիամին	124-09-4	Hexamethylenediamine		L	Kg	176.0										acids, Acid chlorides, Acid anhydrides, Strong oxidizing agents, Carbon dioxide (CO2)	-
19	2600500600	Հեքսացիանֆերտիկալ		Hexacianfertical		S	Kg	3,175.00											
20	2600100700	Հիդրոքինոն	123-31-9	Hydroquinone			Kg	2,015.00										Strong bases, Strong oxidizing agents	Air Light.
21	1203700200	Հիպերիզ	80-15-9	Cumene hydroperoxide		L	Kg	40.0										Powdered metals, Organic materials, Heavy metal salts, metal salts, Combustible material, Acids, Alkalis,	-
22	2600100900	Դիբուտիլֆտալատ	84-74-2	Dibutyl phtalate		L	Kg	60.0										Strong oxidizing agents, Nitrates, Bases, acids, Chlorine	-
23	2600101400	Դիէթանոլամին	111-42-2	Diethanolamine		L	Kg	5,488.00										Oxidizing agents, Copper, Zinc, Iron	-
24	2600104200	Դիիզոբուտիլեն	25167-70-8	Diisobutylene		L	Kg	94.0										Strong oxidizing agents	Heat, flames and sparks. Extremes of temperature and direct sunlight.
25	2600106600	Դիքլորէթան	107-06-2	Dichloroethane		L	Kg	789.5										Strong oxidizing agents	Heat, flames and sparks. Extremes of temperature and direct sunlight.
26	2601100100	Դիսպերգատոր ՆՖԿ		Disperator NFK		L	Kg	808.0											
27	2600101500	Դիտալակ		Ditalak			Kg	470.0											
28	2600104600	Դիտրետ-բուտիլհիդրոխինոն	88-58-4	Di-te-butylhydroquinone		S	Kg	802.0										Strong oxidizing agents, Strong bases	-
29	2600101300	Դիֆենիլգուանդին	102-06-7	Diphenyl guanidine		S	Kg	240.9										Strong oxidizing agents	-
30	2600106500	Դոդեցիլմերկապտան	112-55-0	Dodecyl mercaptan		S	Kg	2,363.00										Strong oxidizing agents	-

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31	2600106510	Դոդեցիլմերկապտան տեխնիկական	25103-58-6	Dodecyl mercaptan technical		S	Kg	120,482.00										Strong oxidizing agents	-
32	2600108600	Դուսակտոքս	793-24-8	Dusantox		S	Kg	125.0										Reacts with strong acids and oxidizing agents. No further relevant information available.	Store in a cool location. Protect from humidity and water. Avoid storage near extreme heat, ignition sources or open flame.
33	2600104300	Դրեզինատեկս	61790-51-0	Dresinate x		S	Kg	829.0											
34	2600106110	Էթիլեն թիոմիզանյութ	96-45-7	Ethylene thiourea			Kg	0.8										No further relevant information available	Do not store together with oxidizing and acidic materials. Keep away from heat and direct sunlight.
35	1401700100	Էպոկսիդի խեժ	mix	Epoxide resin			Kg	0.5										Strong oxidizing agents	Store in dry well ventilated areas.. Caustic soda can induce vigorous polymerization at temperatures around 200ºC
36	2600107501	Էթիլացետատ	141-78-6	Ethyl acetate		L	Kg	193.0										Containers which are opened must be carefully resealed and kept upright to prevent leakage	Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
37	2600106100	Էթիլենդիմետակրիլ գլիկոլ	97-90-5	Ethylene dimetacryl glycol		L	Kg	4,629.00										Strong acids, Strong oxidizing agents, Strong bases, Reducing agents, Amines, Heavy metals, Peroxides, Free radical initiators	May polymerize on exposure to light. Exposure to light.
38	2600112400	Էթիլենգլիկոլ	107-21-1	Ehtylene glycol			Kg	14.0										Strong acids, Strong oxidizing agents, Strong bases, Aldehydes, Aluminum	-
39	2600107100	Լաք-էթինոլ		Lacquer-ethynol		L	Kg	57,000.00											
40	2601400610	Նատրիումի լաուրիլսուլֆատ 70%	151-21-3	Sodium lauryl sulphate	70%		Kg	7,101.40										Oxidizing agents	Heat, flames and sparks.
41	2600104800	Լոմար PW	9084-06-04	Lomar PW		S	Kg	46,599.00	NH	NH	NH	NH	NH	NH	NH	NH	NH	Reactive with oxidizing agents.	Excess heat, incompatible materials
42	2600501600	Լովինոքս	128-37-0	Lovenox			Kg	50.0										acids, mineral acids, oxidizing agents, peroxides, water reactive substances, Friedel-Crafts catalysts	Avoid humidity
43	2600112500	Քլորոֆորմ	67-66-3	Chloroform			Kg	6.5										Protected from light. Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorised persons.	-
44	2600111000	Քլորպարաֆին	63449-39-8	Chlorinated paraffin grades CP 470		S	Kg	13,431.00										Strong acids, strong oxidants, alkali metals.	high temperature.
45	2600200804	Ծծմբական թթու 96%-ոց	7664-93-9	Sulfuric acid	96%	L	Kg	37,867.00										Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metal	-
46	1010005501	Ծծմբական թթու 78 %-ոց (օգտագործված)	7664-93-9 + add	Sulfuric acid	78% used		Kg	29,335.00										Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metal	-
47	1010005502	Ծծմբական թթու 84%-ոց (օգտագործված)	7664-93-11 + add	Sulfuric acid	84% used		Kg	10,400.00										Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metal	-
48	2602200200	Կոագուլյանտ Կ		Coagulant K			Kg	2.0											
49	2600500300	Երկաթի կալիում	13746-66-2	Potassium ferricyanide (red prussiate of potass)		S	Kg	4,339.00										Prevent formation of aerosols.	Keep receptacle tightly sealed
50	2600500200	Կալիումի քլորիդ	7447-40-7	Potassium chloride		S	Kg	985.0	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong acids, Strong oxidizing agents	-
51	2301600100	Կալցիումի քլորիդ լուծույթ (31-33%)	10043-52-4	Calcium chloride	31-33% solution		Kg	20,432.00										Strong oxidizing agents	
52	2600800400	Բևեկնախեժ դիսպրոպորցիոննիյ	8052-10-6	Resin disproportional		S	Kg	58,994.00										?	
53	2600800200	Բևեկնախեժ սոճու	8050-09-7	Pine resin		S	Kg	6,673.70										Strong oxidizing agents	
54	2600800100	Բևեկնախեժ		Resin		S	Kg	12,705.00											
55	2600400210	Կաուչուկ ՍԿԴ	MSDS witout CAS	Rubber SKD			Kg	120.0	NH	NH	NH	NH	NH	NH	NH	NH	NH	Concentrated acids, oxidizers, and organic solvents	Warming, direct sunlight over a long period of time, open fire.
56	2600401700	Կաուչուկ SMR-20	MSDS witout CAS	Rubber SMR-20			Kg	29.0	NH	NH	NH	NH	NH	NH	NH	NH	NH	-	Exposure to heat or fire
57	2600111700	Կապտաքս	149-30-4	Captax (2-Mercaptobenzothiazole)		S	Kg	20,836.00										Oxidizing agents	-

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58	2601300100	Կատիոնիտ ԿՈւ-2-8		Cationite CU 2-8			Kg	28,720.00											
59	2600107600	Կալցիումի կարբիդ	75-20-7	Calcium carbide		S	Kg	5.0										Never allow product to get in contact with water during storage.	Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
60	2600201100	Քացախաթթու 100%	64-19-7	Acetic acid	100%	L	Kg	16,665.00										Incompatible materials : Oxidizing agents, Soluble carbonates and phosphates, Hydroxides, Metals, Peroxides, permanganates, e.g. potassium permanganate, Amines, Alcohols, Nitric acid	Heat, flames and sparks.
61	2602200100	Կոագուլյանտ Ա	9003-05-8	Coagulant A		S	Kg	6,722.90	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong oxidizing agents	-
62	2602200101	Կոագուլյանտ ՄՌ-473Ի/Կ/		Coagulant MR-473 I/K		S	Kg	4,500.00											
63	1401900400	Կրոնժելտիյ	7758-97-6	Lead(II) chromate PbCrO4		S	Kg	45.0										Organic materials, Powdered metals	-
64	1700301700	Յուղ ՊՄՍ-200	9006-65-9	Oil PMS-200		L	Kg	1,556.00										Strong oxidants. Strong oxidation agent, strong bases	
65	2600102100	Երկու գլեկսինային մանգան		Two glexine manganese			Kg	2,799.00											
66	2600112300	Մարֆոլին	110-91-8	Morpholine		L	Kg	700.0										Strong oxidizing agents	Heat, flames and sparks.
67	2600102200	Պղինձի քլորիդ	7758-89-6	Copper chloride		S	Kg	452.8										Oxidizing agents, Alkali metals	Air Avoid moisture. Light.
68	2600102000	Պղնձի սուլֆատ (կուպարուս)	7758-99-8	Copper sulphate			Kg	344.2										Powdered metals, Anhydrous copper(II) sulfate, reacts violently with:, hydroxylamine, Magnesium	Exposure to moisture
69	2600106700	Մեթիլ մետակրիլատ	80-62-6	Methyl methacrylate		S	Kg	2,992.92										Oxidizing agents, Peroxides, Amines, Bases, acids, Reducing agents, Halogens	May polymerize on exposure to light. Heat, flames and sparks. Heat Extremes of temperature and direct sunlight. Heat, flames and sparks.
70	2600106800	Մեթիլ պերալիդոն	872-50-4	Methyl pyrrolidone		S	Kg	51,003.00										Strong acids, Strong oxidizing agents, Strong reducing agents	Heat, flames and sparks.
71	1010001900	Մրիթապիոն	7440-44-0	Soot waste			Kg	5.0	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong oxidizing agents	-
72	2600400700	Նաիրիտ ԿԻ-18		Nairite KL-18		S	Kg	2 000.0										All metals	
73	2601400100	Նեֆտորիստի նատրիումի մածուկ	1893-85-9	Netflorist sodium paste			Kg	26.6										Strong oxidizing agents	-
74	2601400400	Նատրիումի տիոսուլֆատ	7772-98-7	Sodium thiosulfate		S	Kg	53,948.00	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong acids, Strong oxidizing agents	-
75	2600105200	Նեոզոն	90-30-2	Neozone			Kg	288.0										Oxidizing agentsStrong oxidizing agents	-
76	2600102300	Նեոզոն Դ (նաֆտամ 2)	135-88-6	Neozone D (naphtam 2)			Kg	920.3										Oxidizing agentsStrong oxidizing agents	-
77	2601400300	Նատրիումի նիտրատ	7631-99-4	Sodium nitrate, $NaNO_3$		S	Kg	16,550.00										Strong acids, Strong reducing agents, Powdered metals, Organic materials, Alkali metals, Alkaline earth metals, Cyanides, thiocyanates	Fusion of mixtures of metal cyanides, including lead thiocyanate, with metal chlorates, perchlorates, nitrates or nitrites causes a violent explosion. Addition of one solid component (even as a residue in small amount) to another molten component is also highly dangerous. Heat
78	2600102400	Նիտրոզ դիֆենիլ ամին	86-30-6	Nitroso-diphenylamine		S	Kg	26,223.00										Strong oxidizing agents	-
79	2600103500	Ուրոտրոպին	100-97-0	Urotropine (Hexamethylenet etramine)		S	Kg	113.8										Strong oxidizing agents	-
80	2600109400	Պարաֆին	8002-74-2 or 64742-43-4	Paraffin			Kg	1,121.70	NH	NH	NH	NH	NH	NH	NH	NH	NH	Reactive with oxidizing agents.	-
81	2601700100	Պարաֆոր	50-00-0 + mix	Formaldehyde, CH_2=O		S	Kg	5,152.00										-	Heat, flames and sparks.
82	2600500400	Կալիումի պերսուլֆատ	7727-21-1	Potassium persulfate		S	Kg	1,308.80										Organic materials, Strong reducing agents, Powdered metals, Strong bases, Alcohols, phosphorous, Anhydrides, Halogens, Acids	Exposure to moisture Heat
83	2600109601	Պոլիէթիլեն	9002-88	Polyethylene			Kg	1,200.00	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong oxidizing agents	-
84	2601600200	Պոլիէթեր 24Կ	69227-21-0	Polyether 24K			Kg	1,000.00	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong oxidizing agents	-
85	2601600100	Պոլիէթեր ՏԳՄ-3 (պրոդուկտ)		Polyether TGM -3 (polyester?)		L	Kg	5,000.00											
86	2601401300	Նատրիումի պոլիֆոսֆատ	50813-16-6	Sodium polyphosphate		S	Kg	19,065.00										Strong oxidizing agents.	Incompatible products, Exposure to moist air or water.
87	9800100300	Սպիտակ մուր	14808-60-7	(White smoot)		L	Kg	1,483.25										Hydrogen fluoride	-
88	9800100301	Սև մուր		Black smoot			Kg	9,560.00											
89	2600114600	Սանտաֆլեքս		Santaflex			Kg	338.0											
90	2600102800	Լուծվող ծծումբ		Instant sulphur			Kg	17.0											
91	2600105400	Արծաթի աղ	131-08-8	Silver salt (sodium anthraquinone)		S	Kg	556.4	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong oxidizing agents	-

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93	2602000200	Խեժ 101Կ	secret	Resin 101K			Kg	830.0										Strong oxidizing agents	Strong acids or bases in bulk and elevated
94	2600200400	Խեժ ինդենկումար		Resin Indenkumar			Kg	1,931.00											
95	2600105300	Նատրիում հիդրոսուլֆիդ	7775-14-6	Sodium hydrosulphite		S	Kg	50.0										Strong oxidizing agents, acids, Water	Do not allow water to enter container because of violent reaction. Avoid moisture. Heat.
96	2600118500	Նատրիում դիբուտիլդիտիոկարբամատ	136-30-1	Sodium dibutyl dithiocarbamate		L	Kg	4,540.00										-	-
97	2600118200	Նատրիում լաուրիլսուլֆատ 30%	151-21-3	Sodium lauryl sulphate			Kg	10.0										Oxidizing agents	Heat, flames and sparks.
98	2600105600	Դիֆենիլամինա	122-39-4	Diphenylamine			Kg	530.0										Reactive with oxidizing agents.	Excess heat, ignition sources, incompatible materials, light, air.
99	2601400700	Նատրիումի սուլֆիտ տեխնիկական	7757-83-7	Sodium sulphite technical		S	Kg	8,748.00		NH	NH	NH	NH	NH	NH	NH	NH	Acids, Strong oxidizing agents	Exposure to air may affect product quality. Exposure to moisture may affect product quality
100	2600105500	Սուպերսոդիդ	10043-52-4	Super ice (Calcium chloride)		S	Kg	136.0										-	Incompatible materials, dust generation, exposure to moist air or water
101	2600300310	Սպիրտ /Էթանոլ/	64-17-5	Ethanol			l	6.0										Alkali metals, Oxidizing agents, Peroxides	Heat, flames and sparks.
102	2600108500	Ստեարին	100-42-5	Stearin		L	Kg	805.5										Oxidizing agents, Copper	Oxidizing agents, Copper
103	2600112200	Ստիրոլ		Stirol		L	Kg	106.0											
104	2600109600	Մոմ	555-43-1	Paraffin		S	Kg	3,784.40										Reactive with oxidizing agents.	Excess heat., incompatible materials
105	2600107100	Տոլուոլ (մաքուր)	108-88-3	Toluene		L	Kg	38,400.00										Strong oxidizing agents	Heat, flames and sparks.
106	2600107100	Տոլուոլ 0,5% ԴՎԱ-ի պարունակությամբ	25013-15-4	Toluene 0,5% divinylacetylene			Kg	23,990.00										Strong oxidizing agents	Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.
107	1207501410	Տալկմոլոտիլ ՏՌՊՎ	14807-96-6	Talc powder TRVP		S	Kg	33,699.50	NH	NH	NH	NH	NH	NH	NH	NH	NH	Oxidizing agents	-
108	2600103400	Թիոդիֆենիլամին (ֆենտիազին)	92-84-2	Thiodiphenylamine		S	Kg	22,850.00										Strong oxidizing agents	-
109	2600109300	Տիուրամ Դ	137-26-8	Tiuram D		S	Kg	2,758.90										Strong oxidizing agents	-
110	2600103300	Տիուրամ Ե	97-77-8	Tiuram E		S	Kg	16,039.91										Strong oxidizing agents	-
111	2600102600	Սուրմայի օքսիդ	1309-64-4	Stibium oxide (antimoine trioxyde)			Kg	350.0										Strong reducing agents, Strong oxidizing agents	-
112	2600116200	Տրետբուտիլպիրոկատեխին	98-29-3	Tert butyl pirocatequina			Kg	1,300.00										Strong oxidizing agents	-
113	2600107000	Տրիէթանոլամին	102-71-6	Triethanolamine		L	Kg	598.9										Acids, Oxidizing agents	-
114	2601400800	Նատրիումի տրիպոլիֆոսֆատ	7558-29-4	Sodium tripolyphosphate			Kg	265.0	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong acids, Strong oxidizing agents	Avoid moisture.
115	2600103700	Ցեոլիտ	1318-02-1	Zeolit		S	Kg	840.0	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong acids, Strong bases, Hydrogen fluoride, Chlorine trifluoride, Ethylene oxide, Halogenated hydrocarbon, Oxygen difluoride, Sodium nitrate, Vinyl compoundsStrong acids, Strong oxidizing agents	Avoid moisture.
116	2600110100	Մանգանի օքսիդ	1313-13-9	Manganese oxide		S	Kg	4,793.90										Strong acids, Strong reducing agents, Organic materials	-
117	2600108400	Ցինկի օքսիդ	1314-13-2	Zinc oxide, ZnO		S	Kg	79.5										Strong oxidizing agents	-
118	2600116800	Օկտոպոլ ՆԲ-47		Octapol NB-47			Kg	1,999.00											
119	1402300100	Օսվերդիտել ՈւՊ 06-3314		Hardener UP 06-3314		L	Kg	236.0											
120	2600106000	Ֆարմալդեհիդ սուլֆակս	149-44-0	Sodium formaldehyde sulfoxylate		S	Kg	2,900.00										Strong oxidizing agents, Acids	-
121	300120400	Աղաջուր	7647-14-5	Sodium chloride solution		L	m^3	5,170.00										Strong oxidizing agents	-
122			1309-48-4	Magnesium oxyide		S													
123				Sodium silicate Na_2SiO_6 ?		S													
124	2600106900	Մաքուր ամոնիումի քլորիդ	12125-02-9	Pure ammonium chloride		S													
125				Quartz sand		S			NH	NH	NH	NH	NH	NH	NH	NH	NH		
126			64-19-7	Acetic acid 30%	30%	L													
127		Աղաջուր-հում (օրգանական խառնուրդով)		NaCl solution (with organic mixture)		L	m^3	300.0											

N°	Ծածկագիր (Nairit Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր Unit	Քանակ weight / vol										Incompatibility Materials	Condition to Avoid
128		Աղաջուր-հետադարձ՝ հիմքի և սոդայի պարունակությամբ		$NaCl$ solution + $NaOH$+ $NaHCO_3$		L	m^3	3 472.0											
129		Աղաջուր-հում (խրոմպիկի պարունակությամբ)		$NaCl$ solution (with bichromates)		L	m^3	2 215.0											
130		Натрий кремнефтористый (КФТ), технически	1310-73-2	Sodium hydroxide			Kg	25 223.0										Strong oxidizing agents, Strong acids, Organic materials	
131		Полиэтиленовый воск	68441-17-8	PE WAX (Amberlite)			Kg	1 200.0	NH	NH	NH	NH	NH	NH	NH	NH	NH		
132		Стеарин		Stearine			Kg	103.0											
133		Воск		Wax			Kg	3 784.0											
134		Лак-этиноль		Lacquer –Ethynol		L	Kg	1 247 000.0											
135		Катализатор смесь монохлорида меди и хлористого аммония		The catalyst is a mixture of copper monochloride and ammonium chloride		S	Kg	121 000.0										Oxidizing agents, Alkali metals	Air Avoid moisture. Light.
136		Хлорорганические отходы производства		Chlororganic waste of products		L	Kg	99 700.0										Strong oxidizing agentsStrong oxidizing agents, Strong bases	Heat, flames and sparks.
137		Сажа (производственный отход)		Carbon black (industrial waste)		S	Kg	30 000.0											
138		Масло ХА-30		Oil XA-30			Kg	385.0											
139				Asbestos		S													
140		Смесь монокарбоновых кислот(уксусной, муравьинной, пропионовой) и смесь жидких отходов.		A mixture of monocarboxylic acids (acetic, formic, propionic) and a mixture of liquid waste.		L	m^3	310.0											
141		Пропионовая кислота (некачественная)	79-09-4	Propionic acid (substandard)			Kg	48 310.0											
142		Диизопропиловый эфир	108-20-3	Isopropyl ether			Kg	4 844.0											
143		Гипохлорид натрия (некондиционный)		Sodium hypochlorite (substandard)			m^3	119.075											
144		Сырой и обратный рассол (NaCl)		Crude reverse brine (NaCl)			m^3	5170.0											
145		Хлор	7782-50-5	Chlorine		G	Kg	600.0											
146		Электрощелочь (NaOH)		Electro Alkali			Kg	392 250.0											
147		Обратный рассол NaCl		Reverse NaCl Brine			m^3	514.0											
148		Щелочно-солевой осадок		Alkaline-salt precipitate			Ton	2 800.0											
149		Раствор уксусной кислоты30% с примесью 2% эмульгатора ломара PW		Acetic acid solution 30% with admixture 2% emulsifier lomar PW		L	Kg	726.0											
150		Раствор стабилизатора:Смесь: Толуол-1932кг, Третбутилпирокатехин-50кг, Фентиазин-50кг, Нитрозодифениламин-60кг, Лаурил сульфат натрия-50кг		Stabilizer solution: Mixture: Toluene-1932kg Tretbutylpyrocatechin-50kg Fentiazine-50kg Nitrosodiphenylamine-60 kg Lauryl Sodium Sulphate-50kg		L	кг	4 000.0											
151		Моноэтаноламин C_2HNO	141-43-5	Ethanolamine		L	кг	375.0											
152		Бентонит	1302-78-9	Bentonite		S	кг	80.0											
153		Трансформаторное масло		Tranformers oil (PCB ?)		L	кг	181 576.0											
154		Масла разные		Different oils		L		8 300.0											
155		Мышьяковистый ангидрид	85586-03-4	Arsenic trioxide															
156		Мышьяковистая кислота	7778-39-4	Arsenic acid															
157		Мышьяк	7440-38-2	Arsenic		S													
158		Ртуть цианистая	592-04-1	Mercury(II) cyanide		S													
159		Калий цианистый	151-50-8	Potassium cyanide		S													
160		Сулема (хлорид ртути)	7487-94-7	Mercury(II) chloride		S													
161		Натрий мышьяковистый	7784-46-5	Sodium arsenite		S													
162			126-99-8	Chloroprene		L													

ANNEX 4

Last existing process

Existing Process Units – Acetylene Route

Summary of Main Process Units (ISBL)

The In Side Battery Limit (ISB) units are listed below:

- **Chlor-Alkali (C-A) Unit:**
- Area 1-1: Solvay process area for CO_2 production
- This area includes lime kilns for CO_2 production that is required to produce sodium bicarbonate, Na_2CO_3. This in turn is required to precipitate out the impurities contained within raw brine prior to its electrolysis. Depending on the production scenario undertaken, it may be more cost effective to simply import sodium carbonate rather than operate these rather old kilns.
- Area 1-4 a, b: Brine Production and Treatment
- This area includes the brine extraction well-sand planned brine solution treatment.
- Area 1-3 a, c: Caustic Soda (NaOH) Production
- This area includes the brine treatment unit, as well as caustic soda production facilities
- Area 1-3 b: Brine Electrolysis
- This area is the heart of the Chlor-Alkali unit; it comprises the diaphragm electrolysis cells which use purified brine to produce both hydrogen and chlorine, as required by the site, leaving behind residual cell liquor, which is re-circulated back to Area 1-3 a, c for caustic soda production
- Area 1-5: Hydrogen Chloride (HCl) production
- This area contains HCl furnaces as well as falling film absorber packages
- Area 1-20: Liquid Chlorine and Sodium Hypochlorite Production
- This area contains the chlorine liquefaction and sodium hypochlorite unit.
- **Acetylene Production Unit (Natural Gas based):**
- Area 1-6: Air Separation Unit, for the production of oxygen, nitrogen, and instrumentation air
- Area 1-7a: Partial Oxidation Unit, for the production of cracking gas, containing a large acetylene fraction. This area also includes a black water treatment plant and a solids incineration unit.

- Area 1-7b: Acetylene Extraction Unit, which uses NMP solution as an extraction medium for acetylene separation from the rest of the cracking gas.
- **Chloroprene (CR) Monomer Unit:**
- Area 1-12a: Production of Mono-Vinyl-Acetylene (MVA) from acetylene. This unit includes
- Acetylene compression and MVA synthesis and absorption into toluene.
- Area 1-12b: Production of Chloroprene from MVA. This unit includes MVA desorption from toluene solvent, MVA hydro-chlorination synthesis section and Chloroprene distillation (involving stabilization with NO)
- Stabilized chloroprene from Area 1-12b is then sent to Area 1-18 (described below) for neutralization before being sent to the PCR rubber unit.
- Area 1-19: Liquid and chlorinated hydrocarbon waste incineration unit. This area is used to incinerate any liquid and chlorinated hydrocarbon waste generated within chloroprene monomer unit based.
- Area 1-18: Although the equipment of this area relates mostly to the monomer production from butadiene, it also includes a nitric oxide preparation unit (from nitric acid), which is then fed to Area-12b (chloroprene distillation), to stabilize chloroprene monomer. Furthermore, the final neutralisation of the chloroprene monomer from acetylene is also carried out here.
- **Poly-Chloroprene Rubber (PCR) Unit:**
- Area 1-21: Recovery of recycled chloroprene. In this area, crude chloroprene monomer incoming from the chloroprene monomer unit (Area 1-18) is mixed with chloroprene recycle stream from chloroprene polymerization and degassing (Area 1-22), is distilled and sent to polymerization reactors within Area 1-22.
- Area 1-22: Chloroprene polymerization and degassing. This area consists of a batch polymerization reaction section and subsequent degassing of the crude PCR latex product.
- Area 1-23: Rubber finishing lines. This area includes two latex drying and extrusion lines, as well as associated PCR rubber packaging lines.

Condition of the Main Process Units – ISBL

Chlor-Alkali Unit

Process Overview

The key function of the chlor-alkali unit is produce HCl, necessary for the hydrochlorination of the mono-vinyl acetylene (MVA), which is the final synthesis step of the chloroprene monomer production from acetylene. The unit by-products are caustic soda, NaOH (part used for internal needs, part exported), hydrogen (utilised for internal fuel needs) and sodium hypochlorite NaOCl (bleach, also exported).

Each area is reviewed in more detail below.

Areas 1-4 a, b: Brine Production and Treatment

This area includes the brine extraction wells, and initial brine solution treatment.

The raw brine, produced from underground leaching wells (Area 1-4 a) located outside Yerevan city.

The existing brine pipeline is now defunct. The new proposed route, due to land ownership issues, currently is supplied for treatment via a 42 km-long pipeline to a raw brine treatment Area (1-4 b).

The brine field was commissioned in 1971 with a design capacity of 45,000 m³ of brine per year, operating with 5 wells.

As of present, the brine field consists of 5 wells, which are linked to CJSC “Nairit Plant” via a single pipeline. The amount of wells in operation can be varied depending on brine consumption rate.

Given that construction works in the Area 1-4 b are currently in progress, brine treatment takes place in Area 1-3 a instead.

Area 1-3 a: Brine Treatment

This area receives brine from the incoming feed pipe to the site, as well as the recycled brine from the caustic production. The brine is purified using a Solvay type process, so that Chlorinated Lime is also produced. As such, Lime furnace area 1-1 is considered part of this process area 1-3a.

Area 1-3b: Brine Electrolysis

After the treatment, purified brine solution, with NaCl concentration of 300-310 g/l is fed to electrolysis cell rooms, located in Chlor-Alkali production Area 1-3b, where diaphragm electrolysis process takes place. Direct current is applied to the electrolysis cells. The main reaction taking place at the anode is the reduction of chloride ions into chlorine gas which can be summarized by the following reaction:

$$2Cl^{-} - 2e^{-} \rightarrow Cl_2$$

The main electrolytic process at the cathode is the dissociation of water molecules and the formation of hydrogen, which can be summarised by following reactions:

$$H_2O + 2e^{-} \rightarrow 2OH^{-} + 2H+$$

$$2H+ + 2e^{-} \rightarrow H_2$$

In the remaining solution, Na+ and Cl^{-} ions form sodium hydroxide:

$$Na+ + OH^{-} \rightarrow NaOH$$

The chlorine gas is then fed through titanium heat exchangers, where it is cooled with circulating water and fed to drying towers. Wet chlorine gas undergoes drying with 98% sulphuric acid to reduce its moisture content to at least 150 ppm. The current unit was first commissioned in 1986.

Area 1-3 c: Caustic Soda Production

Spent cell liquor from the electrolysis cells contains NaOH at a concentration of 110-140 g/l which is pumped into an Evaporation Area (Area 1-3ac), where, at least 44 % caustic soda (NaOH) is formed through a 3-stage evaporation, part of which is used for the operation’s own needs and the remaining part is sold.

Quicklime is produced in a Lime Separation Section by limestone calcining in lime kilns and is used for production of calcium chloride solution and waste water neutralization. Lime surplus is sold to outside consumers. The resultant flue gas by-products are used for the treatment of brine supplied to electrolysis and for production of caustic soda needed for acetylene production from natural gas. Year of commissioning 1936;

Design capacity 50,000 t/year in terms of lime;

Actual capacity 15,800 t/year; (nominal due to idling)

The last large scale revamp of this section took place in 1983.

Part of this equipment needs complete replacement. For the remaining part, some parts and

assemblies should be replaced.

Area 1-20: Liquid Chlorine Production

Dried chlorine gas is compressed and is either used for chlorine liquefaction in the Chlorine Liquefaction Area (1-20) if the plant is operating to produce butadiene rubber, or used for the production of hydrogen chloride and 31% hydrochloric acid, if the plant is producing acetylene rubber.

This latter production mode also uses electrolytic hydrogen with minimum concentration of 98%.

The Chlorine Liquefaction and Chlorine Gas Production section was commissioned in 1980 with a design capacity of 60,000 tonnes per year of liquid chlorine. Chlorine liquefaction is a combined one stage process, which yields liquid chlorine at a pressure of 2.5 kg/cm^2 (2.42 atm) when cooled with brine at -30°C. Hydrogen chloride production is based on the combustion of hydrogen in chlorine gas in specially designed furnaces.

Hydrogen chloride is used as a feed in Area 1-12ab, for MonoVinylAcetylene (MVA) hydrochlorination, which in turn is used for chloroprene production.

Hydrogen Chloride and Synthetic Hydrochloric Acid Section has the following nominal capacity:

- 34,000 ton/year of hydrogen chloride
- 23,000 ton/year of synthetic hydrochloric acid

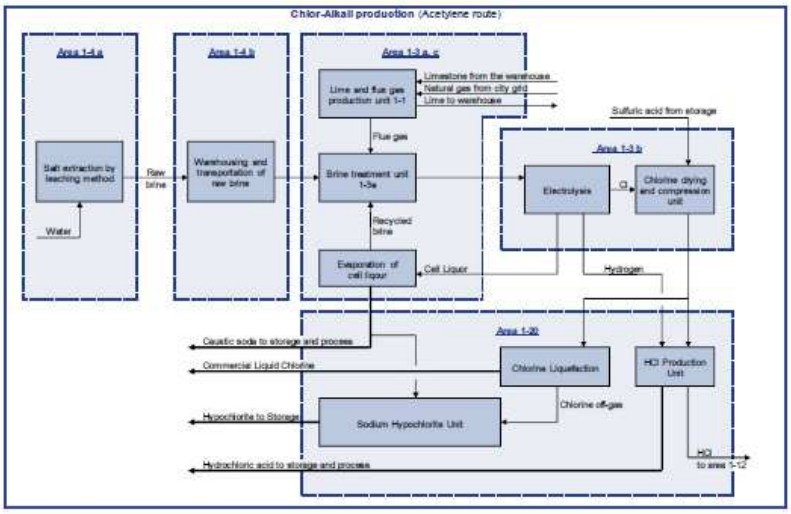
Liquefaction off-gases containing 45-80% of chlorine are either delivered to produce hydrochloric acid or supplied to the off-gases neutralization unit to produce commercial sodium hypochlorite (Area 1-20) according to the following reaction:

$$2NaOH + Cl_2 \rightarrow NaCl + NaOCl + H_2O$$

Block Flow Diagram

Schematic Block Flow diagram of Chlor-Alkali production for acetylene route is shown below.

Figure D- 1: Chlorine Production (Acetylene Route) Block Flow Diagram



Source: Jacobs Consultancy Ltd.

ANNEX 5

Chemicals location mapping

Note:

Number of the chemicals listed and located during the mission will have to be repacked before further temporary storage and treatment.

It is therefore strongly recommended to adopt state of the art procedures such as standard European procedures for decanting.

The same will apply to asbestos containingmaterial which have not been mapped yet.

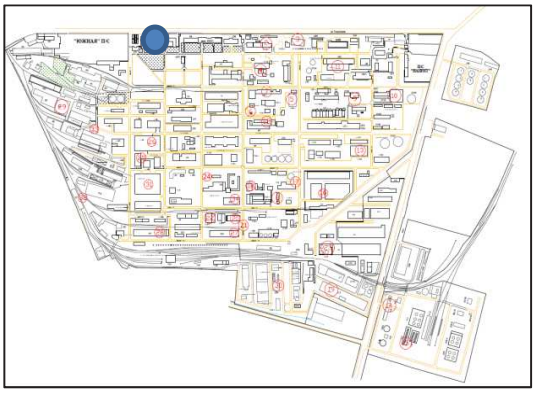

"ЮЖНАЯ" П/С
П/С "НАИРИТ"
ул. Баграмяна
Sodium hypochlorite
Sulfuric acid
NaOH
NaCl
участки хранения остатков химикатов
13.09.2017

Foreword

- A large scale map of the Nairit site is given as separate annex.
- Satellite images are extracted from Google Earth. The North is always on the top of the picture.
- Buildings drawings are not at scale and are approximate, given only for general information.
- A overall table of the chemicals identified on site is given as a separate annex. All the sub-tables given for each storage are extracted from the main table.
- The list of chemical is “as observed on-site” and does not pretend to be exhaustive.
- For all information related to chemicals, refer to the MSDS given as annex. The Presented MSDS are extracted by the mission from different supplier’s websites, not necessarily from the original supplier of the assessed chemical.
- The proposed pictures are directly related to what has been observed in a given storage during the assessment. All chemicals have been photographed in their storage context.
- This compilation does not pretend du be exhaustive and information must be double-checked on the ground.

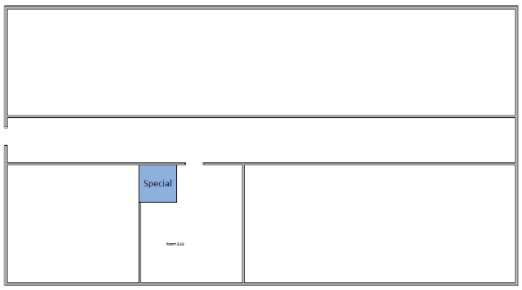
STORAGE 1

General map of Nairit plant



Satellite view

Detailed position within the building



Room 2.13 of the main administrative building

Pictures

The safe box, sealed, containing the chemicals

Security conditions

Small quantities stored in a safe box, in a closed room.

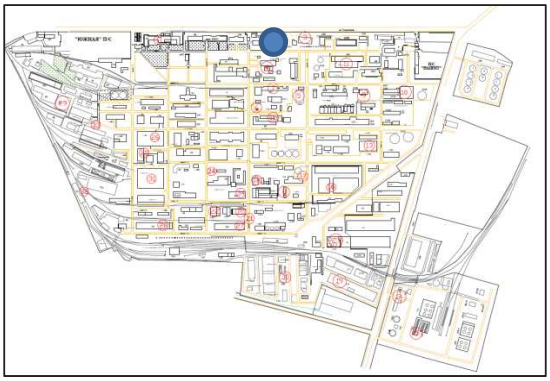
Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
155		Мышьяковистый ангидрид	85586-03-4	Arsenic trioxide															
156		Мышьяковистая кислота	7778-39-4	Arsenic acid															
157		Мышьяк	7440-38-2	Arsenic		S													
158		Ртуть цианистая	592-04-1	Mercury(II) cyanide		S													
159		Калий цианистый	151-50-8	Potassium cyanide		S													
160		Сулема (хлорид ртути)	7487-94-7	Mercury(II) chloride		S													
161		Натрий мышьяковистый	7784-46-5	Sodium arsenite		S													

Comments: The chemicals are stored in small quantities in a sealed safe box and have not been touched for decades

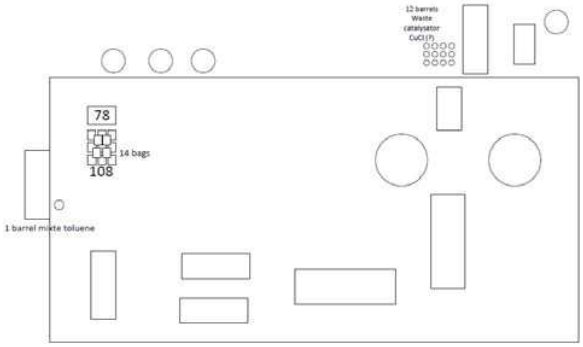
STORAGE 2

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

Tanks showing light signs of corrosion, exposed to weather conditions

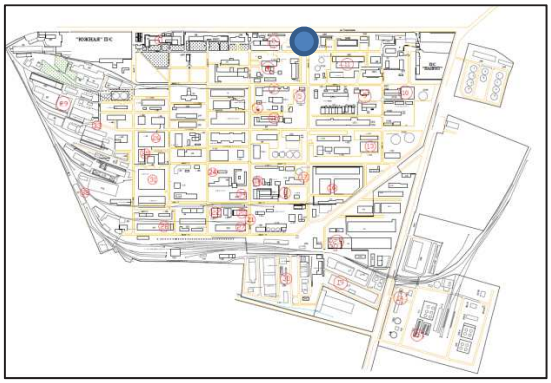
Bags stored without care

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
67	2600102200	Պղինձի քլորիդ	7758-89-6	Copper chloride		S	Kg	452.80										Oxidizing agents, Alkalimetals	Air Avoid moisture. Light.
78	2600102400	Նիտրոզո դիֆենիլ ամին	86-30-6	Nitroso-diphenylamine		S	Kg	26,223.00										Strong oxidizing agents	-
108	2600103400	Թիոդիֆենիլամին (Ֆենոտիազին)	92-84-2	Thiodiphenylamine		S	Kg	22,850.00										Strong oxidizing agents	-

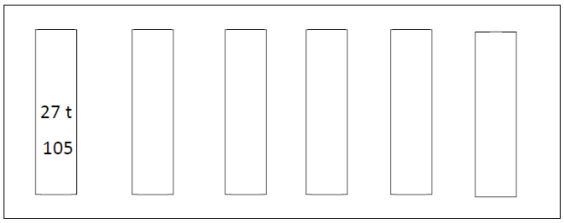
STORAGE 3

General map of Nairit plant



Satellite view

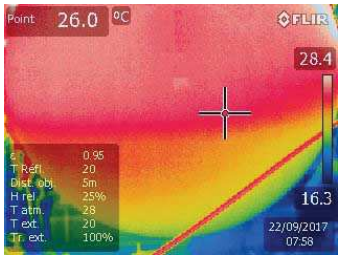
Detailed position within the site



Some remaining of lacquer-ethynol in the other tanks.

Pictures

The white elements are remaining of glass wool



The thermal picture shows that the tank is not empty

Security conditions

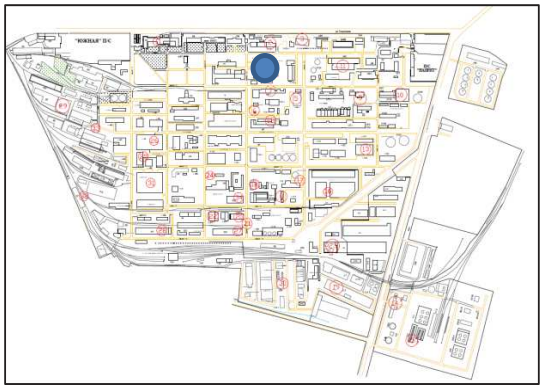
Some tanks have a poor and partial cooling system and damaged insulation if any. The thermal pictures shows that the tank is half full.

Chemical characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
39	2600107100	Լաք-էթիլոլ		Lacquer-ethynol		L	Kg	57,000.000											
105	2600107100	Տոլուոլ (ացետոն)	108-88-3	Toluene		L	Kg	38,400.000										Strong oxidizing agents	Heat, flames and sparks.

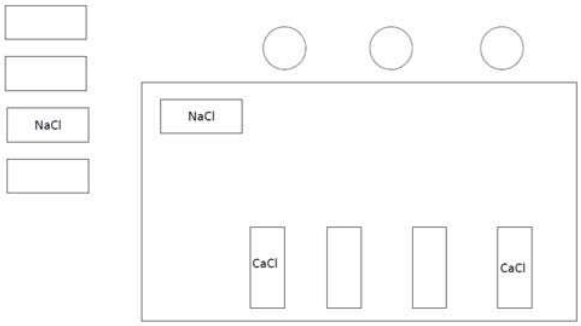
STORAGE 4

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

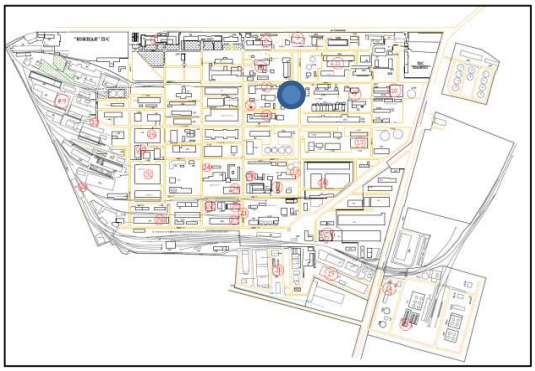
Tank exposed to weather conditions, presenting signs of corrosion

Chemical characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
51	2301600100	Կալցիումի քլորիդ լուծույթ (31-33%)	10043-52-4	Calcium chloride	31-33% solution	L	Kg	20,432.00											Strong oxidizing agents	
127		Աղաջուր-հում (օրգանական խառնուրդով)		NaCl solution (with organic mixture)		L	m^3	300.00											

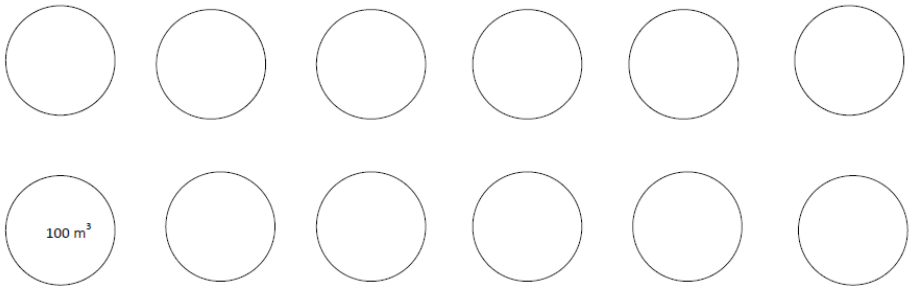
STORAGE 5

General map of Nairit plant



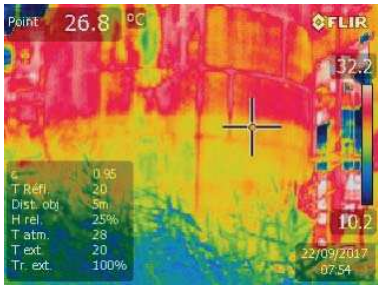
Satellite view

Detailed position within the site



21 t Mixture of Dichlorobenzene

Pictures



Thermal picture showing that at least one tank is half full

Security conditions

Flammable chemical stored in a vertical tank in a retention, corroded with a large vapour volume.

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
136		Хлорорганические отходы		Chlororganic waste of products		L	кг	99700										Strong oxidizing agentsStrong oxidizing agents, Strong bases	Heat, flames and sparks.

Comment: needs an incineration in specific conditions.

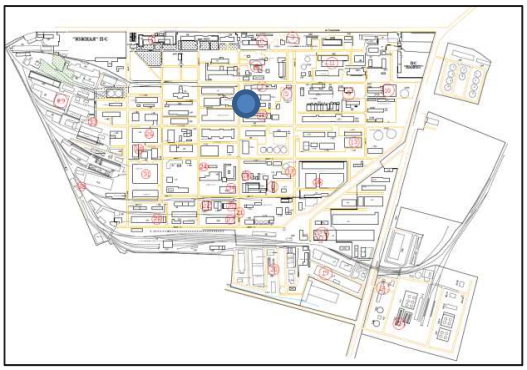
High risk due to the important vapor phasis.

Should be evacuated as priority.

Limited quantity, could be repacked in 200 l barrels awaiting for final evacuation.

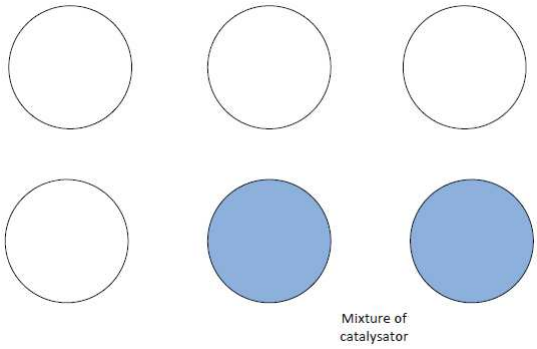
STORAGE 6

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

Exposed to weather conditions, presenting signs of corrosion

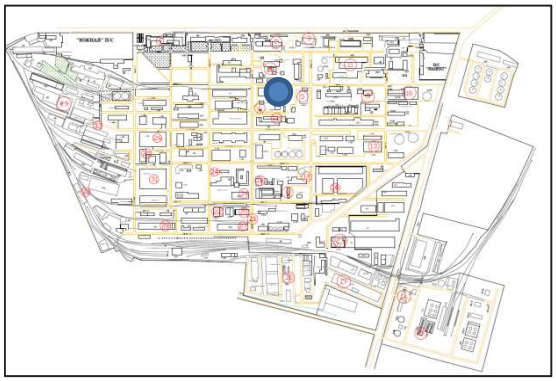
Mixture not clearly identified

Chemicals characteristics table

N°	Ծածկագիր (Nairit Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր Unit	Քանակ weight / vol										Incompatibility Materials	Condition to Avoid
163		Катализатор (5% медный нафтенат в уайтспирите)		Catalysator (5% copper naphtenate in white spirit)		L	Kg	40 000.0												

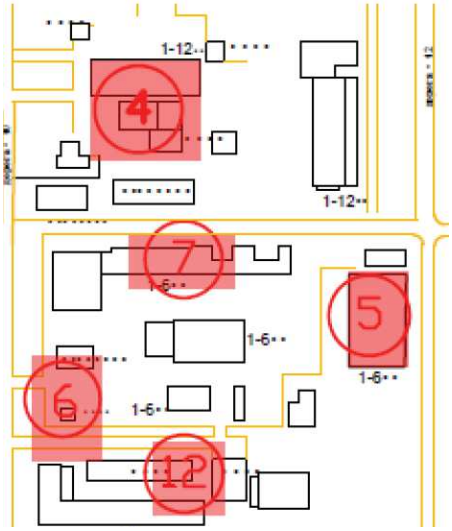
STORAGE 7

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

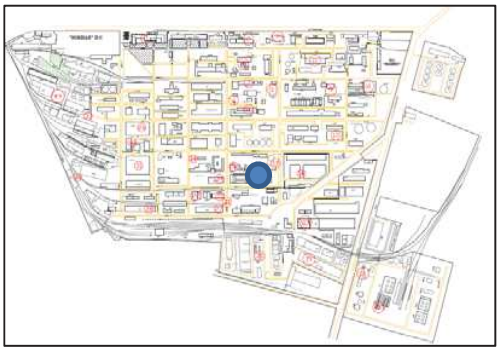
Mission could not confirm if the installation were cleaned or not.

Chemicals characteristics table

N°	Ծածկագիր (Nairit Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր Unit	Քանակ weight / vol										Incompatibility Materials	Condition to Avoid
31	2600106510	Դոդեցիլմերկապտան տեխնիկական	25103-58-6	Dodecyl mercaptan technical		S	Kg	200.0										Strong oxidizing agents	-

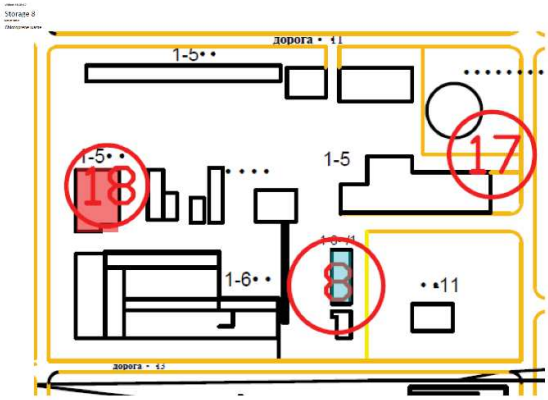
STORAGE 8

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

Old vertical tanks presenting signs of corrosion.

Possible liquid leaks.

Not clearly identified content. It could be the 2-chlorobut-1,3-diene CAS 126-99-8

Comment: needs an incineration in specific conditions.

High risk due to the important vapour phases.

Should be evacuated as priority.

Limited quantity, could be repacked in 200 l barrels awaiting for final evacuation.

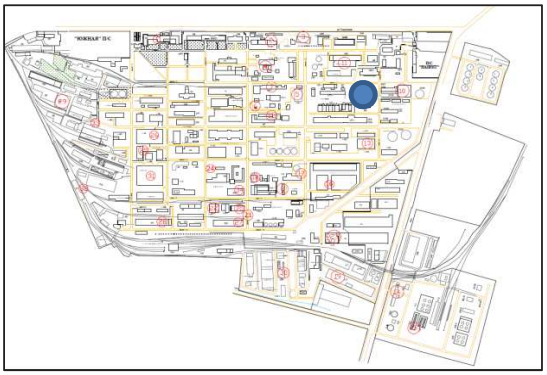
September 2017	UN MISSION NAIRIT PLANT - ARMENIA	Annex 5 Risk assessment

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
162			126-99-8	Chloroprene		L													

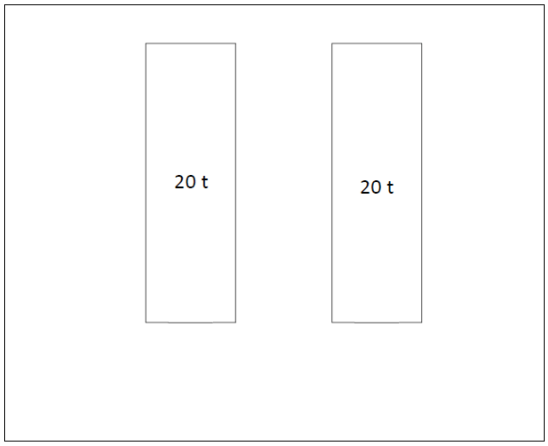
STORAGE 9

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Tanks located below ground level, in an concrete pool

Security condition

Open tanks with important vaporization of chemicals.

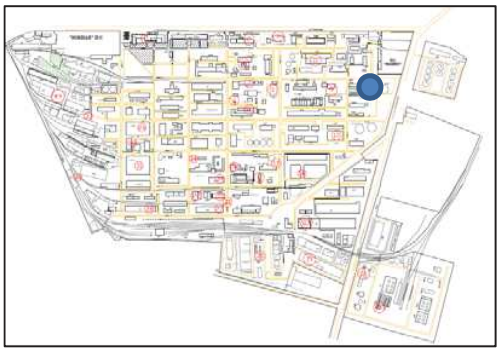
No fire detection.

Chemicals characteristics table

N°	Ծածկագիր (Nairit Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր Unit	Քանակ weight / vol										Incompatibility Materials	Condition to Avoid
70	2600106800	Մեթիլ պերոլիդոն	872-50-4	Methyl pyrrolidone		S	Kg	44 400.0										Strong acids, Strong oxidizing agents, Strong reducing agents	Heat, flames and sparks.

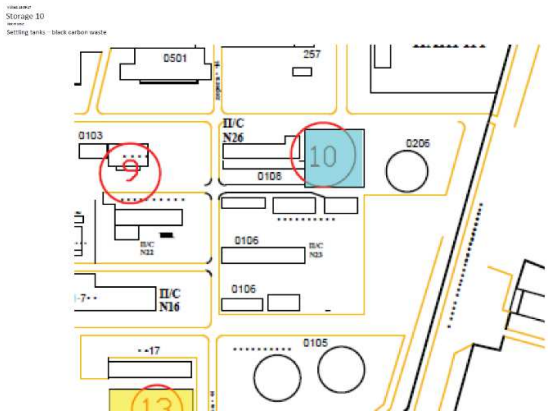
STORAGE 10

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

Carbon black solidified sludge in open pool.

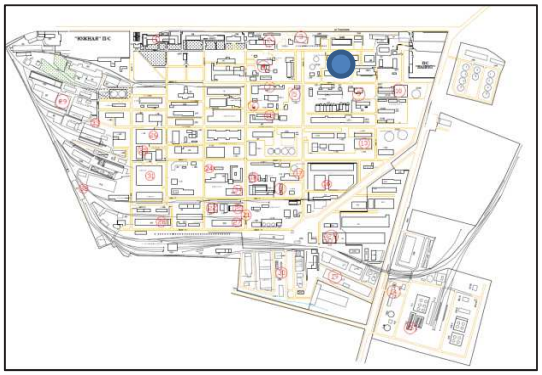
Need to be analysed.

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
137		Сажа (производст		Carbon black (industrial waste)		S	кг	30000											

STORAGE 11

General map of Nairit plant



Satellite view

Detailed position within the site

Pictures

Ammonia tanks with thermal insulation

Liquid pool with green wastewater (Chromate?).

Security conditions

Ammonia under pressure, in insulated tanks.

Little leaks exists which release vapours.

Chemicals characteristics table

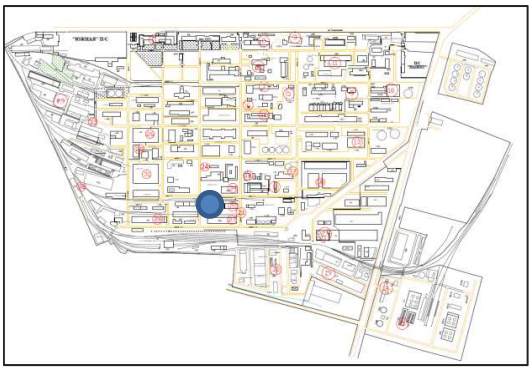
N°	Ցանկագրի (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
12	2600107200	Ամոնիակ	7664-41-7	Ammonia	100%	G	Kg	53,368.000										Most common metals are not affected by dry ammonia. However, when combined with water vapour, ammonia will attack copper, zinc, or alloys containing copper as a major alloying element. Therefore, these materials should not be used in contact with ammonia.	Heating of cylinders, as the increase in pressure bears a direct relationship to increase in temperature. When the gas is exposed to temperatures in the range 449°C at 101,325kPa, dissociation will occur, with the release of nitrogen and hydrogen. The hydrogen could then form explosive gas/air mixtures. Never use cylinders as rollers or supports, or for any other purpose than the storage of ammonia.

High priority to evacuate!

Should be saleable as being commonly used in the industry.

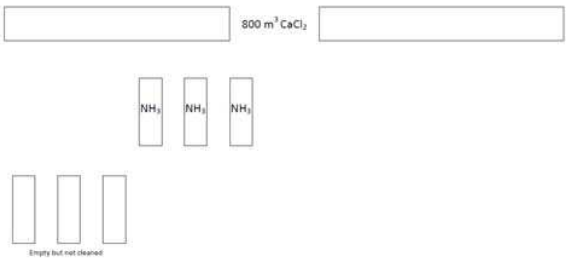
STORAGE 12

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Tanks exposed to weather conditions presenting signs of corrosion

Security conditions

Ammonia under pressure in corroded tanks without insulation.

Little leaks with release of vapour.

Chemicals characteristics table

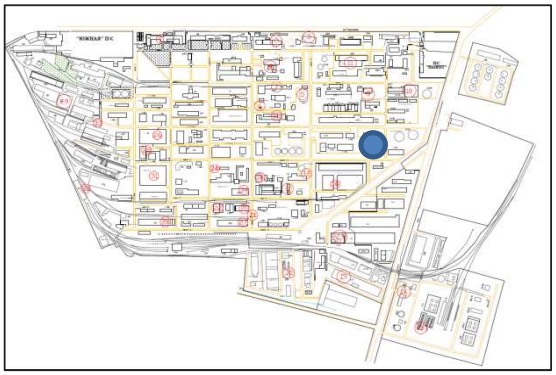
N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
12	2600107200	Ամոնիակ	7664-41-7	Ammonia	100%	G	Kg	53,368.00		 2			 5	 6			 9	Most common metals are not affected by dry ammonia. However, when combined with *water vapour*, ammonia will attack copper, zinc, or alloys containing copper as a major alloying element. Therefore, these materials should not be used in contact with ammonia	Heating of cylinders, as the increase in pressure bears a direct relationship to increase in temperature. When the gas is exposed to temperatures in the range 449°C at 101,325kPa, dissociation will occur, with the release of nitrogen and hydrogen. The hydrogen could then form explosive gas/air mixtures. Never use cylinders as rollers or supports, or for any other purpose than the storage of ammonia.
51	2301600100	Քլորիդ կալցիում	10043-52-4	Calcium chloride	31-33% solution	L	Kg	20,432.00										Strong oxidizing agents	

High priority to evacuate!

Should be saleable as being commonly used in the industry.

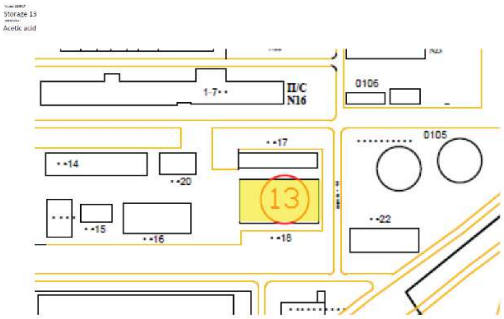
STORAGE 13

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

Tanks with damaged insulation, presenting signs of corrosion.

All tanks are in a retention pools.

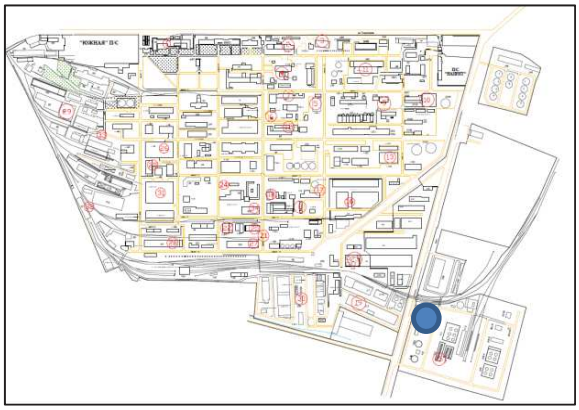
Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
140		Смесь монокарбоновых кислот (уксусной, муравьиной, пропионовой) и смесь жидких отходов.		A mixture of monocarboxylic acids (acetic, formic, propionic) and a mixture of liquid waste.		L	m^3	310											

Can be easily incinerated

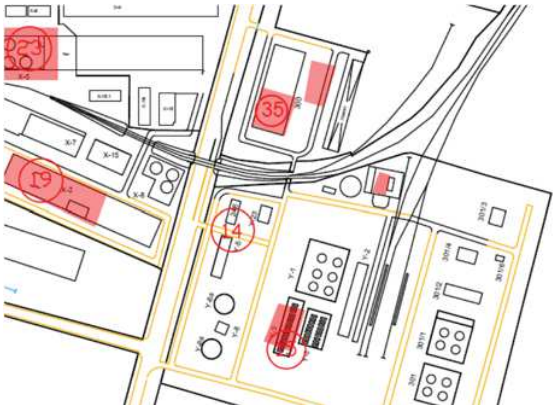
STORAGE 14

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Ion exchanging resin

Hydrochloric acid

Sodium hydroxide solution

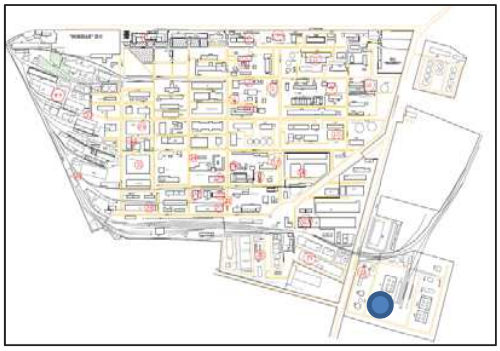
Security conditions

Chemicals characteristics table

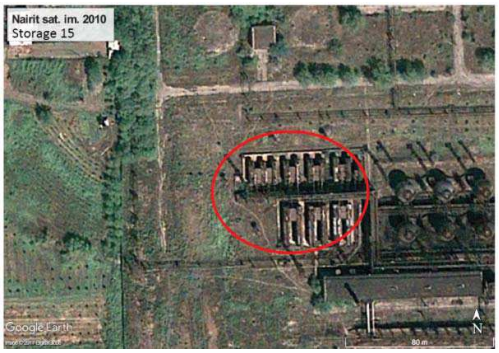
N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
7	2600114500	Անիոնիտ		Anionite		S	Kg	2,763.00			NH	NH	NH	NH	NH	NH	NH		
13	2300400100	Աղաթթու 28-29 %	7647-01-0	Hydrochloric acide	29-29%		Kg	7 750.0										Bases, Amines, Alkali metals, Metals, permanganates, e.g. potassium permanganate, Fluorine, metal acetylides, hexalithium disilicide	
58	2601300100	Կատիոնիտ ԿՈւ-2-8		Cationite CU 2-8			Kg	28,720.00											
130		Натрий кремнефтористый (КФТ), технический	1310-73-2	Sodium hydroxide			кг	25 223.00										Strong oxidizing agents, Strong acids, Organic materials	

STORAGE 15

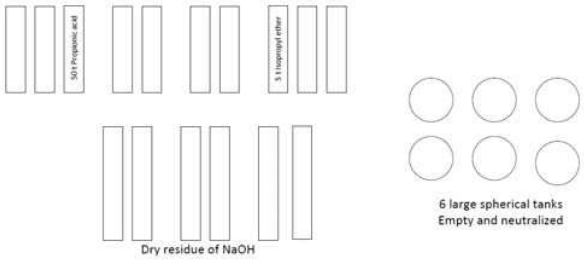
General map of Nairit plant



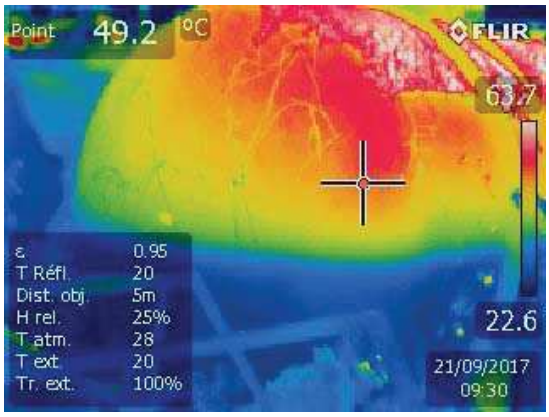
Satellite view



Detailed position within the site



Pictures



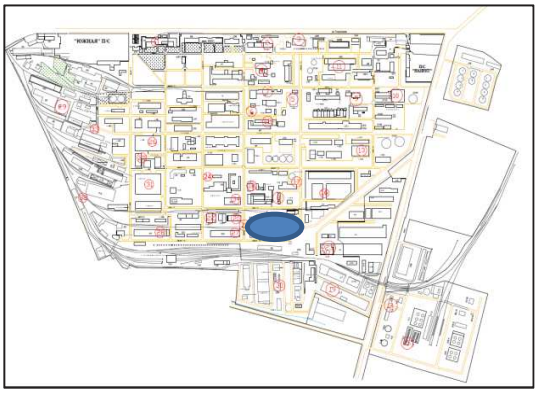
Security conditions

Chemicals characteristics table

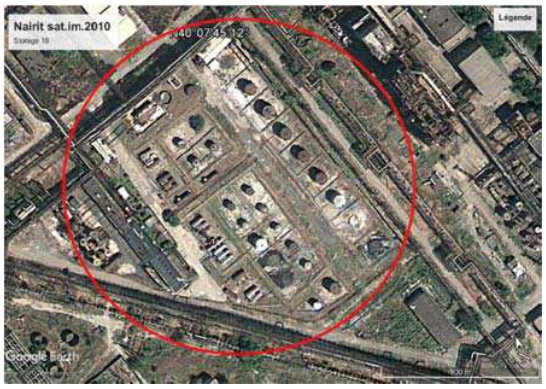
N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
141		Пропионовая кислота (	79-09-4	Propionic acid (substandard)			кг	48310												
142		Диизопропиловый эфир	108-20-3	Isopropyl ether			кг	4844											

STORAGE 16

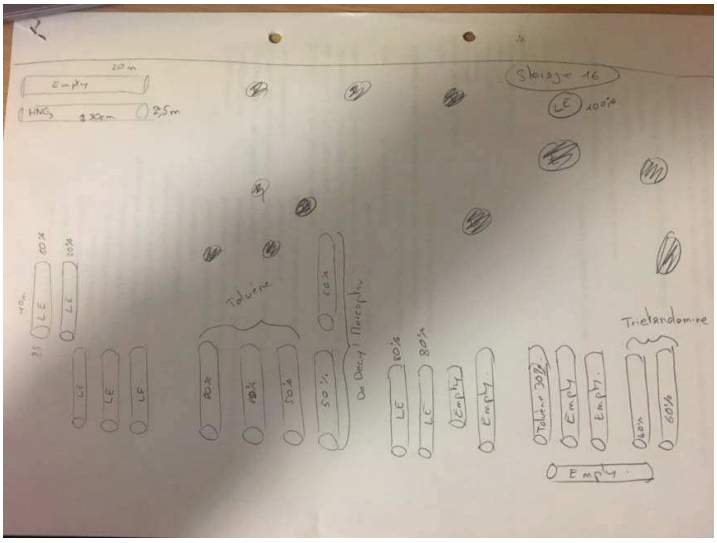
General map of Nairit plant



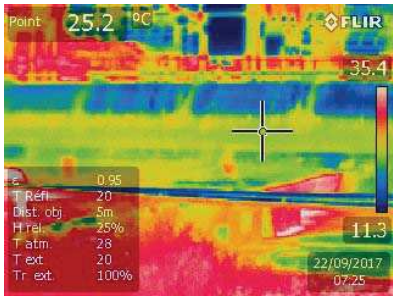
Satellite view



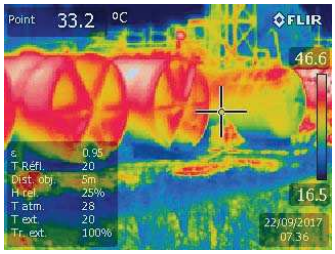
Detailed position within the site

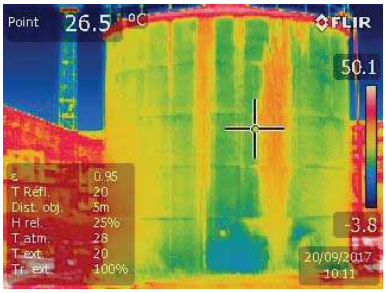


Pictures



Thermal picture showing the level of liquid in the tank





The thermal pictures shows the tank being full.

Security conditions

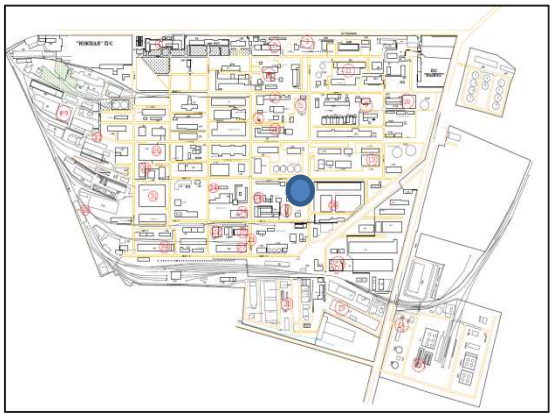
Serious signs of corrosion and unreliable retention pool

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
11	2600200500	Ազոտական թթու. (50-55%)	7697-37-2	Nitric acid	50-55%	L	Kg	5,168.000											Acids, Reducing agents, Alcohols, Acetic anhydride, Acrylonitrile, Acetonitrile, Organic materials, Alkali	
30	2600106500	Դոդեցիլմերկապտան	112-55-0	Dodecyl mercaptan		S	Kg	2,363.000										Strong oxidizing agents	-
39	2600107100	Լաք-էթիլոլ		Lacquer-ethynol		L	Kg	57,000.000											
105	2600107100	Տոլուոլ (մաքուր)	108-88-3	Toluene		L	Kg	38,400.000										Strong oxidizing agents	Heat, flames and sparks.
113	2600107000	Տրիէթանոլամին	102-71-6	Triethanolamine		L	Kg	598.91										Acids, Oxidizing agents	-

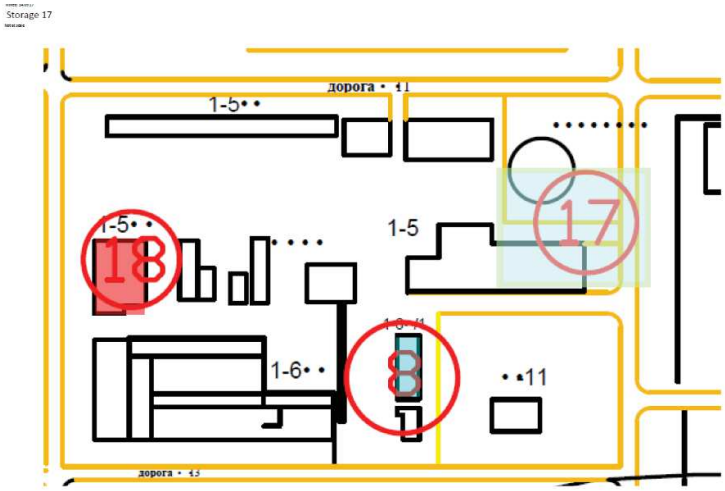
STORAGE 17

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

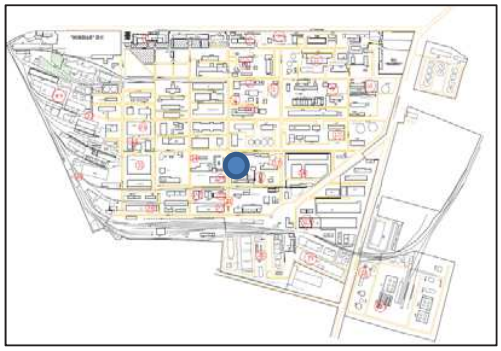
September 2017	UN MISSION NAIRIT PLANT - ARMENIA	Annex 5 Risk assessment

Chemicals characteristics

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
13	2300400100	Աղաթթու՝ 28-29 %	7647-01-0	Hydrochloric acide	29-29%		Kg	74 459.00											Bases, Amines, Alkali metals, Metals, permanganates, e.g. potassium permanganate, Fluorine, metal acetylides, hexalithium disilicide	

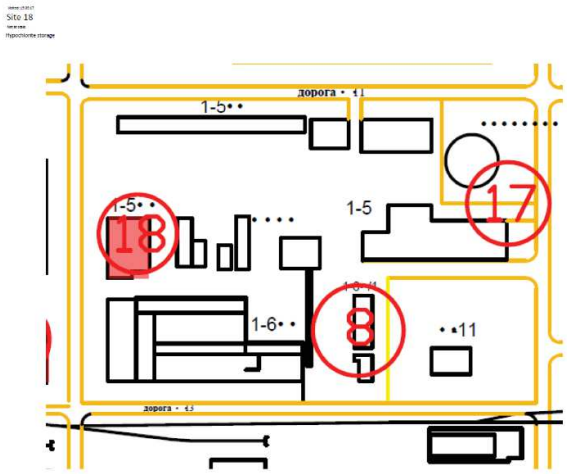
STORAGE 18

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

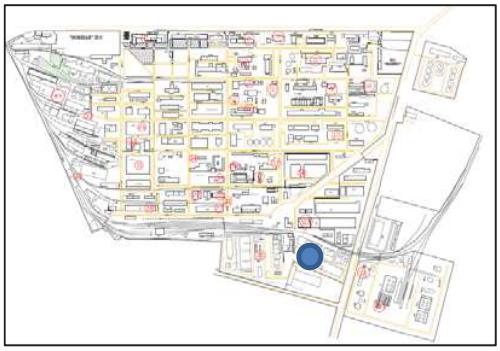
Security conditions

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ											Incompatibility Materials	Condition to Avoid
130		Натрий кремнефтористый (КФТ), технический	1310-73-2	Sodium hydroxide		L	кг	25 223.00											Strong oxidizing agents, Strong acids, Organic materials	
143		Гипохлорид натрия (некондиционный)		Sodium hypochlorite (substandard)		L	$м^3$	119.07												

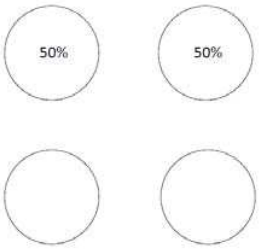
STORAGE 19

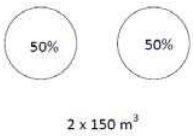
General map of Nairit plant



Satellite view

Detailed position within the site





Pictures

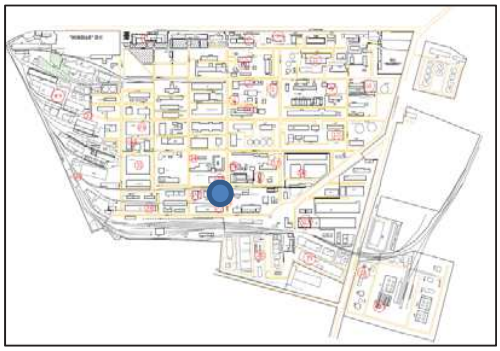
Security conditions

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
128		Աղաջուր-հետադարձ՝ հիմքի և սոդայի պարունակությամբ		NaCl solution + NaOH+ $NaHCO_3$		L	m^3	3 472.00											

STORAGE 20

General map of Nairit plant

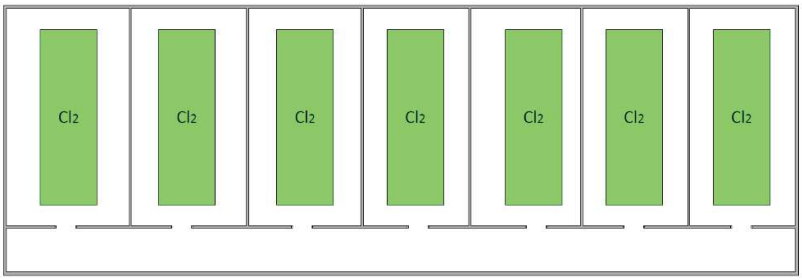


Satellite view

Detailed position within the site

Storage 20
Chlorine large scale storage

Empty since 2010



Pictures

Security conditions

Majority of cylinders still contain a residual pressure of 0.5 bar of Chlorine

September 2017	UN MISSION NAIRIT PLANT - ARMENIA	Annex 5 Risk assessment

Chemical characteristics table

CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
7782-50-5	Chlorine		G	кг	600										Alcohols	

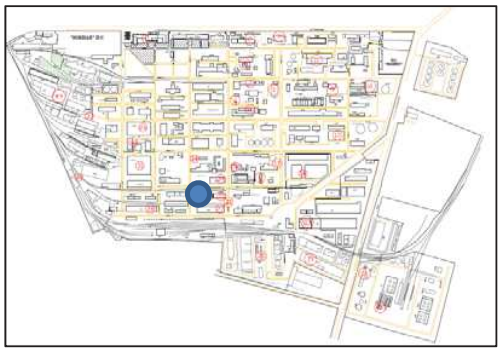
High priority !

Toxic gas under pressure.

To be destroyed.

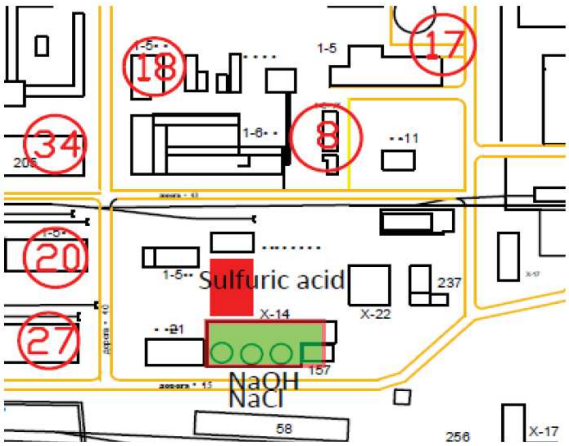
STORAGE 21

General map of Nairit plant

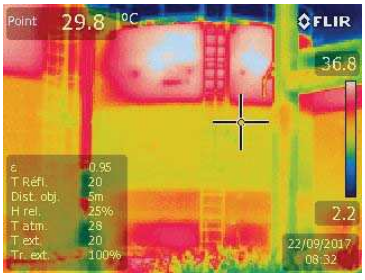


Satellite view

Detailed position within the site



Pictures



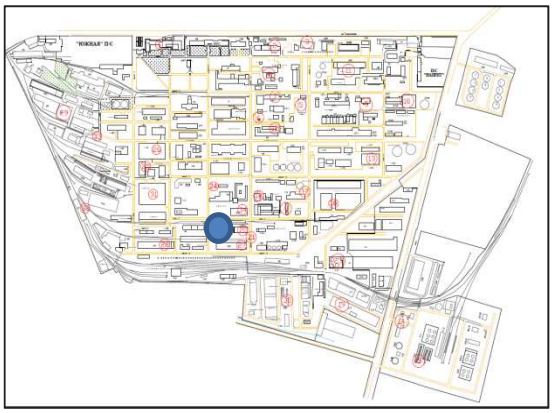
Security conditions

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
45	2600200804	Ծծմբական թթու 96%-ոց	7664-93-9	Sulfuric acid	96%	L	Kg	37.867.000										Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metal	-
127		Աղաջուր-հում (օրգանական խառնուրդով)		NaCl solution (with organic mixture)		L	m^3	300.00											
128		Աղաջուր-հեռացարժ՝ հիմքի և սոդայի պարունակությամբ		NaCl solution + NaOH+ NaHCO3		L	m^3	3 472.00											
129		Աղաջուր-հում (խրոմպիկի պարունակությամբ)		NaCl solution (with bichromates)		L	m^3	2 215.00											

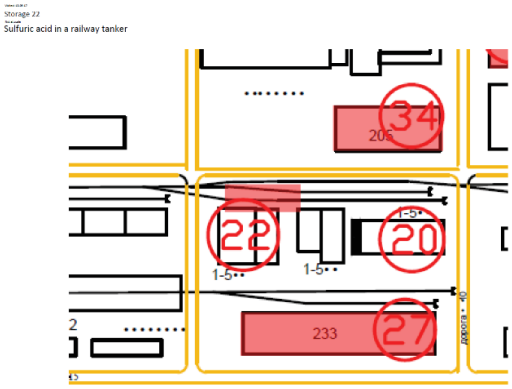
STORAGE 22

General map of Nairit plant

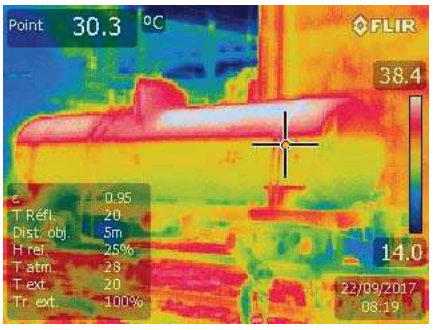


Satellite view

Detailed position within the site



Pictures



Thermal picture showing the level of liquid in the tank

A little repair

Security conditions

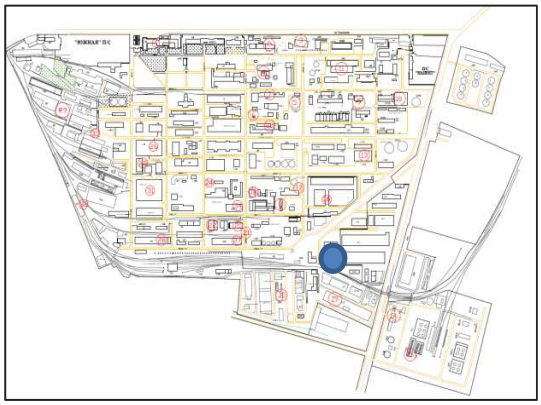
The tanker shows sign of corrosion and is not on a retention pool

Chemicals characteristics table

N°	Ցանկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
45	2600200804	Ծծմբական թթու 96%-ոց	7664-93-9	Sulfuric acid	96%	L	Kg	37,867.000										Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkalihalides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metal	

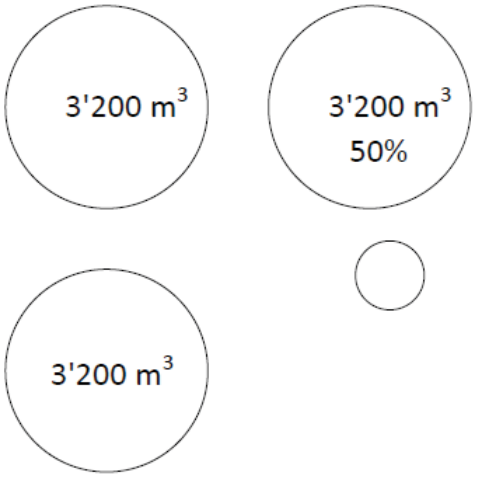
STORAGE 23

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

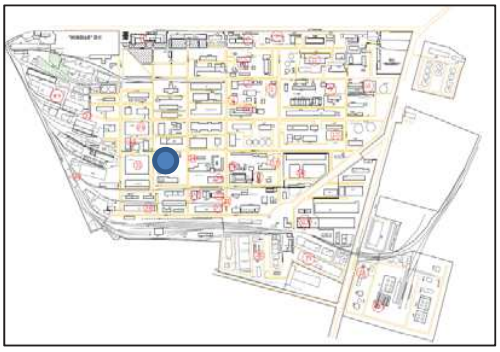
Security conditions

Chemicals characteristics table

N°	Ցածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
127		Աղաջուր-հում (օրգանական խառնուրդով)		NaCl solution (with organic mixture)		L	m^3	300.00											
128		Աղաջուր-հեռադարձ՝ հիմքի և սոդայի պարունակությամբ		NaCl solution + NaOH+ $NaHCO_3$		L	m^3	3 472.00											
129		Աղաջուր-հում (խրոմպիկի պարունակությամբ)		NaCl solution (with bichromates)		L	m^3	2 215.00											

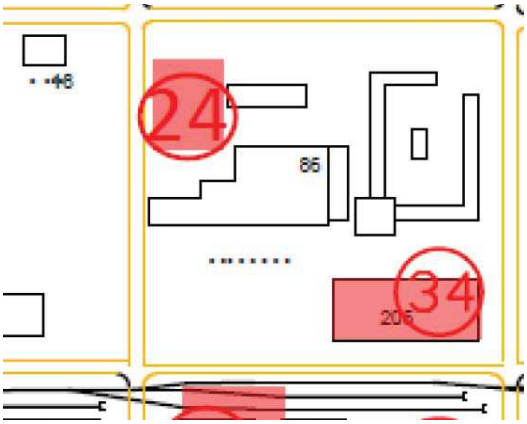
STORAGE 24

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

No retention pool.

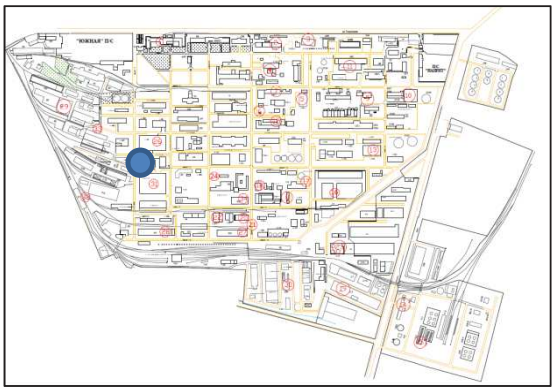
Type of oil to be clearly identified.

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
153		Трансформаторное масло		Tranformers oil (PCB ?)		L	кг	181576											

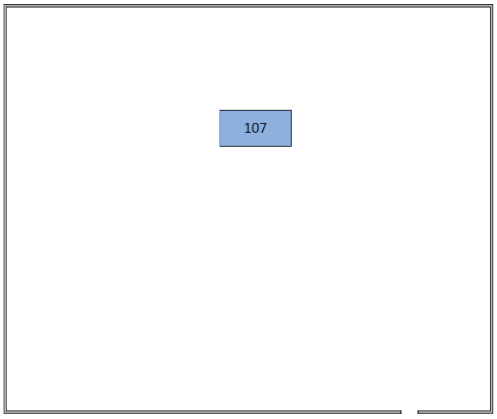
STORAGE 25

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

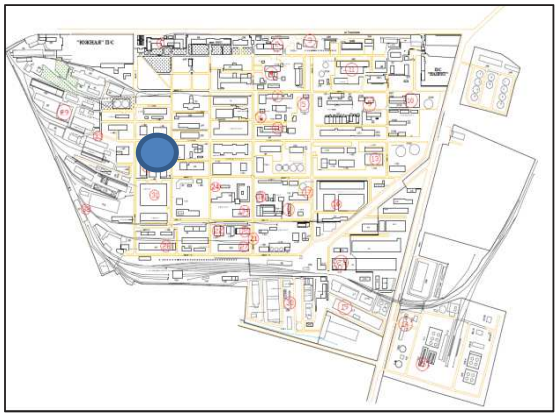
Security conditions

Chemical characteristics table

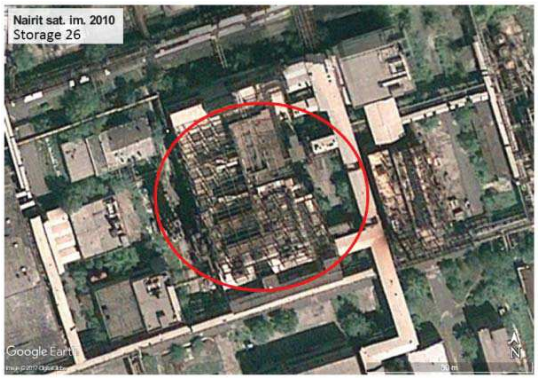
N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
107	1207501410	ալկոհոլի տալկ	14807-96-6	Talc powder TRVP		S	Kg	33,699.500	NH	NH	NH	NH	NH	NH	NH	NH	NH	Oxidizing agents	-

STORAGE 26

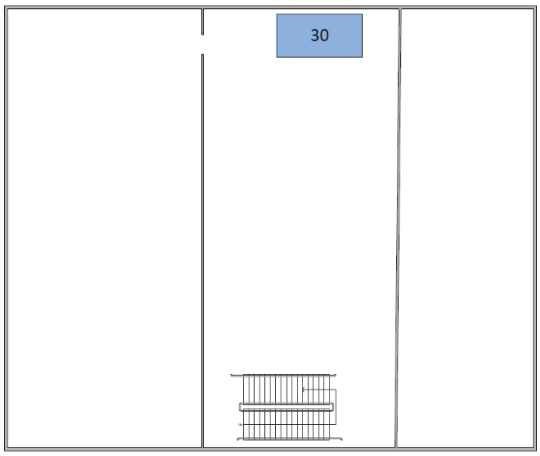
General map of Nairit plant



Satellite view



Detailed position within the site



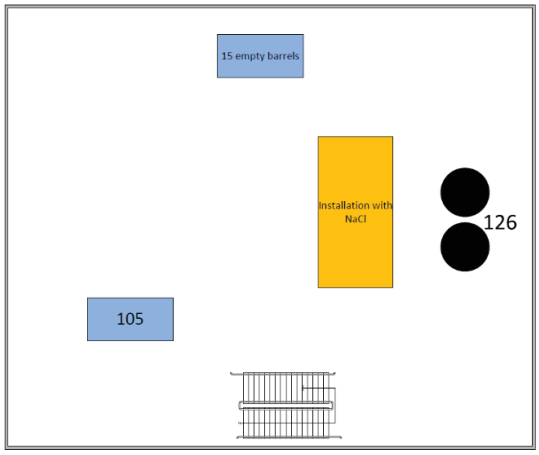
Level 0

Pictures

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ													Incompatibility Materials	Condition to Avoid
30	2600106500	Դոդեցիլմերկապտան	112-55-0	Dodecyl mercaptan		S	Kg	2,363.000													Strong oxidizing agents	-

Detailed position within the site Level 1

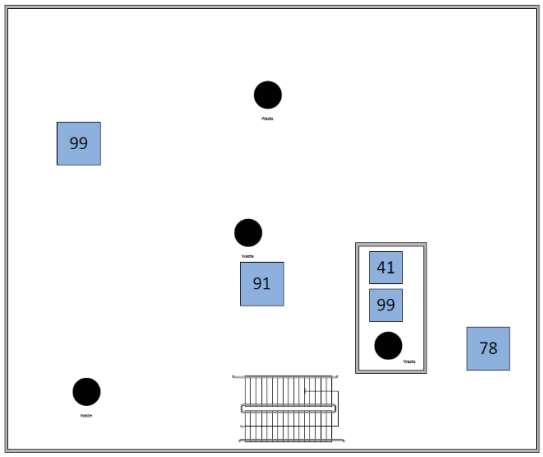


Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Storage location(s)	Container size	Total Weight	Container conditions	Date of storage										Incompatibility Materials	Condition to Avoid
105	2600107100	Տոլուոլ (մաքուր)	108-88-3	Toluene	100%	L	Kg	38,400,000	26L1	200 L Barrel	3'420	Good											Strong oxidizing agents	Heat, flames and sparks.
126			64-19-7	Acetic acid 30%	30%	L			26L1	Vertical tank	10,6 m^3	Good	2010											

Detailed position within the site

Level 2



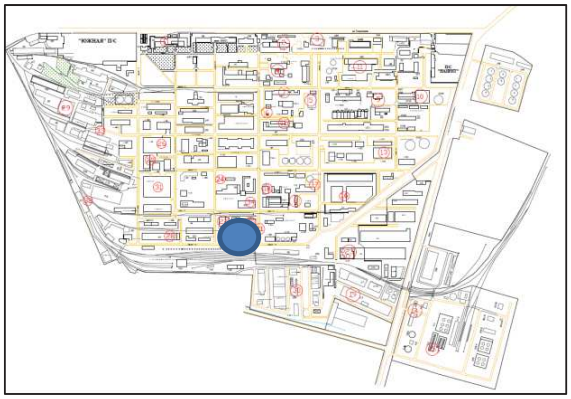
Chemical characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Storage location(s)	Container size	Total Weight	Container conditions	Date of storage										Incompatibility Materials	Condition to Avoid
41	2600104800	Լոնար PW	9084-06-04	Lonar PW		S	Kg	46,599.000	26L2	1/2 Barrel				NH	NH	NH	NH	NH	NH	NH	NH	NH	Reactive w ith oxidizing agents.	Excess heat, incompatible materials
78	2600102400	Նիտրոզ դիֆենիլ ամին	86-30-6	Nitroso-diphenylamine		S	Kg	26,223.000	26L2	40 Kg bag	1000									!			Strong oxidizing agents	-
91	2600105400	Արծաթի աղ	131-08-8	Silver salt (sodium anthraquinone)		S	Kg	556.40	26L2	25 kg Bag P	750			NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong oxidizing agents	-
99	2601400700	Նատրիումի սուլֆիտ տեխնիկական	7757-83-7	Sodium sulphite technical		S	Kg	8,748.000	26L2	50 L Barrel C	60				NH	NH	NH	NH	NH	NH	NH	NH	Acids, Strong oxidizing agents	Exposure to air may affect product quality. Exposure to moisture may affect product quality

All small packaging must be moved and groups in the main newly identified warehouse

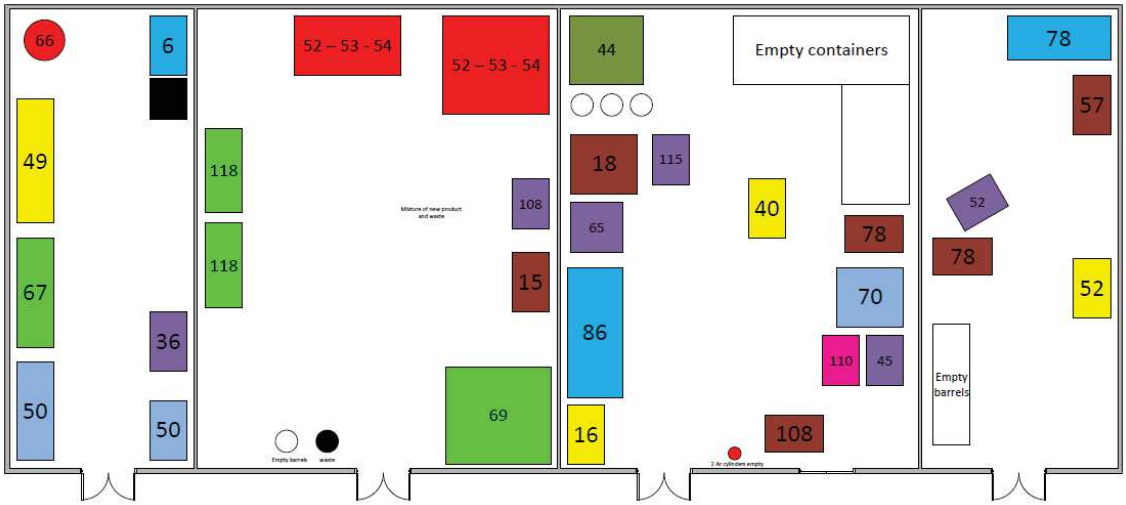
STORAGE 27

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

118

52

86

Security conditions

Door closed with padlock.

No ventilation.

High piled storage with damaged barrel.

No ground protection.

No fire protection.

No retention pool.

Chemicals characteristics table

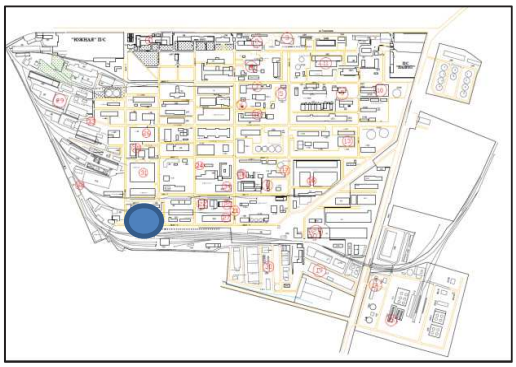
N°	Ցանկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Container size	Total Weight	Container conditions										Incompatibility Materials	Condition to Avoid
6	2600110300	Անիլին	62-53-3	Aniline		L	Kg	25.00	Glass bottle	25.00	Good										Oxidizing agents, Iron and iron salts , Zinc	Heat, flames and sparks
15	2600201200	Բորաթթու	10043-35-3	Boric acid		S	Kg	43.00	bag	43.00	Medium										Moisture sensitive.	Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
16	2600100400	Բութիոզոլ բուտիլ	111-76-2	Butylcellosolve		L	Kg	6,580.000	200 Lbarrel P	3,000.00	good										Strong oxidizing agents	Heat, flames and sparks.
18	2600100800	Հեքսամեթիլենդիամին	124-09-4	Hexamethylenediamine		L	Kg	176.00	Kg	176.00											acids, Acid chlorides, Acid anhydrides, Strong oxidizing agents, Carbon dioxide (CO2)	-
36	2600107501	Էթիլացետատ	141-78-6	Ethyl acetate		L	Kg	193.00	Kg	193.00											Containers which are opened must be carefully resealed and kept upright to prevent leakage	Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
40	2601400610	Նատրիումի լաուրիլսուլֆատ 70%	151-21-3	Sodium lauryl sulphate	70%		Kg	7,101.400	Kg	7,101.400											Oxidizing agents	Heat, flames and sparks.
44	2600111000	Քլորպարաֆին	63449-39-8	Chlorinated paraffin grades CP 470		S	Kg	13,431.000	Kg	13,431.000											Strong acids, strong oxidants, alkali metals.	high temperature.
45	2600200804	Ծծմբական թթու 96%-ոց	7664-93-9	Sulfuric acid	96%	L	Kg	37,867.000	Kg	37,867.000											Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permunganate, Hydrogen peroxide, Azides, Perchlorates , Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Pow dered metal	-
49	2600500300	Երկաթի կալիում	13746-66-2	Potassium ferricyanide (red prussiate of potassium)		S	Kg	4,339.000	Kg	4,339.000											Prevent formation of aerosols.	Keep receptacle tightly sealed
50	2600500200	Կալիումի քլորիդ	7447-40-7	Potassium chloride		S	Kg	985.00	Kg	985.00		NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong acids, Strong oxidizing agents	-
52	2600800400	Բևեկնախեժ դիսպրոպորցիոնևիկ	8052-10-6	Resin disproportional		S	Kg	58,994.000	Kg	58,994.000											?	
53	2600800200	Բևեկնախեժ սոճու	8050-09-7	Pine resin		S	Kg	6,673.700	Kg	6,673.700											Strong oxidizing agents	
54	2600800100	Բևեկնախեժ		Resin		S	Kg	12,705.000	Kg	12,705.000												
57	2600111700	Կապտոպաքս	149-30-4	Captax (2-Mercaptobenzothiazole)		S	Kg	20,836.000	Kg	20,836.000											Oxidizing agents	-
65	2600102100	Երկու գլեկսինային մանգան		Two glexine manganese			Kg	2,799.000	Kg	2,799.000												
66	2600112300	Մորֆոլին	110-91-8	Morpholine		L	Kg	700.00	Kg	700.00											Strong oxidizing agents	Heat, flames and sparks.
67	2600102200	Պղինձի քլորիդ	7758-89-6	Copper chloride		S	Kg	452.80	Kg	452.80											Oxidizing agents, Alkali metals	Air Avoid moisture. Light
69	2600106700	Մեթիլ մեթակրիլատ	80-62-6	Methyl methacrylate		S	Kg	2,992.920	Kg	2,992.920											Oxidizing agents, Peroxides, Amines, Bases, acids, Reducing agents, Halogens	May polymerize on exposure to light. Heat, flames and sparks. Heat Extremes of temperature and direct sunlight. Heat, flames and sparks.

September 2017	UN MISSION NAIRIT PLANT - ARMENIA	Annex 5 Risk assessment

N°	Ցանկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Container size	Total Weight	Container conditions										Incompatibility Materials	Condition to Avoid
70	2600106800	Մեթիլ պիրոլիդոն	872-50-4	Methyl pyrrolidone		S	Kg	51,003.00	Kg	51,003.00											Strong acids, Strong oxidizing agents, Strong reducing agents	Heat, flames and sparks.
78	2600102400	Նիտրոզո դիֆենիլ ամին	86-30-6	Nitroso-diphenylamine		S	Kg	26,223.00	Kg	26,223.00											Strong oxidizing agents	-
86	2601401300	Նատրիումի պոլիֆոսֆատ	50813-16-6	Sodium polyphosphate		S	Kg	19,065.00	Kg	19,065.00											Strong oxidizing agents.	Incompatible products, Exposure to moist air or water.
108	2600103400	Թիոդիֆենիլամին (Ֆենոտիազին)	92-84-2	Thiodiphenylamine		S	Kg	22,850.00	Kg	22,850.00											Strong oxidizing agents	-
110	2600103300	Տիուրամ Ե	97-77-8	Tiuram E		S	Kg	16,039.91	Kg	16,039.90											Strong oxidizing agents	-
115	2600103700	Զեոլիտ	1318-02-1	Zeolit		S	Kg	840.00	Kg	840.00		NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong acids, Strong bases, Hydrogen fluoride, Chlorine trifluoride, Ethylene oxide, Halogenated hydrocarbon, Oxygen difluoride, Sodium nitrate, Vinyl compounds:Strong acids, Strong oxidizing agents	Avoid moisture.
118	2600116800	Օկտոպոլ ՆԲ-47		Octapol NB-47			Kg	1,999.00	Kg	1,999.00												

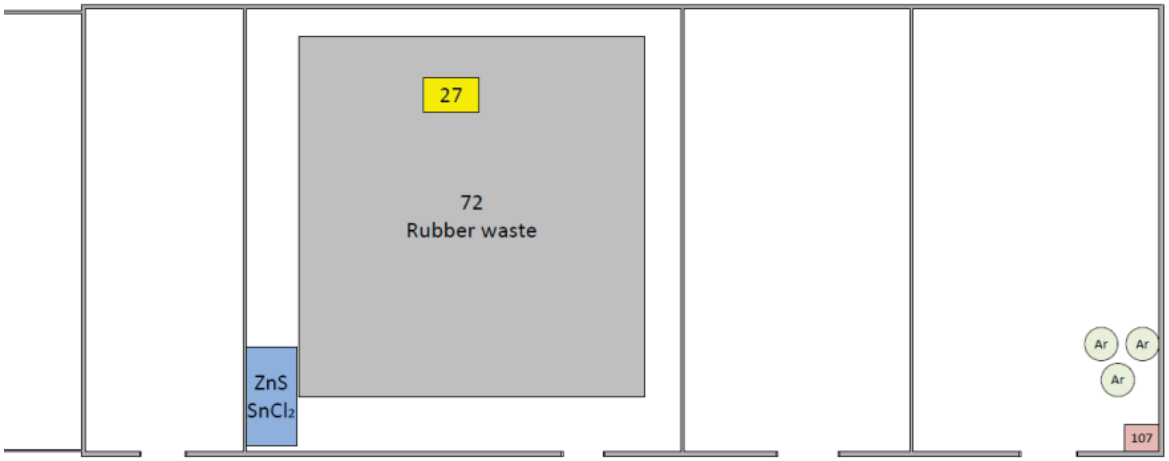
STORAGE 28 level 0

General map of Nairit plant



Satellite view

Detailed position within the site



Pictures

Security conditions

Chemicals, like ruber waste, are stored without any protection releasing corrosive vapours.

No ventilation

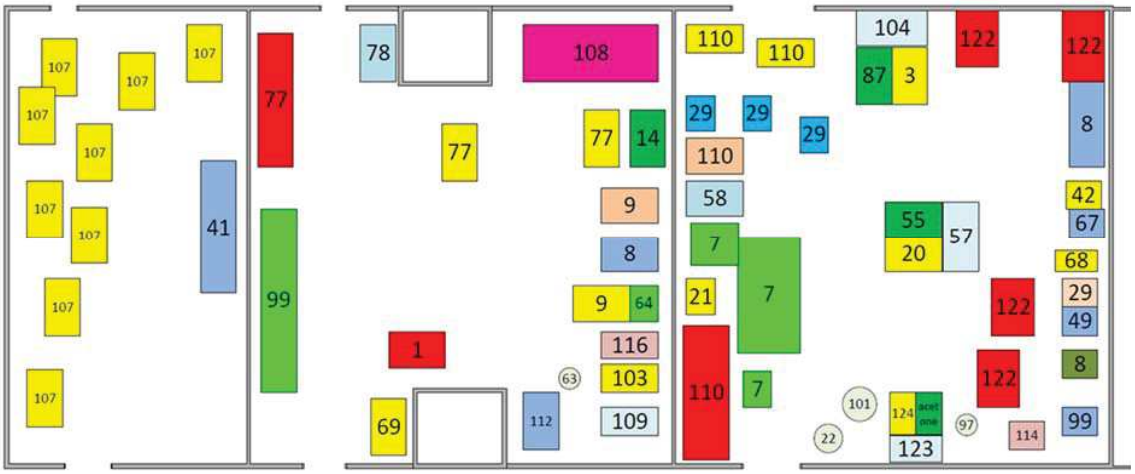
Corroded argon bottle under pressure.

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Container size	Total Weight	Container conditions										Incompatibility Materials	Condition to Avoid
27	2600101500	Դիտանակ		Ditalak			Kg	470.00	200 L barrel	470.00	BAD											
72	2600400700	Նաիրիտ Կ-18		Nairite KL-18		S	Kg	2 000.00		2 000.00											All metals	
107	1207501410	Տալկմոնոդի ՏՈՊՎ	14807-96-6	Talc powder TRVP		S	Kg	33,699.50	20 kg bag	50.00		NH	NH	NH	NH	NH	NH	NH	NH	NH	Oxidizing agents	-
				Argon		G	Kg		50 kg pressure		Medium											

STORAGE 28 Level 1 – Part 1

Detailed position within the site



Pictures

Chemicals characteristics table

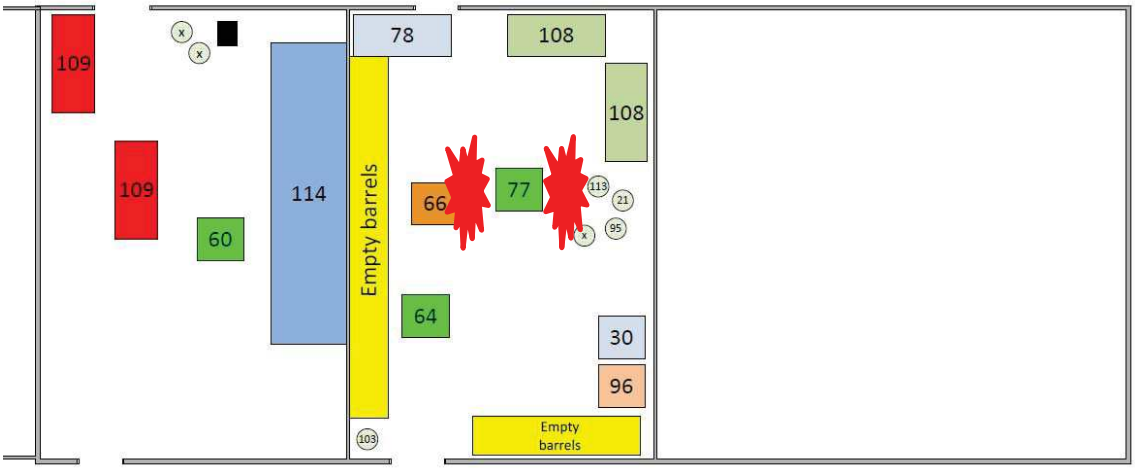
N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Container size	Total Weight	Container conditions	GHS01	GHS02	GHS03	GHS04	GHS05	GHS06	GHS07	GHS08	GHS09	Incompatibility Materials	Condition to Avoid
1	2600502280	4-Մեթիլ-2.6դի-տրետ-բուտիլֆենոլ	128-37-0	4-méthyl-2,6-di-tert-butylphénol		S	Kg	140.00	25 kg bags	225.00	Good									GHS09	Acid chlorides, Acid anhydrides, Oxidizing agents, Bases, Brass, Copper	-
3	2600102501	Ալյումինի սուլֆատ	10043-01-3	Aluminum sulphate		S	Kg	2,000.000	Open bags	2,000.00	Bad					GHS05					Incompatible with strong bases and oxidizing agents., Ammonia, Water, Amines. Avoid: Air Exposure to moisture	Air Exposure to moisture
7	2600114500	Անիոնիտ		Anionite		S	Kg	2,763.000	Barrel / bags	2,763.00	Medium			NH	NH	NH	NH	NH	NH	NH		
8	2600102920	Հակաօքսիդանտ	732-26-3	Antioxydant			Kg	0.80	30 kg bags	200.00	Good							GHS07		GHS09	Bases, Acid chlorides, Acid anhydrides, Oxidizing agents, Brass, Copper	-
9	2600118700	Հակաօքսիդանտ 22-Մ-46	119-47-1	Antioxydant 22-M.46			Kg	4,500.000	30 kg bags	4,500.00	Good								GHS08		Strong oxidizing agents	-
10	2602500102	Ացետոն	67-64-1	Acetone		L	l	15.00	20 L barrel	15.00	Good		GHS02					GHS07			Bases, Oxidizing agents, Reducing agents, Acetone reacts violently with phosphorous oxychloride.	Heat, flames and sparks.
14	2600113110	Նատրիումի բիքրոմատ	10588-01-9	Sodium dichromate		S	Kg	1,850.000	25 kg bags	1,850.00	Good			GHS03		GHS05	GHS06	GHS08	GHS08	GHS09	Reducing agents; Organic materials, Readily oxidizble materials	Heat, flames and sparks. Moisture.
20	2600100700	Հիդրոքինոն	123-31-9	Hydroquinone		S			25 kg bags	200.00	Bad				GHS05		GHS07	GHS08	GHS09		Strong bases, Strong oxidizing agents	Air Light.
21	1203700200	Հիպերիզ	80-15-9	Cumene hydroperoxide		L	Kg	40.00	60 L barrel	26.00			GHS02			GHS05	GHS06		GHS08	GHS09	Powdered metals, Organic materials, Heavy metal salts, metal salts, Combustible material, Acids, Alkalis,	-
22	2600100900	Դիբուտիլֆտալատ	84-74-2	Dibutyl phtalate		L	Kg	60.00											GHS08	GHS09	Strong oxidizing agents, Nitrates, Bases, acids, Chlorine	-
29	2600101300	Դիֆենիլգուանիդին	102-06-7	Diphenyl guanidine		S	Kg	240.90	bags	240.90	Bad						GHS06		GHS08	GHS09	Strong oxidizing agents	-
41	2600104800	Լոմար PW	9084-06-04	Lomar PW		S	Kg	46,599.000	25 kg bags	46,599.00	Good	NH	NH	NH	NH	NH	NH	NH	NH	NH	Reactive with oxidizing agents.	Excess heat, incompatible materials
42	2600501600	Լովինոքս	128-37-0	Lovenox			Kg	50.00	bags	50.00	bad									GHS09	acids, mineral acids, oxidizing agents, peroxides, water reactive substances, Friedel-Crafts catalysts	Avoid humidity
49	2600500300	Երկաթի կալիում	13746-66-2	Potassium ferricyanide (red prussiate of potask)		S	Kg	4,339.000		4,339.00								GHS07			Prevent formation of aerosols.	Keep receptacle tightly sealed
55	2600400210	Կաուչուկ ՍԿԴ	MSDS witout CAS	Rubber SKD			Kg	120.00	Kg	120.00	NH	NH	NH	NH	NH	NH	NH	NH	NH	NH	Concentrated acids, oxidizers, and organic solvents	Warming, direct sunlight over a long period of time, open fire.
57	2600111700	Կապտաքս	149-30-4	Captax (2-Mercaptobenzothiazole)		S	Kg	20,836.000	bags	4 900.00	Bad							GHS07		GHS09	Oxidizing agents	-
58	2601300100	Կատիոնիտ ԿՈւ-2-8		Cationite CU 2-8			Kg	28,720.000	bags	28,720.00	Bad											
63	1401900400	Կրոնմեկոպ	7758-97-6	Lead(II) chromate PbCrO4		S	Kg	45.00	bags	45.00	Bad								GHS08	GHS09	Organic materials, Powdered metals	-
64	1700301700	Յուղ ՊՄՍ-200	9006-65-9	Oil PMS-200		L	Kg	1,556.000	20 L barrel	98.00											Strong oxidants. Strong oxidation agent, strong bases	
67	2600102200	Պղնձի քլորիդ	7758-89-6	Copper chloride		S	Kg	452.80	Bags	452.80	Bad					GHS05		GHS07		GHS09	Oxidizing agents, Alkali metals	Air Avoid moisture. Light.
68	2600102000	Պղնձի սուլֆատ (կուպարոս)	7758-99-8	Copper sulphate			Kg	344.20	bags	300.00	Bad							GHS07		GHS09	Powdered metals, Anhydrous copper(II) sulfate, reacts violently with:, hydroxylamine, Magnesium	Exposure to moisture
69	2600106700	Մեթիլ մետակրիլատ	80-62-6	Methyl methacrylate		S	Kg	2,992.920	20 L barrel	80.00			GHS02					GHS07			Oxidizing agents, Peroxides, Amines, Bases, acids, Reducing agents, Halogens	May polymerize on exposure to light. Heat, flames and sparks. Heat Extremes of temperature and direct sunlight. Heat, flames and sparks.

September 2017	UN MISSION NAIRIT PLANT - ARMENIA	Annex 5 Risk assessment

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Container size	Total Weight	Container conditions										Incompatibility Materials	Condition to Avoid
77	2601400300	Նատրիումի նիտրատ	7631-99-4	Sodium nitrate, NaNO3		S	Kg	16,550.00	30 kg bags	14 950.00	Good										Strong acids, Strong reducing agents, Pow dered metals, Organic materials, Alkali metals, Alkaline earth	Fusion of mixtures of metal cyanides, including lead thiocyanate, w ith metal chlorates, perchlorates, nitrates or nitrites
78	2600102400	Նիտրոզո դիֆենիլ ամին	86-30-6	Nitroso-diphenylamine		S	Kg	26,223.00	30 kg bags	6 960.00	Good										Strong oxidizing agents	-
87	9800100300	Սպիտակ մուր	14808-60-7	(White smoot)		L	Kg	1,483.250	Big bag	1,483.250											Hydrogen fluoride	-
97	2600118200	Նատրիում լաուրիլսուլֆատ 30%	151-21-3	Sodium lauryl sulphate		L			200 L barrel P	32.00	Good											
99	2601400700	Նատրիումի սուլֆիտ տեխնիկական	7757-83-7	Sodium sulphite technical		S	Kg	8,748.00	30 kg bags	8,748.00	Good		NH	NH	NH	NH	NH	NH	NH	NH	Acids, Strong oxidizing agents	Exposure to air may affect product quality. Exposure to moisture may affect product quality
101	2600300310	Սպիրտ /էթանոլ/	64-17-5	Ethanol			l	6.00													Alkali metals, Oxidizing agents, Peroxides	Heat, flames and sparks.
103	2600112200	Ստիրոլ		Stirol		L	Kg	106.00	Glass bottles	3.20	Medium											
104	2600109600	Մոմ	555-43-1	Paraffin		S	Kg	3,784.40	Big bag	1 200.00	Medium										Reactive w ith oxidizing agents.	Excess heat., incompatible materials
107	1207501410	Տալկմոնոդի ՏՈՊԼ	14807-96-6	Talc powder TRVP		S	Kg	33,699.50	30 kg bags	33,699.50	Good	NH	NH	NH	NH	NH	NH	NH	NH	NH	Oxidizing agents	-
108	2600103400	Թիոդիֆենիլամին (ֆենոտիազին)	92-84-2	Thiodiphenylamine		S	Kg	22,850.00	30 kg bags	13 625.00	Good										Strong oxidizing agents	-
109	2600109300	Տիուրամ Դ	137-26-8	Tiuram D		S	Kg	2,750.90	50 kg bag	240.00	Good										Strong oxidizing agents	-
110	2600103300	Տիուրամ Ե	97-77-8	Tiuram E		S	Kg	16,039.90	25 kg bags	1 125.00	Good										Strong oxidizing agents	-
110									Open bags	1 125.00	Bad											
112	2600116200	Տրետբուտիլպիրոկատեխին	98-29-3	tert butyl pirocatequina			Kg	1,300.00	60 l barrel	1,300.00	Good										Strong oxidizing agents	-
114	2601400800	Նատրիումի տրիպոլիֆոսֆատ	7558-29-4	Sodium tripolyphosphate		S			Big bag	428.00	Medium	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong acids, Strong oxidizing agents	Avoid moisture.
116	2600110100	Մանգանի օքսիդ	1313-13-9	Manganese oxide		S	Kg	4,793.90	30 kg bags	840.00	Good										Strong acids, Strong reducing agents, Organic materials	-
122			1309-48-4	Magnesium oxyide		S			30 kg bags	5 000.00	Bad											
123				Sodium silicate Na_2SiO_6		S			bag	30.00	Bad											
124	2600106900	Մաքուր ամոնիումի քլորիդ	12125-02-9	Pure ammonium chloride		S			Bag	6.00	Bad											

STORAGE 28 – Level 1 – Part 2

Detailed position within the site



Pictures

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Container size	Total Weight	Container conditions										Incompatibility Materials	Condition to Avoid
21	1203700200	Հիպերիզ	80-15-9	Cumene hydroperoxide		L	Kg	40.00	20 l barrel	40.00	medium										Pow dered metals, Organic materials, Heavy metal salts, metal salts, Combustible material, Acids, Alkalis,	-
30	2600106500	Դոդեցիլմերկապտան	112-55-0	Dodecyl mercaptan		S	Kg	2,363.00	200 L barrel	2,363.000	Good										Strong oxidizing agents	-
60	2600201100	Քացախաթթու 100%	64-19-7	Acetic acid	100%	L	Kg	16,665.00	20 L barrel	40.00	good		2			5					Incompatible materials Oxidizing agents, Soluble carbonates and phosphates, Hydroxides, Metals, Peroxides, permanganates, e.g. potassium permanganate, Amines, Alcohols, Nitric acid	Heat, flames and sparks.
64	1700301700	Յուղ ՊՄՍ-200	9006-65-9	Oil PMS-200		L	Kg	1,556.00	200 L barrel	1 314.00	Good										Strong oxidants. Strong oxidation agent, strong bases	
66	2600112300	Մարֆոլին	110-91-8	Morpholine		L	Kg	700.00	200 L barrel	700.00	Good										Strong oxidizing agents	Heat, flames and sparks.
77	2601400300	Նատրիումի նիտրատ	7631-99-4	Sodium nitrate, NaNO3		S	Kg	16,550.00	20 kg bag	3 500.00	Good				3				7		Strong acids, Strong reducing agents, Pow dered metals, Organic materials, Alkali metals, Alkaline earth metals, Cyanides, thiocyanates	Fusion of mixtures of metal cyanides, including lead thiocyanate, w ith metal chlorates, perchlorates, nitrates or nitrites causes a violent explosion. Addition of one solid component (even as a residue in small amount) to another molten component is also highly dangerous. Heat
78	2600102400	Նիտրոզ դիֆենիլ ամին	86-30-6	Nitroso-diphenylamine		S	Kg	26,223.00	30 kg bag	6 000.00	Good										Strong oxidizing agents	-
90	2600102800	Ուռնիդ ծծումբ		Instant sulphur			Kg	17.00	40 L barrel	50.00	BAD											
91	2600105400	Արծաթի աղ	131-08-8	Silver salt (sodium anthraquinone)		S	Kg	556.40	GRV	4,540.000	Good	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong oxidizing agents	-
98	2600105600	Դիֆենիլամինա	122-39-4	Diphenylamine			Kg	530.00	L glass bot	4.00	good										Reactive with oxidizing agents.	Excess heat, ignition sources, incompatible materials, light, air.
103	2600112200	Ստիրոլ		Stirol		L	Kg	106.00	30 kg bag	22,850.000	good											
104	2600109600	Մոմ	555-43-1	Paraffin		S	Kg	3,784.40	25 lg bag	2,758.900	Bad										Reactive with oxidizing agents.	Excess heat., incompatible materials
108	2600103400	Թիոդիֆենիլամին (Ֆենոտիազին)	92-84-2	Thiodiphenylamine		S	Kg	22,850.00	200 L barrel	100.00	Bad										Strong oxidizing agents	-

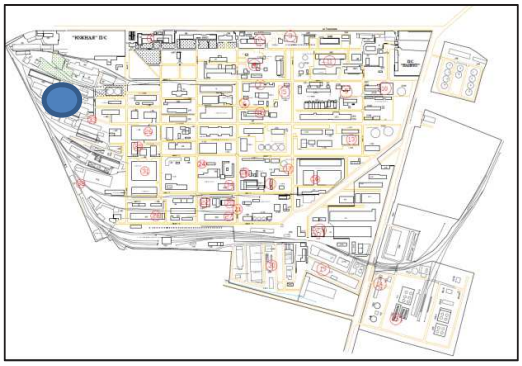
Priority actions to undertake:

Repacking 95 : violent reaction with water

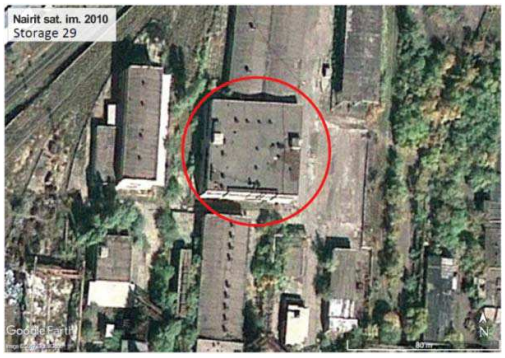
Isolating 77: Oxidizer

STORAGE 29 – LEVEL 0

General map of Nairit plant



Satellite view



Detailed position within the site

Pictures

Security conditions

Structure: All concrete, and a metallic door

Security conditions: Main door closed with a padlock with key. Large opens on outdoor with no protection against the rain and humidity.

September 2017	UN MISSION NAIRIT PLANT - ARMENIA	Annex 5 Risk assessment

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Storage location(s)	Container size	Total Weight	Container conditions										Incompatibility Materials	Condition to Avoid
5	2600111300	Ֆտալոիլային անհիդրիդ	85-44-9	Phtalic anhydrid		S	Kg	1,000.00	29L0-1	Barrel	127	Open										Strong acids, Strong bases, Strong oxidizing agents, Strong reducing agents	Avoid moisture
5	2600111300	Ֆտալոիլային անհիդրիդ		Phtalic anhydrid		S	Kg	1,000.00	29L0-2	25 kg bags	900	Good										Strong acids, Strong bases, Strong oxidizing agents, Strong reducing agents	Avoid moisture
7	2600114500	Անիոնիտ		Anionite		S	Kg	2,763.00	29L0-2	25 kg bags	900	Good			NH	NH	NH	NH	NH	NH	NH		
19	2600500600	Հեքսացիանֆերոտիկալ		Hexacianfertical		S	Kg	3,175.00	29L0-4	25 kg bags	200	Good											
23	2600101400	Դիէթանոլամին	111-42-2	Diethanolamine		L	Kg	5,488.00	29L0-5	25 kg bags	3500	Good										Oxidizing agents, Copper, Zinc, Iron	-
24	2600104200	Դիիզոբուտիլեն	25167-70-8	Diisobutylene		L	Kg	94.00	29L07	200 L Barrel	1300	Bad										Strong oxidizing agents	Heat, flames and sparks. Extremes of temperature and direct sunlight.
28	2600104600	Դիտրեթ-բուտիլհիդրոդիսինոն	88-58-4	Di-te-butylhydroquinone		S	Kg	800.00	29L0-5	200 L Barrel 1 L bottle	1300	Good										Strong oxidizing agents, Strong bases	-
33	2600104300	Դրեզինատնատր	61790-51-0	Dresinate x		S	Kg	829.00	29L0-8	200 L Barrel	50	Good											
37	2600106100	Էթիլենդիմետակրիլ գլիկոլ	97-90-5	Ethylene dimetacryl glycol		L	Kg	4,629.00	29L0-8	200 L Barrel C	2800	Good										Strong acids, Strong oxidizing agents, Strong bases, Reducing agents, Amines, Heavy metals, Peroxides, Free radical initiators.	May polymerize on exposure to light. Exposure to light.
54	2600800100	Բևեկնախեժ		Resin		S	Kg	12,705.00	20L0-5	20 kg bags	850	Medium											
57	2600111700	Կապտաքս	149-30-4	Captax (2-Mercaptobenzothiazole)		S	Kg	20,836.00	29L0-8	200 L Barrel	4180	Bad										Oxidizing agents	-
59	2600107800	Կալցիումի կարբիդ	75-20-7	Calcium carbide		S	Kg	5.00	29L0-1	200 L Barrel	390	Open										Never allow product to get in contact with water during storage.	Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
61	2602200100	Կոագուլյանտ Ա	9003-05-8	Coagulant A		S	Kg	6,722.90	29L0-7	25 kg bags	8200	Medium	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong oxidizing agents	-
62	2602200101	Կոագուլյանտ ՄՐ-473Ա/Կ		Coagulant MR-473 I/K		S	Kg	4,500.00	29L0-8	Open Bag	6	Bad -											
77	2601400300	Նատրիումի նիտրատ	7631-99-4	Sodium nitrate, NaNO3		S	Kg	16,550.00	29L0-2	10 kg bags	2000	Good			3				7			Strong acids, Strong reducing agents, Powdered metals, Organic materials, Alkali metals, Alkaline earth metals, Cyanides, thiocyanates	Fusion of mixtures of metal cyanides, including lead thiocyanate, with metal chlorates, perchlorates, nitrates or nitrites causes a violent explosion. Addition of one solid component (even as a residue in small amount) to another molten component is also highly dangerous. Heat
78	2600102400	Նիտրոզ դիֆենիլ ամին	86-30-6	Nitroso-diphenylamine		S	Kg	26,223.00	29L0-8	10 kg bags	2400	Good										Strong oxidizing agents	-
82	2600500400	Կալիումի պերսուլֆատ	7727-21-1	Potassium persulfate		S	Kg	1,308.80	29L0-2	25 kg bags	2200	Medium										Organic materials, Strong reducing agents, Powdered metals, Strong bases, Alcohols, phosphorous, Anhydrides, Halogens, Acids	Exposure to moisture Heat

September 2017	UN MISSION NAIRIT PLANT - ARMENIA	Annex 5 Risk assessment

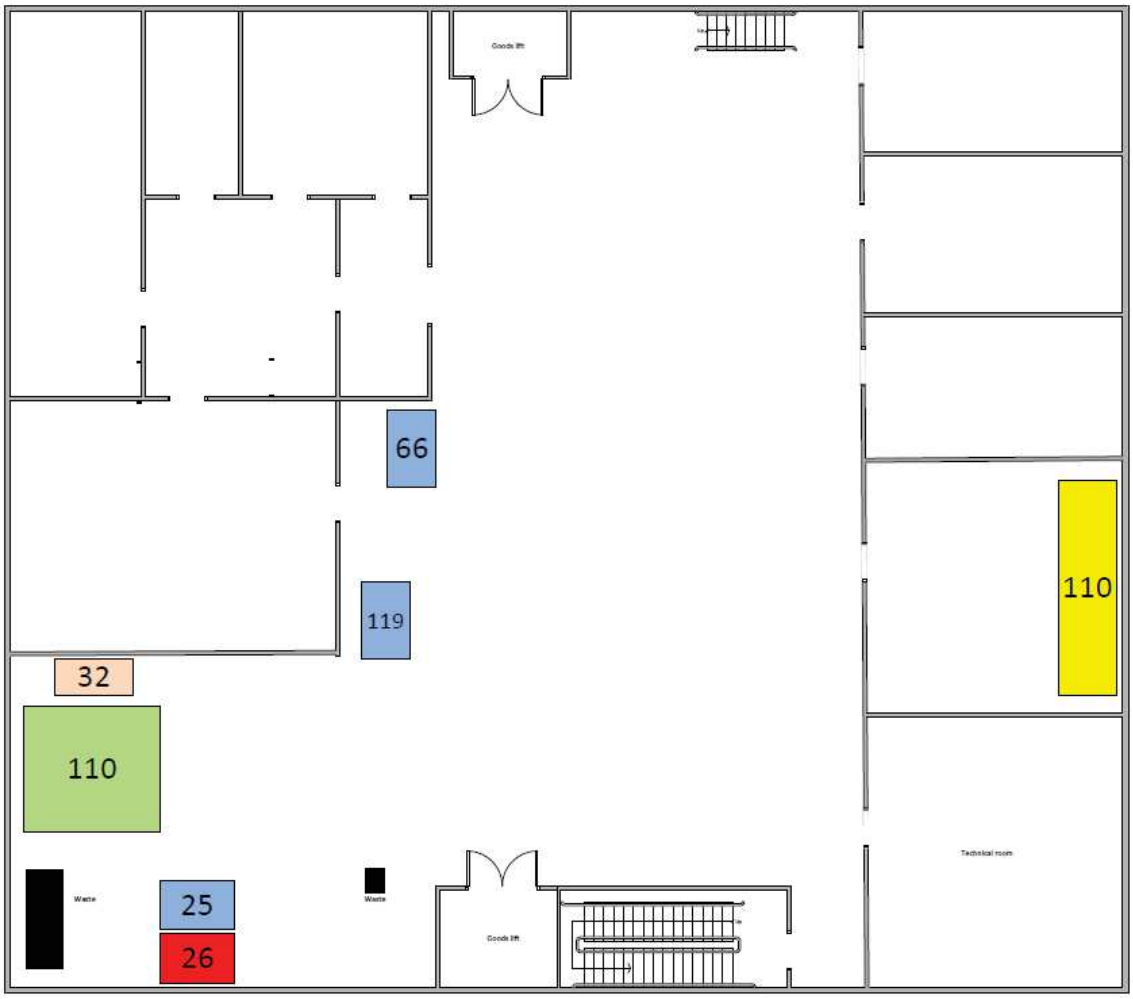
N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Storage location(s)	Container size	Total Weight	Container conditions										Incompatibility Materials	Condition to Avoid
85	2601600100	Պոլիեթեր SQU-3 (պրոդուկտ)		Polyether TGM -3 (polyester?)		L	Kg	5,000.00	29L0-2	50 kg bags	100	Medium											
91	2600105400	Արծաթի աղ	131-08-8	Silver salt (sodium anthraquinone)		S	Kg	556.40	29L0-1	200 L Barrel bags	1472	Medium	NH	NH	NH	NH	NH	NH	NH	NH	NH	Strong oxidizing agents	-
100	2600105500	Սուպերլոր	10043-52-4	Super ice (Calcium chloride)		S	Kg	136.00	29L0-8	50 kg Bags	750	Medium										-	Incompatible materials, dust generation, exposure to moisture or water
104	2600109600	Մոմ	555-43-1	Paraffin		S	Kg	3,784.40	29L0-3	Bags	1300	Medium										Reactive with oxidizing agents.	Excess heat., incompatible materials
110	2600103300	Տիուրամ Ե	97-77-8	Tiuram E		S	Kg	16,039.91	29L0-1	200 L Al Barrel	4400	Good										Strong oxidizing agents	-
120	2600106000	Նատրիումի սուլֆոքսիլատ	149-44-0	Sodium formaldehyde sulfoxylate		S	Kg	2,900.00	29L0-8	200 L barrel P	1400	Good										Strong oxidizing agents, Acids	-
125			14808-60-7	Quartz sand	100	S	Kg	200.00	29L0-8	200 L barrel	22800	Medium	NH	NH	NH	NH	NH	NH	NH	NH	NH		
X				Unkown yellow powder		S	Kg		29L0-1	Bag	45	Open	U	U	U	U	U	U	U				
X				Unknown		S	Kg		29L0-1	Barrel	160	Open	U	U	U	U	U	U	U				
X				Unknown		S	Kg		29L0-1	Barrels			U	U	U	U	U	U	U				
W				Waste		S	Kg		29L0-2	Barrels Bags			U	U	U	U	U	U	U				

Priority actions to undertake:

Isolating the oxidizers: (19, 77)

STORAGE 29 – LEVEL 2

Detailed position within the site



Pictures

Structure: All concrete, and a metallic door

Security conditions: Main door closed with a padlock with key

Security conditions

Structure: All concrete, and a metallic door

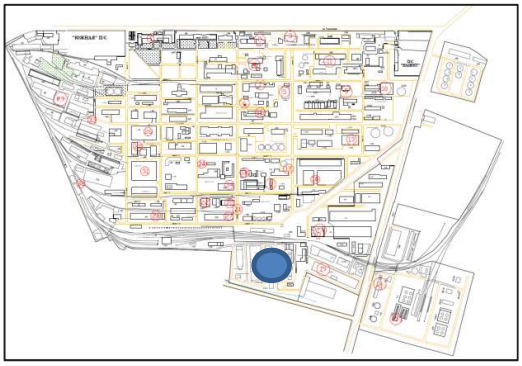
Security conditions: Main door closed with a padlock with key. Large opens on outdoor with no protection against the rain and humidity.

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ	Storage location(s)	Container size	Total Weight	Container conditions	Date of storage	GHS01	GHS02	GHS03	GHS04	GHS05	GHS06	GHS07	GHS08	GHS09	Incompatibility Materials	Condition to Avoid
25	2600106600	Դիքլորէթան	107-06-2	Dichloroethane		L	Kg	789.50	29L1	200 L Barrel	650	Good			◆				◆		◆		Strong oxidizing agents	Heat, flames and sparks. Extremes of temperature and direct sunlight.
26	2601100100	խպեռգատոր ՆՖԿ		Disperator NFK		L	Kg	808.00	29L1	200 L Barrel	789	Good										◆		
32	2600108600	Դուսանտոքս	793-24-8	Dusantox		S	Kg	125.00	29L1	25 kg bags	2500	Good								◆		◆	Reacts with strong acids and oxidizing agents. No further relevant information available.	Store in a cool location. Protect from humidity and water. Avoid storage near extreme heat, ignition sources or open flame.
66	2600112300	Մարֆոլին	110-91-8	Morpholine		L	Kg	700.00	29L1	200 L Barrel	700	Medium			◆			◆	◆		◆		Strong oxidizing agents	Heat, flames and sparks.
110	2600103300	Տիուրամ Ե	97-77-8	Tiuram E		S	Kg	16,039.91	29L1	25 kg bags	2100	Medium								◆	◆	◆	Strong oxidizing agents	-
110	2600103300	Տիուրամ Ե				S	Kg		29L1	25 kg bags	8500	Good								◆	◆	◆	Strong oxidizing agents	-
119	1402300100	Եորդիտեն ՈւՊ 06-3314		Hardener UP 06-3314		L	Kg	236.00	29L1	200 L Barrel	350	Bad												
W				Waste		S	Kg		29L1	Barrels Bags				U	U	U	U	U	U	U	U	U		

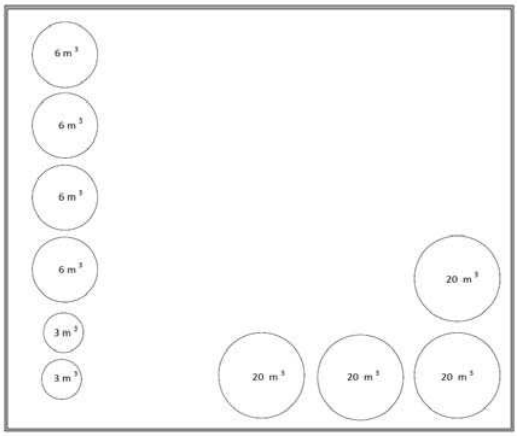
STORAGE 30

General map of Nairit plant



Satellite view

Detailed position within the building



Pictures

Security conditions

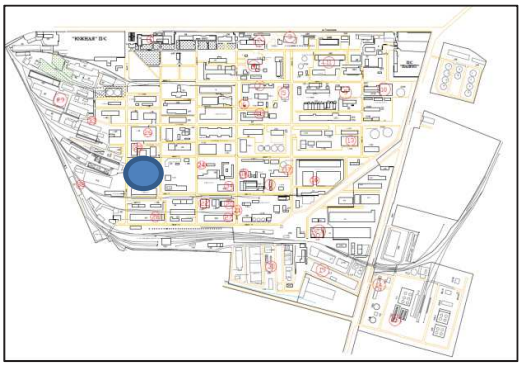
Part of the solution is crystallised

Chemical characteristics table

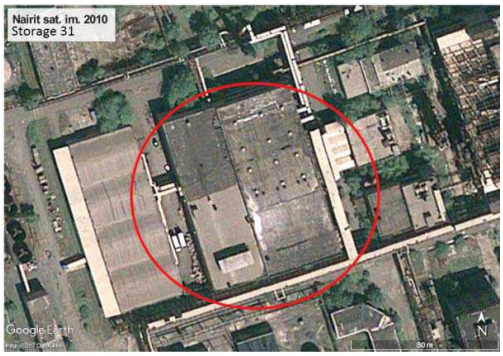
N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
51	2301600100	Կալցիումի քլորիդ լուծույթ (31-33%)	10043-52-4	Calcium chloride	31-33% solution	L	Kg	20,432.00											Strong oxidizing agents	

STORAGE 31

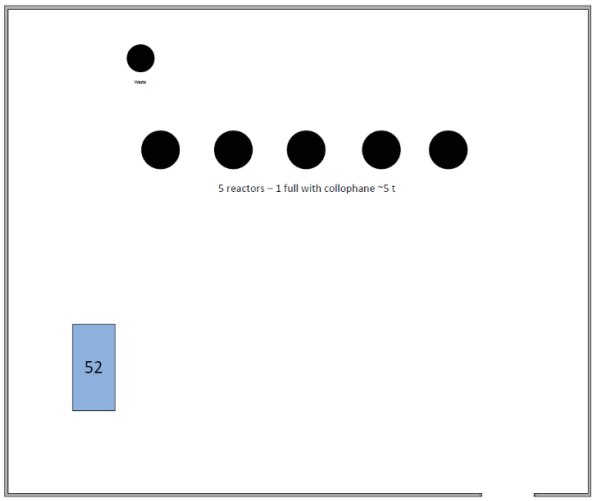
General map of Nairit plant



Satellite view



Detailed position within the building



Pictures

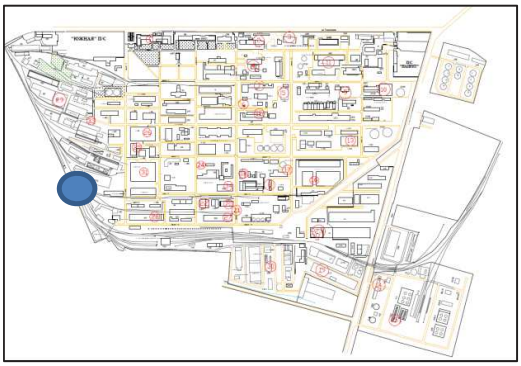
Security conditions

Chemicals characteristics table

N°	Ծածկագիր (Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր	Քանակ										Incompatibility Materials	Condition to Avoid
52	2600800400	Բևեվնախեժ դիսպրոպորցիոնիկ	8052-10-6	Resin disproportional		S	Kg	58,994.00										?	

STORAGE 32

General map of Nairit plant



Satellite view

Detailed position within the building

Pictures

Security conditions

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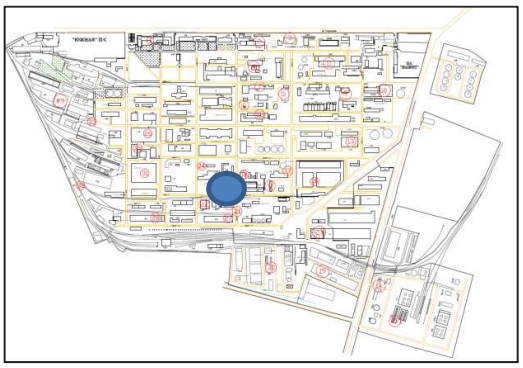
Chemicals characteristics table

N°	Ծածկագիր (Nairit Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր Unit	Քանակ weight / vol										Incompatibility Materials	Condition to Avoid
154		Масла разные		Different oils		L		8 300.0											

Storage mobile

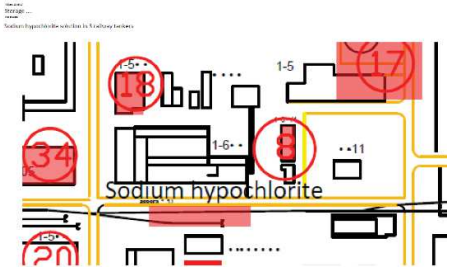
Hypochlorite wagons

General map of Nairit plant

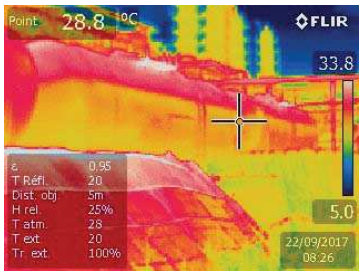


Satellite view

Detailed position within the building



Pictures



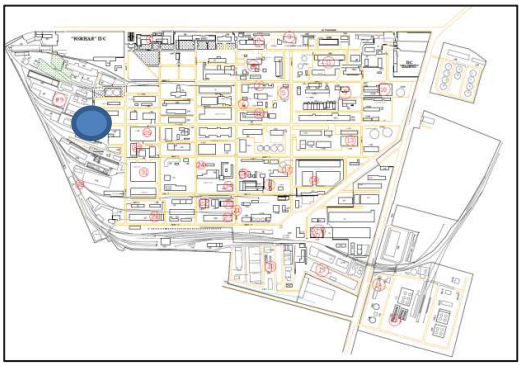
Security conditions

Poor conditions for a thermal sensitive product

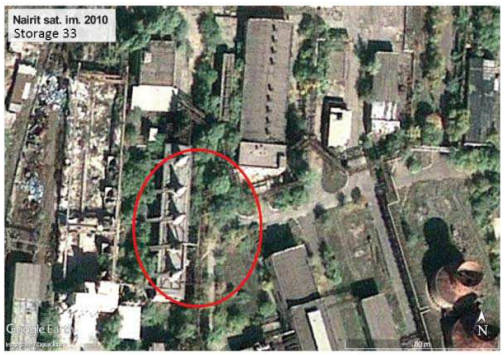
N°	Ծածկագիր (Nairit Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր Unit	Քանակ weight / vol										Incompatibility Materials	Condition to Avoid
143		Гипохлорид натрия (некондиционный)	7681-52-9	Sodium hypochlorite (substandard)	low		m^3	119.1											Contact with acids liberates toxic gas	

STORAGE 33

General map of Nairit plant



Satellite view



Detailed position within the building

Pictures

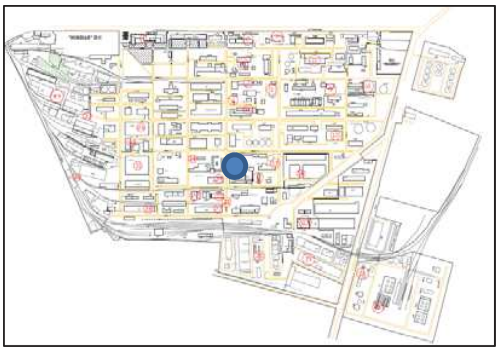
Security conditions

Chemicals characteristics table

N°	Ծածկագիր (Nairit Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր Unit	Քանակ weight / vol										Incompatibility Materials	Condition to Avoid
154		Масла разные		Different oils		L		4 300.0											

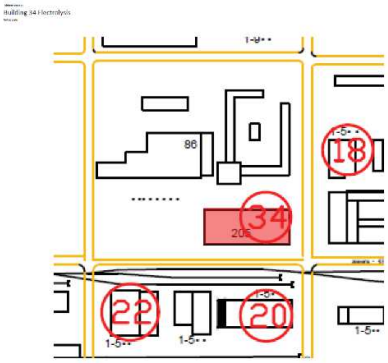
STORAGE 34

General map of Nairit plant



Satellite view

Detailed position within the building



Pictures

Security conditions

Chemicals characteristics table

N°	Ծածկագիր (Nairit Inventory number)	Անվանում (Chemical name)	CAS number	Chemical name	Level of purity	State (S, L, G)	Չափման միավոր Unit	Քանակ weight / vol	1	2	3	4	5	6	7	8	9	Incompatibility Materials	Condition to Avoid
154		Масла разные		Different oils		L		576.0											

ANNEX 6

Compilation of MSDS related to the identified chemicals

Note:

The presented MSDS were not available at Nairit Chemical Plant and have therefore been compiled from other sources and are as accurate as possible

Not all MSDS have been found

Some chemical do not have MSDS

Annex 8

Compilation of the MSDS related to the identified chemicals

Note:

The presented MSDS were not available at Nairit Chemical Plant and have therefore been compiled from other sources and are as accurate as possible

Not all MSDS have been found

Some chemical do not have MSDS

N°	Name
1	2,6-Di-tert-butyl-4-methylphenol
3	Aluminium sulfate
4	Ammonium chloride
5	Phtalic anhydride
6	Aniline
8	2,4,6-Tri-tert-buthylphenol
9	Lowinox 22M46
10	Acetone
11	Nitric acid
12	Ammonia
13	Hydrochloric acid
14	Sodium dichromate
15	Boric acid
16	Ethylene glycol butyl ether - butyl_cellosolve
17	Sodium tetraborate decahydrate - sodium borate
18	Hexamethylenediamine
20	Hydroquinone
21	Cumene Hydroperoxide
22	Dibutyl Phthalate
23	Diethanolamine
24	Diisobutylene
25	1,2-Dichloroethane
28	2,5-Di-tert-butylhydroquinone
29	1,3-Diphenylguanidine
30-31	tert-Dodecylmercaptan
32	Dusantox 6PPD
34	Ethylene thiourea
35	Epoxy resin example
36	Ethyl acetate
37	Ethylene glycol dimethacrylate
38	Ehtylene glycol
40	Sodium dodecyl sulfate
41	Lomar PW

42 Lovenox-Sodium 2-naphtalenesulfonate
43 Chloroform
44 Chloroparafin
45 Sulfuric acid 96%
46 Sulfuric acid 78% used
47 Sulfuric acid 84% used
49 Potassium hexacyanoferrate(III)
50 Potassium chloride
51 Calcium chloride solution
53 Gum rosin
55 Butadiene rubber SKD
56 Rubber SMR-20
57 2-Mercaptobenzothiazole
59 Calcium carbide
60 Acetic acid 100%
61 Polyacrilamide
63 Lead(II) chromate
64 Oil PMS-200 Dimethicone
66 Morpholine
67 Copper(I) chloride
68 Copper(II) sulfate pentahydrate
69 Methyl methacrylate
70 1-Methyl-2-pyrrolidone
71 Carbon
73 Sodium hexafluorosilicate
74 Sodium thiosulfate
75 Neozone N-Phenyl-1-naphthylamine
76 Neozone D N-Phenyl-2-naphtylamine
77 Sodium nitrite
78 N-Nitrosodiphenylamine
79 Urotropine Hexamethylenetetramine
80 Paraffin
81 Formaldehyde solution
82 Potassium persulfate
83 Polyethylene

84 Polyether 24K
86 Sodium polyphosphate
87 Silicon dioxide
91 Sodium anthraquinone-2-sulfonate
92 Silica gel
93 Resin 101K
95 Sodium hydrosulfite
96 Sodium dibutyldithiocarbamate
97 Sodium dodecyl (Lauryl) Sulfate 30%
98 Diphenylamine
99 Sodium Sulfite
100 Sodium Pholyphosphate
101 Ethanol
102 Styrene
104 Tristearin (Parafin)
105 Toluene
106 Vinyltoluene
107 Talc
108 Phenothiazine
109 Tetraethylthiuram disulfide D
110 Tetraethylthiuram disulfide E
111 Antimony(III) oxide
112 4-tert-Butylcatechol
113 Triethanolamine
114 Sodium tripolyphosphate
115 Zeolite (NaX)
116 Manganese(IV) oxide
117 Zinc Oxide
120 Sodium hydroxymethanesulfinate hydrate
121 Sodium chloride solution
130 Sodium hydroxide
135 Ammonium chloride
135 Copper(I) chloride
136 3,4-Dichloro-1-butene
141 Propionic acid

142 Diisopropyl ether
145 Chlorine
151 Ethanolamine
152 Bentonite
162 Chloroprene solution

SIGMA-ALDRICH

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.5 Revision Date 28.01.2016
Print Date 11.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	2,6-Di-*tert*-butyl-4-methylphenol
Product Number	:	B1378
Brand	:	Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	128-37-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word	Warning
Hazard statement(s) H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	none
Supplemental Hazard	none

Statements

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_{15}H_{24}O$
Molecular weight	:	220,35 g/mol
CAS-No.	:	128-37-0
EC-No.	:	204-881-4

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
2,6-di-tert-Butyl-p-cresol			
CAS-No. EC-No.	128-37-0 204-881-4	Aquatic Acute 1; Aquatic Chronic 1; H400, H410 M-Factor - Aquatic Acute: 1	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber

Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder, crystalline Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 69 - 73 °C - lit.
f)	Initial boiling point and boiling range	265 °C - lit.
g)	Flash point	127,0 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	0,01 hPa at 20,0 °C
l)	Vapour density	No data available
m)	Relative density	1,05 g/cm3 at 20 °C
n)	Water solubility	0,0004 g/l at 20 °C - slightly soluble
o)	Partition coefficient: n-octanol/water	log Pow: 5,1
p)	Auto-ignition temperature	470,0 °C
q)	Decomposition temperature	No data available

r)	Viscosity	3,47 mm2/s at 80 °C -
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Solubility in other solvents	Toluene - soluble Methanol - soluble Acetone - soluble
Dissociation constant	12,2

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Acid chlorides, Acid anhydrides, Oxidizing agents, Bases, Brass, Copper

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - > 6.000 mg/kg
(OECD Test Guideline 401)

LD50 Dermal - Rat - male and female - > 2.000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(Read-across (Analogy))

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

Mouse - male and female
Result: negative

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (2,6-di-tert-Butyl-p-cresol)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity: Rat - male and female - Oral - NOAEL : 25 mg/kg
RTECS: GO7875000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oryzias latipes - 5,3 mg/l - 48 h
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 0,48 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to bacteria	Growth inhibition EC50 - Protozoa - 1,7 mg/l - 24 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077	IMDG: 3077	IATA: 3077

14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (2,6-di-tert-Butyl-p-cresol)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (2,6-di-tert-Butyl-p-cresol)
IATA: Environmentally hazardous substance, solid, n.o.s. (2,6-di-tert-Butyl-p-cresol)

14.3 Transport hazard class(es)

ADR/RID: 9	IMDG: 9	IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.0 Revision Date 17.05.2016
Print Date 11.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Aluminum sulfate
Product Number	:	202614
Brand	:	Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	10043-01-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Corrosive to metals (Category 1), H290
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word Danger

Hazard statement(s)

H290	May be corrosive to metals.
H318	Causes serious eye damage.

Precautionary statement(s)	
P280	Wear eye protection/ face protection.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$Al_2O_{12}S_3$
Molecular weight	:	342,15 g/mol
CAS-No.	:	10043-01-3
EC-No.	:	233-135-0

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Aluminium sulphate			
CAS-No. EC-No.	10043-01-3 233-135-0	Met. Corr. 1; Eye Dam. 1; H290, H318	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic Store under inert gas.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 770 °C - dec.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable. - Flammability (solids)
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	2,71 g/mL at 25 °C
n)	Water solubility	1.000 g/l at 20 °C - OECD Test Guideline 105 - completely miscible

o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not explosive
t)	Oxidizing properties	The product has been shown not to be oxidizing in a test following Directive 67/548/EEC (Method A17, Oxidizing properties).

9.2 Other safety information

Surface tension	73 mN/m at 20 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Air Exposure to moisture

10.5 Incompatible materials
Incompatible with strong bases and oxidizing agents., Ammonia, Water, Amines

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Sulphur oxides, Aluminum oxide
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - > 5.000 mg/kg
(OECD Test Guideline 401)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irritating to eyes.
(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

Rat
Cytogenetic analysis

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

Reproductive toxicity - Rat - Intratesticular
Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).
Paternal Effects: Testes, epididymis, sperm duct.

Reproductive toxicity - Mouse - Intraperitoneal
Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Behavioral.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: BD1700000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 38,2 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3260	IMDG: 3260	IATA: 3260

14.2 UN proper shipping name

ADR/RID:	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (Aluminium sulphate)
IMDG:	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (Aluminium sulphate)
IATA:	Corrosive solid, acidic, inorganic, n.o.s. (Aluminium sulphate)

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H318	Causes serious eye damage.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.4 Revision Date 22.10.2014
Print Date 11.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Ammonium chloride
Product Number	:	A9434
Brand	:	Sigma
Index-No.	:	017-014-00-8
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	12125-02-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Eye irritation (Category 2), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xn	Harmful	R22
Xi	Irritant	R36

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.

H319	Causes serious eye irritation.
Precautionary statement(s)	
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Salmiac
Formula	:	H_4ClN
Molecular weight	:	53,49 g/mol
CAS-No.	:	12125-02-9
EC-No.	:	235-186-4
Index-No.	:	017-014-00-8

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Ammonium chloride			
CAS-No. EC-No. Index-No.	12125-02-9 235-186-4 017-014-00-8	Acute Tox. 4; Eye Irrit. 2; H302, H319	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Ammonium chloride			
CAS-No. EC-No. Index-No.	12125-02-9 235-186-4 017-014-00-8	Xn, R22 - R36	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Hygroscopic.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Crystalline powder
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	4,5 - 5,5 at 50,00000 g/l at 20,0 °C
e)	Melting point/freezing point	340,0 °C
f)	Initial boiling point and boiling range	No data available
g)	Flash point	Not applicable

h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1,3 hPa at 160,4 °C
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	500 kg/m3

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture may affect product quality.

10.5 Incompatible materials
Strong acids, Strong bases, Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1.650 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation

Respiratory or skin sensitisation
Will not occur

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: BP4550000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Cyprinus carpio (Carp) - 209,00 mg/l - 96 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 3,98 mg/l - 96 h
	NOEC - Oncorhynchus mykiss (rainbow trout) - 57 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 161 mg/l - 48 h
	Growth inhibition NOEC - Daphnia magna (Water flea) - 0,1 mg/l - 216 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -	IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H319	Causes serious eye irritation.

Full text of R-phrases referred to under sections 2 and 3

Xn	Harmful
R22	Harmful if swallowed.
R36	Irritating to eyes.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 17.08.2016
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Phthalic anhydride
Product Number	:	320064
Brand	:	Sigma-Aldrich
Index-No.	:	607-009-00-4
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	85-44-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Respiratory sensitisation (Category 1), H334
Skin sensitisation (Category 1), H317
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)	
H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
Precautionary statement(s)	
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P342 + P311	If experiencing respiratory symptoms: Call a POISON CENTER/doctor.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_8H_4O_3$
Molecular weight	:	148,12 g/mol
CAS-No.	:	85-44-9
EC-No.	:	201-607-5
Index-No.	:	607-009-00-4

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Phthalic anhydride			
CAS-No. EC-No. Index-No.	85-44-9 201-607-5 607-009-00-4	Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; Resp. Sens. 1; Skin Sens. 1; STOT SE 3; H302, H315, H318, H334, H317, H335	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: flakes Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	2 at 6 g/l at 20 °C
e)	Melting point/freezing point	Melting point/range: 131 - 134 °C - lit.
f)	Initial boiling point and boiling range	284 °C - lit.
g)	Flash point	152 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 10,4 %(V) Lower explosion limit: 1,7 %(V)
k)	Vapour pressure	< 0,01 hPa at 20 °C
l)	Vapour density	No data available
m)	Relative density	1,53 g/cm3 at 20 °C
n)	Water solubility	16,4 g/l at 20 °C - soluble
o)	Partition coefficient: n-octanol/water	log Pow: 1,6 at 20 °C
p)	Auto-ignition temperature	580 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	32,7 mN/m at 180 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Avoid moisture.

10.5 Incompatible materials
Strong acids, Strong bases, Strong oxidizing agents, Strong reducing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 1.530 mg/kg

LC50 Inhalation - Rat - 4 h - > 2,14 mg/l
(OECD Test Guideline 403)

LD50 Dermal - Rabbit - > 10.000 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Moderate eye irritation
(Draize Test)

Respiratory or skin sensitisation
Maximisation Test - Guinea pig
May cause allergic skin reaction.
(OECD Test Guideline 406)

in vivo assay - Guinea pig
May cause allergic respiratory reaction.

Germ cell mutagenicity
reverse mutation assay
S. typhimurium
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity: Rat - male and female - Oral - NOAEL : 500 mg/kg
RTECS: TI3150000

prolonged or repeated exposure can cause:, Liver injury may occur., Kidney injury may occur., Exposure to and/or consumption of alcohol may increase toxic effects., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Danio rerio (zebra fish) - 560 mg/l - 7 d
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 640 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 60 - 350 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability: Biotic/Aerobic - Exposure time 14 d
Result: 85 % - Readily biodegradable
(OECD Test Guideline 301)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Harmful to aquatic life.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 04.12.2014
Print Date 11.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Aniline
Product Number	:	242284
Brand	:	Sigma-Aldrich
Index-No.	:	612-008-00-7
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	62-53-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Acute toxicity, Oral (Category 3), H301
Serious eye damage (Category 1), H318
Skin sensitisation (Category 1), H317
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure (Category 1), Blood, H372
Specific target organ toxicity - repeated exposure (Category 1), H372
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

T	Toxic	R23/24/25, R48/23/24/25 R40 R68
Xi	Irritant	R41

		R43
N	Dangerous for the environment	R50

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word	Danger
Hazard statement(s)	
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H341	Suspected of causing genetic defects.
H351	Suspected of causing cancer.
H372	Causes damage to organs (Blood) through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P261	Avoid breathing vapours.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P311	Call a POISON CENTER or doctor/ physician.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
Rapidly absorbed through skin.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C_6H_7N
Molecular weight	:	93,13 g/mol
CAS-No.	:	62-53-3
EC-No.	:	200-539-3
Index-No.	:	612-008-00-7

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Aniline			
CAS-No. EC-No. Index-No.	62-53-3 200-539-3 612-008-00-7	Acute Tox. 3; Eye Dam. 1; Skin Sens. 1; Muta. 2; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H301 + H311 + H331, H317, H318, H341, H351, H372, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component	Classification	Concentration

Aniline			
CAS-No. EC-No. Index-No.	62-53-3 200-539-3 612-008-00-7	T, N, Carc.Cat.3, Mut.Cat.3, R23/24/25 - R40 - R41 - R43 - R48/23/24/25 - R68 - R50	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Handle under inert gas. Protect from moisture. Light sensitive.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0,6 mm
Break through time: 90 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of

anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	8,8 at 36 g/l at 20 °C
e)	Melting point/freezing point	Melting point/range: -6 °C - lit.
f)	Initial boiling point and boiling range	184 °C - lit.
g)	Flash point	70 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 23 %(V) Lower explosion limit: 1,3 %(V)
k)	Vapour pressure	0,49 hPa at 20 °C 0,8 hPa at 20 °C
l)	Vapour density	3,22 - (Air = 1.0)
m)	Relative density	1,022 g/cm3 at 25 °C
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0,91
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	190 °C -
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	42,12 mN/m at 25 °C

Relative vapour density 3,22 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Iron and iron salts., Zinc

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 250 mg/kg

LC50 Inhalation - Mouse - 4 h - 248 ppm

LD50 Dermal - Rabbit - 836 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Severe eye irritation

Respiratory or skin sensitisation
May cause sensitisation by skin contact.

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Aniline)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure. - Blood

Aspiration hazard
No data available

Additional Information
RTECS: BW6650000

Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer., Cyanosis, Headache, Vomiting, Nausea, Incoordination., fatigue, Dizziness, Drowsiness, Confusion., Weakness, Unconsciousness, Symptoms may be delayed.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 10,6 mg/l - 96,0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 80 - 380 mg/l - 48 h
	semi-static test EC50 - Daphnia magna (Water flea) - 0,16 mg/l - 48 h
Toxicity to algae	EC50 - SELENASTRUM - 19 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 30 d Result: 90 % - Readily biodegradable. (OECD Test Guideline 301D)

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 1547 IMDG: 1547 IATA: 1547

14.2 UN proper shipping name
ADR/RID: ANILINE
IMDG: ANILINE
IATA: Aniline

14.3 Transport hazard class(es)

ADR/RID: 6.1	IMDG: 6.1	IATA: 6.1

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Dam.	Serious eye damage
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
H341	Suspected of causing genetic defects.
H351	Suspected of causing cancer.

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
T	Toxic
R23/24/25	Toxic by inhalation, in contact with skin and if swallowed.
R40	Limited evidence of a carcinogenic effect.
R41	Risk of serious damage to eyes.
R43	May cause sensitisation by skin contact.
R48/23/24/25	Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.
R50	Very toxic to aquatic organisms.
R68	Possible risk of irreversible effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 10.02.2015
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : 2,4,6-Tri-*tert*-butylphenol

Product Number : T49409
Brand : Aldrich
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 732-26-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xn, N	Harmful, Dangerous for the environment	R22, R51/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H400 Very toxic to aquatic life.

Precautionary statement(s)	
P273	Avoid release to the environment.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P391	Collect spillage.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_{18}H_{30}O$
Molecular weight	:	262,43 g/mol
CAS-No.	:	732-26-3
EC-No.	:	211-989-5

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
2,4,6-Tri-tert-butylphenol			
CAS-No. EC-No.	732-26-3 211-989-5	Acute Tox. 4; Aquatic Acute 1; H302, H400	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
2,4,6-Tri-tert-butylphenol			
CAS-No. EC-No.	732-26-3 211-989-5	Xn, N, R22 - R51/53	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 125 - 130 °C - lit.
f)	Initial boiling point and boiling range	277 °C - lit.
g)	Flash point	130,00 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Bases, Acid chlorides, Acid anhydrides, Oxidizing agents, Brass, Copper

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: SN3570000

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 0,061 mg/l - 96,0 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077	IMDG: 3077	IATA: 3077

14.2 UN proper shipping name

ADR/RID:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (2,4,6-Tri-tert-butylphenol)
IMDG:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (2,4,6-Tri-tert-butylphenol)
IATA:	Environmentally hazardous substance, solid, n.o.s. (2,4,6-Tri-tert-butylphenol)

14.3 Transport hazard class(es)

ADR/RID: 9	IMDG: 9	IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
H302	Harmful if swallowed.
H400	Very toxic to aquatic life.

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xn	Harmful
R22	Harmful if swallowed.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

LOWINOX® 22M46 stabilizer

Phenolic Antioxidant

Distribute by Double A Plus Intertrade co.,ltd.
www.aachemical.com

Description

LOWINOX® 22M46 stabilizer is a non-discoloring antioxidant based on a sterically hindered alkylated bis-phenol.

Chemical Name

Phenol, 2,2'-methylenebis[6-(1,1-dimethylethyl)-4-methyl-

Synonym

2,2'-Methylenebis(6-t-butyl-4-methylphenol) 2,2'-Methylenebis(6-t-butyl-4-methylphenol)

CAS-Number:

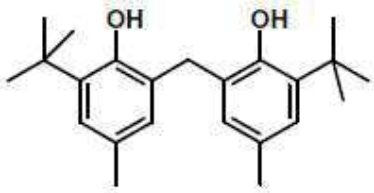
119-47-1

EINECS-Number:

204-327-1

Formula

LOWINOX® 22M46 stabilizer



Typical physical properties of LOWINOX® 22M46 stabilizer

Appearance	White to off-white powder (milled/unmilled) or granules (gr)
Melting range [°C]	128 - 132
Molecular weight [g/mol]	341
Bulk density [kg/m^3]	300 (milled) / 460 (unmilled) / 530 (gr)

Solubility (g/100g solvent) @ 25°C

n-Hexane	7	Methanol	28
Ethyl Acetate	139	Toluene	53
Acetone	>200	Water	<0.1
Chloroform	62	Ethanol	80

Thermogravimetric Analysis (10 mg @ 10 K/minute under N_2)

Weight Loss [%]	5	10	25
Temperature [°C]	178	180	210

Application

LOWINOX® 22M46 stabilizer is an excellent long term stabilizer for synthetic rubbers and latexes by protecting against the effects of oxygen and heat without influencing processing or vulcanization properties. At the recommended doses, the damaging consequences of over vulcanization can be avoided. At these levels there is no tendency for blooming to occur during vulcanization and on contact with lacquered surfaces it does not cause discoloration or corona formation. In light colored vulcanizates **LOWINOX® 22M46 stabilizer** retards the crazing effect caused by exposure to light. Prolonged light exposure of purely white vulcanizates containing **LOWINOX® 22M46 stabilizer** will result in the formation of a pink tint which is masked in light colored compounds. **LOWINOX® 22M46 stabilizer** also has insignificant volatility with the absence of migration and so is an excellent long term stabilizer for thermoplastics such as polyoxymethylene (POM) and ABS. When used in combination with thio fatty acid esters or organic phosphites **LOWINOX® 22M46 stabilizer** forms synergistic systems with visibly increased effectiveness.

Food Contact

This compound has broad food contact approvals; for details please contact Addivant™ Regulatory Affairs Polymer Additives.

Handling and Storage

The use of proper protective equipment is recommended. Excess exposure to the product should be avoided. Wash thoroughly after handling. Store the product in a cool, dry, well-ventilated area away from incompatible materials. Unless otherwise stated, the shelf life of the product is 1 year when it is properly stored.

For additional handling and toxicological information consult the Addivant™ Material Safety Data Sheet.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.11 Revision Date 10.02.2016
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Acetone
Product Number	:	650501
Brand	:	Sigma-Aldrich
Index-No.	:	606-001-00-8
REACH No.	:	01-2119471330-49-XXXX
CAS-No.	:	67-64-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Eye irritation (Category 2), H319
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.

Precautionary statement(s)

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear eye protection/ face protection.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P403 + P235	Store in a well-ventilated place. Keep cool.

Supplemental Hazard information (EU)

EUH066	Repeated exposure may cause skin dryness or cracking.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C_3H_6O
Molecular weight	:	58,08 g/mol
CAS-No.	:	67-64-1
EC-No.	:	200-662-2
Index-No.	:	606-001-00-8
Registration number	:	01-2119471330-49-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Acetone			
CAS-No.	67-64-1	Flam. Liq. 2; Eye Irrit. 2; STOT SE 3; H225, H319, H336	<= 100 %
EC-No.	200-662-2		
Index-No.	606-001-00-8		
Registration number	01-2119471330-49-XXXX		

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Skin contact	Long-term systemic effects	186mg/kg BW/d
Consumers	Ingestion	Long-term systemic effects	62mg/kg BW/d

Consumers	Skin contact	Long-term systemic effects	62mg/kg BW/d
Workers	Inhalation	Acute systemic effects	2420 mg/m3
Workers	Inhalation	Long-term systemic effects	1210 mg/m3
Consumers	Inhalation	Long-term systemic effects	200 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	33,3 mg/kg
Marine water	1,06 mg/l
Fresh water	10,6 mg/l
Marine sediment	3,04 mg/kg
Fresh water sediment	30,4 mg/kg
Onsite sewage treatment plant	100 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air

respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -94 °C
f)	Initial boiling point and boiling range	56 °C at 1.013 hPa
g)	Flash point	-16,99 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 13 %(V) Lower explosion limit: 2 %(V)
k)	Vapour pressure	533,3 hPa at 39,5 °C 245,3 hPa at 20,0 °C
l)	Vapour density	No data available
m)	Relative density	0,791 g/mL at 25 °C
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -0,24
p)	Auto-ignition temperature	465,0 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	23,2 mN/m at 20,0 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Bases, Oxidizing agents, Reducing agents, Acetone reacts violently with phosphorous oxychloride.

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 5.800 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Tremor. Behavioral:Headache. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

LC50 Inhalation - Rat - 8 h - 50.100 mg/m3
Remarks: Drowsiness Dizziness Unconsciousness

LD50 Dermal - Guinea pig - 7.426 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
- Guinea pig
Result: Does not cause skin sensitisation.

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: AL3150000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney - Irregularities - Based on Human Evidence
Skin - Dermatitis - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 5.540 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 8.800 mg/l - 48 h
Toxicity to algae	Remarks: No data available

12.2 Persistence and degradability

Biodegradability: Result: 91 % - Readily biodegradable
(OECD Test Guideline 301B)

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1090 IMDG: 1090 IATA: 1090

14.2 UN proper shipping name

ADR/RID: ACETONE
IMDG: ACETONE
IATA: Acetone

14.3 Transport hazard class(es)

ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packaging group

ADR/RID: II IMDG: II IATA: II

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

EUH066	Repeated exposure may cause skin dryness or cracking.
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 6.0 Revision Date 31.12.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Nitric acid
Product Number	:	309079
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7697-37-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Oxidizing liquids (Category 2), H272
Corrosive to metals (Category 1), H290
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1A), H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word Danger

Hazard statement(s)
H272 May intensify fire; oxidizer.

H290	May be corrosive to metals.
H311 + H331	Toxic in contact with skin or if inhaled.
H314	Causes severe skin burns and eye damage.

Precautionary statement(s)

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220	Keep/Store away from clothing/ combustible materials.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard information (EU)

EUH071	Corrosive to the respiratory tract.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Formula : HNO_3

Molecular weight : 63,01 g/mol

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Nitric acid			
CAS-No. EC-No. Index-No.	7697-37-2 231-714-2 007-004-00-1	Ox. Liq. 2; Met. Corr. 1; Skin Corr. 1A; H272, H290, H314 Concentration limits: >= 20 %: Skin Corr. 1A, H314; 5 - < 20 %: Skin Corr. 1B, H314; 65 - < 99 %: Ox. Liq. 3, H272; >= 99 %: Ox. Liq. 2, H272; 1 - < 3 %: Eye Irrit. 2A, H319; 3 - < 5 %: 1, H318; >= 1 %: Met. Corr. 1, H290; 1 - < 5 %: Skin Irrit. 2, H315;	>= 90 - <= 100 %
Dinitrogen trioxide			
CAS-No. EC-No.	10544-73-7 234-128-5	Ox. Gas 1; Press. Gas Compr. Gas; Acute Tox. 2; Skin Corr. 1B; H270, H280, H330, H310, H314	>= 10 - < 20 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Keep away from heat and sources of ignition.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Strongly oxidizing hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0,6 mm
Break through time: 120 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	< 1 at 20 °C
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	100 °C at 1.013 hPa
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	11 hPa at 20 °C
l)	Vapour density	No data available
m)	Relative density	1,48 g/cm3 at 20 °C
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Acids, Reducing agents, Alcohols, Acetic anhydride, Acrylonitrile, Acetonitrile, Organic materials, Alkali metals

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: QU5900000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2032 IMDG: 2032 IATA: 2032

14.2 UN proper shipping name

ADR/RID: NITRIC ACID, RED FUMING
IMDG: NITRIC ACID, RED FUMING
IATA: Nitric acid, red fuming
Passenger Aircraft: Not permitted for transport
Cargo Aircraft: Not permitted for transport

14.3 Transport hazard class(es)

ADR/RID: 8 (5.1, 6.1) IMDG: 8 (5.1, 6.1) IATA: 8 (5.1, 6.1)

14.4 Packaging group

ADR/RID: I IMDG: I IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

EUH071	Corrosive to the respiratory tract.
H270	May cause or intensify fire; oxidizer.
H272	May intensify fire; oxidizer.
H280	Contains gas under pressure; may explode if heated.
H290	May be corrosive to metals.
H310	Fatal in contact with skin.
H311	Toxic in contact with skin.
H311 + H331	Toxic in contact with skin or if inhaled.

H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H331	Toxic if inhaled.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

AFROX
A Member of The Linde Group

MATERIAL SAFETY DATA SHEET (MSDS)
AMMONIA
(Please ensure that this MSDS is received by the appropriate person)

DATE: September 2015 Version 3

Ref. No.: MS025

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name	Ammonia
Chemical Formula	NH_3
Trade name	Ammonia
Colour coding	Silver body with a Red(A.11) circle below the valve, and a yellow band immediately below the red circle
Valve	CGA240-3/8 inch – 18 NGT right hand female
Company Identification	African Oxygen Limited 23 Webber Street Johannesburg, 2001 Tel. No: (011) 490-0400 Fax No: (011) 490-0506
EMERGENCY NUMBER	**0860111185 or (011) 873 4382** (24 hours)

2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Ammonia
Chemical family	Corrosive, caustic, reactive gas
Synonyms	Anhydrous ammonia, R717
CAS No.	7664-41-7
UN No.	1005
ERG No.	125
Hazchem	Warning Corrosive toxic gas

3 HAZARDS IDENTIFICATION

Main Hazards Irritating or corrosive to exposed tissues. Inhalation of vapours may result in pulmonary oedema and chemical pneumonitis. Contact with liquid product may cause frostbite or freeze burns, in exposed tissues. All cylinders are portable gas containers and must be regarded as pressure vessels at all times.

Adverse Health Effects. Inhalation of high concentrations produces violent coughing due to the local action on the respiratory tract. If rapid escape is not possible, severe lung irritation, pulmonary oedema and death can result. Lower concentrations cause eye irritation, laryngitis and bronchitis.

Biological Hazards. Because of its alkaline properties, long-term exposure to flora can cause damage. Aquatic fauna can also be affected should the pH of their environment change due to long-term exposure to high concentrations of ammonia.

Vapour Inhalation. Ammonia acts principally on the upper respiratory tract, where it exerts an alkaline, caustic action. It produces respiratory reflexes such as coughing and arrest of respiration. It affects the conjunctiva and cornea immediately. Inhalation causes acute inflammation of the respiratory organs, coughing, oedema of the lungs, chronic bronchial catarrh, secretion of saliva and retention of urine.

Eye Contact Exposure to high gas concentrations may cause temporary blindness and severe eye damage. Direct contact of the eyes with liquid anhydrous ammonia will produce serious eye burns.

Skin Contact Liquid anhydrous ammonia produces skin burns on contact.

Ingestion Swallowing of the liquid results in severe corrosive action of the mouth, throat, and stomach.

Labelling Elements:

Hazard Pictograms

Signal Word: Danger

Hazard Statements:

H221: Flammable gas
H331: Toxic if inhaled
H314: Causes severe skin burns and eye damage
H400: Very toxic to aquatic life

Precautionary Statements:

(SEE FIRST AID MEASURES SECTION FOR TREATMENTS)

P260: Do not breathe gas/vapours
P262: Do not get in eyes, on skin, or on clothing
P264: Wash hands thoroughly after handling
P271: Use only outdoors or in a well ventilates area
P273: Avoid release to the environment
P391: Collect spillage
P284: Wear respiratory protection
P304+P340: IF INHALED: remove to fresh air and keep at rest in a position comfortable for breathing
P310: Immediately call a POISON CENTRE or doctor/physician
P320: Specific treatment is urgent (see first aid measures section)
P301+P330+P331: IF SWALLOWED: Rinse mouth. Do not induce vomiting
P303+P361+P353: IF ON SKIN (or hair): Immediately remove or take off all contaminated clothing. Immediately rinse skin with water/shower
P363: Wash contaminated clothing before re-use.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P401: Store in accordance with national regulations
P403+233: Store in a well ventilated place and keep container tightly closed
P405: Store locked up
P501: Do not dispose contents/container to storm water drains, treat as hazardous waste.

4 FIRST AID MEASURES

Prompt medical attention is mandatory in all cases of overexposure. Rescue personnel should be equipped with self-contained breathing apparatus. Any conscious person who has inhaled ammonia causing irritation should be assisted to an uncontaminated area and inhale fresh air. A person overcome by ammonia should immediately be carried to an uncontaminated area. If breathing has ceased, artificial respiration must be started immediately, preferably by trained personnel. If breathing is weak or has been restored by artificial respiration, oxygen may be administered. Summon a physician immediately for anyone who has been burned or overcome by ammonia. Until a physician arrives, and after having accomplished a thorough removal of ammonia as possible, keep the patient warm and quiet, and take such specific action as may be indicated.

Eye Contact Persons with potential exposure to ammonia should not wear contact lenses. Call a physician at once. Immediately begin irrigation of the eyes with copious amounts of clean water while holding the eyelids apart. Continue irrigation for 15 minutes. Repeat this procedure every 10 minutes for an hour, each time irrigating for a period of 5 minutes. If readily available, a 5% boric acid solution may be used instead of water, but irrigation must not be delayed while such a solution is sought or prepared. Prompt and thorough irrigation is of primary importance. Any standard anaesthetic solution for ophthalmic use ordered by the physician may be instilled for control of severe pain, but only after the 15 minute period of irrigation has been completed. Continuous cold boric acid compresses should be used for cases of severe injury, in addition to irrigation. No oils or ointments should be instilled until after the eye has been examined by a qualified physician, and then only as prescribed by him. Ulcers of the cornea should be treated by an ophthalmologist.

Skin Contact If skin contact is extensive and emergency showers available, the victim should get under the emergency shower immediately. Contaminated clothing and shoes should be removed under the shower. In other cases, the affected areas should be washed thoroughly with large amounts of running water for at least 15 minutes. Do not apply salves or ointments or cover burns with dressing; however, protect the injured area with a clean cloth prior to medical care. Do not attempt to neutralise the ammonia. Subsequent medical treatment is otherwise the same as for thermal burns

Inhalation The conscious person who has inhaled a concentration of ammonia which causes irritation effects should go to an uncontaminated area and inhale fresh air or oxygen. Eye, nose and throat irritation should be treated as described below for more serious exposures. However, if the exposure has been to minor concentrations for a limited time, usually no treatment will be required. A worker overcome by ammonia must be carried to an uncontaminated atmosphere and, if breathing is laboured or has ceased, given artificial respiration (back-pressure, arm lift, or mouth-to-mouth resuscitation) immediately, preferably by trained personnel. When breathing has been restored, 100% oxygen is administered, but not for more than 1 hour of continuous treatment at one time. Oxygen therapy may be interrupted after 1 hour, and reinstituted as the clinical condition indicates. Observe for laryngeal spasm and perform tracheotomy if indicated. In case of severe exposure, the patient should breathe 100% oxygen under positive exhalation pressure (4cm) for one-half hour periods every hour. Treatment may be continued in this way until symptoms subside or other clinical indications for interruption appear.

Contact with nose & throat. Irrigate the nose and mouth continuously for 15 minutes. If the patient can swallow, encourage him to drink large quantities of 0,5% citric acid solution or lemonade. Never give anything by mouth to an unconscious person.

Ingestion If liquid anhydrous ammonia has been swallowed, call a physician immediately. If the patient is conscious and able, he should drink large amounts of water to dilute the chemical. Do not induce vomiting if the patient is in shock, extreme pain or is unconscious. If vomiting begins, place the patient face down with head lower than hips; this prevents vomit from entering the lungs and causing further injury

5 FIRE FIGHTING MEASURES

Extinguishing media. Fog-water spray. (In the absence of fog equipment, a fine spray of water may be used.) Use media suitable for surrounding fire. Although ammonia does not represent a serious flammability hazard, mixtures of air and ammonia containing from 15% to 28% ammonia vapour by volume will ignite when sparked, or exposed to temperatures exceeding 651°C.

Specific Hazards High levels of ammonia can produce corrosive effects on tissues and can cause laryngeal and bronchial spasm and oedema so as to obstruct breathing.

Emergency Actions. Rescue personnel should be equipped with self-contained breathing apparatus. If possible, stop the flow of gas. Since ammonia is soluble in water, it is the best extinguishing media - not only in extinguishing the fire, but also absorbing the escaped ammonia gas. Evacuate the area. All cylinders should be removed from the vicinity of the fire. Cylinders that cannot be removed should be cooled with water from a safe distance. Cylinders which have been exposed to excessive heat should be clearly identified and returned to the supplier. CONTACT THE NEAREST AFROX BRANCH.

Protective Clothing. Self-contained breathing apparatus. Safety gloves, Goggles and shoes, or boots, should be worn when handling cylinders.

Environmental precautions. As the gas is lighter than air, ensure that it is not trapped in confined spaces. Knock down pockets of gas with fog-water spray, and ventilate the area using forced-draft if necessary. Prevent from entering sewers and drains.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions. Personnel working with anhydrous ammonia should be thoroughly familiar with safety precautions for handling a gas corrosive to human tissue as well as measures

for handling emergencies. A gas mask must be worn when breaking and making connections, or pressuring a system. Self-contained breathing apparatus should be available both up and down wind.

Environmental Precautions. Because of its high alkalinity and solubility in water, ammonia can alter the pH balances of surface water, soil and plants. Should they be exposed to high concentrations for any length of time, these changes in pH could be detrimental to both flora and fauna.

Small spills. Only personnel trained for, and designated to handle emergencies, should attempt to stop a leak. Respiratory equipment of a type suitable for ammonia must be worn. All persons not so equipped must leave the affected area until the leak has been stopped. If ammonia vapour is released, the irritating effect of the vapour will typically force personnel to leave the area before they have been exposed to dangerous concentrations. Knock down small amounts of ammonia using a fog-water spray.Prevent from entering sewers or drains. Ventilate the area using forced-draught ventilation if necessary.

Large spills Evacuate all unprotected personnel to upwind areas. Disperse leaks with water spray or fog to lower concentration of ammonia gas. Neutralise contaminated area with a dilute acid, and deluge with plenty of water. Rotate a leaking cylinder to allow gas instead of liquid to escape. Keep area isolated until all gas has been dispersed. Evaporation is very rapid causing ice to form on leaking cylinders

7 HANDLING AND STORAGE

Always store full cylinders in upright position. Avoid dragging, rolling or sliding cylinders. Use trolleys for handling. Cylinders should be stored in a well ventilated area on a hard dry surface. Ventilation inlets should be at ceiling and floor level. Cylinders must be used on a "first in - first out" basis. Keep cylinders away from sources of heat. Keep away from children.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Hazards. Inhalation of high concentrations produces violent coughing due to local action on the respiratory tract. If rapid escape is not possible, severe lung irritation, pulmonary oedema and death can result. Lower concentrations cause eye irritation, laryngitis and bronchitis. Exposure to high gas concentrations may cause temporary blindness and severe eye damage. Direct contact of the eyes with liquid anhydrous ammonia will produce serious eye burns. Liquid anhydrous ammonia produces skin burns on contact.

TLV	25ppm
STEL	35ppm

Engineering control measures. Engineering control measures are preferred to reduce exposures. General methods include mechanical ventilation, process or personal enclosure, and control of process conditions. Administrative controls and personal protective equipment may also be required. Use a suitable flameproof ventilation system separate from other exhaust ventilation systems. Exhaust direct to outside and supply sufficient replacement air to make up for air removed by exhaust system.

Personal protection	Eyes - Chemical goggles Hands - Rubber gloves Skin - rubber or plastic apron

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

Chemical Symbol	NH_3
Molecular Weight	17,031
Specific Volume @ 20°C & 101,325 kPa	1405,6 ml/g
Boiling point @ 101,325 kPa	-33,4°C
Relative density (Air = 1) @ 101,325 kPa	0,599
Flammability levels in air	16 - 25% (by vol.)
Autoignition temperature	651°C
Colour	None
Taste	Alkaline
Odour	Pungent

10 STABILITY AND REACTIVITY

Conditions to avoid. Heating of cylinders, as the increase in pressure bears a direct relationship to increase in temperature. When the gas is exposed to temperatures in the range 449°C at 101,325kPa, dissociation will occur, with the release of nitrogen and hydrogen. The hydrogen could then form explosive gas/air mixtures. Never use cylinders as rollers or supports, or for any other purpose than the storage of ammonia.

Incompatible Materials. Most common metals are not affected by dry ammonia. However, when combined with water vapour, ammonia will attack copper, zinc, or alloys containing copper as a major alloying element. Therefore, these materials should not be used in contact with ammonia.

Hazardous Decomposition Products See above, Conditions to Avoid

11 TOXICOLOGICAL INFORMATION

Acute Toxicity	Ammonia is not a systemic poison
Skin & eye contact	Severe irritant
Chronic Toxicity	Chronic irritation to the eyes, nose, and upper respiratory tract may result from repeated exposure to the vapours.
Carcinogenicity:	No known effect.
Mutagenicity:	Genetic mutations observed in bacterial and mammalian test systems.

Reproductive Hazards: No known effect

National Legislation: None
(For further information see Section 3. Adverse Health Effects).

12 ECOLOGICAL INFORMATION

Ammonia gas can cause damage to the ecology due to its high alkalinity and affinity for water. pH changes can occur in the immediate environs of a spill which could affect both flora and fauna

13 DISPOSAL CONSIDERATIONS

Disposal Methods. Ammonia may be disposed of by discharge into water of sufficient volume to absorb it. Disposal of the resultant ammonium hydroxide, including and subsequent neutralisation products, must be done in an environmentally safe manner that, for example, will not be harmful to aquatic life. Large amounts should only be handled by the gas supplier.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

UN No.	1005
Class	2.3 Toxic gas
Subsidiary risk	Corrosive, inhalation hazard
ERG No	125
Hazchem warning	Toxic gas

SEA TRANSPORTATION

IMDG	1005
class	2.3
Label	Toxic gas

AIR TRANSPORTATION

ICAO/IATA Code	1005
Class	2.3
Subsidiary risk	Toxic, corrosive gas
Packaging group	
- Cargo	200
- Passenger	Forbidden
Maximum quantity allowed	
- Cargo	25kg
- Passenger	Forbidden

15 REGULATORY INFORMATION

GHS Hazard class: Flam gas 2
Acute tox 3
(Inhalation)

Skin corr 1B
Acute aquatic 1

National Legislation OHSact and Regulations (85 of 1993)
Refer to SANS 10234 and SANS 1034 Supplement for explanation of the above

16 OTHER INFORMATION

Bibliography
Compressed Gas Association, Arlington, Virginia
Handbook of Compressed Gases - 3rd Edition
Matheson. Matheson Gas Data Book - 6th Edition
SANS 10265 - Labelling of Dangerous Substances

17 EXCLUSION OF LIABILITY

Information contained in this publication is accurate at the date of publication. The company does not accept liability arising from the use of this information, or the use, application, adaptation or process of any products described herein.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.6 Revision Date 08.03.2016
Print Date 12.07.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Hydrochloric acid

Product Number : H1758
Brand : Sigma
Index-No. : 017-002-01-X
REACH No. : 01-2119484862-27-XXXX
CAS-No. : 7647-01-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Corrosive to metals (Category 1), H290
Skin corrosion (Category 1B), H314
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary statement(s)	
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Formula : HCl
Molecular weight : 36,46 g/mol

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Hydrochloric acid			
CAS-No.	7647-01-0	Met. Corr. 1; Skin Corr. 1B; STOT SE 3; H290, H314, H335 Concentration limits: >= 25 %: Skin Corr. 1B, H314; 10 - < 25 %: Skin Irrit. 2, H315; 10 - < 25 %: Eye Irrit. 2, H319; >= 10 %: STOT SE 3, H335; >= 0,1 %: Met. Corr. 1, H290;	>= 30 - < 50 %
EC-No.	231-595-7		
Index-No.	017-002-01-X		
Registration number	01-2119484862-27-XXXX		

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: light yellow
b)	Odour	pungent
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-30 °C
f)	Initial boiling point and boiling range	> 100 °C - lit.

g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	227 hPa at 21,1 °C 547 hPa at 37,7 °C
l)	Vapour density	No data available
m)	Relative density	1,2 g/cm3 at 25 °C
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Bases, Amines, Alkali metals, Metals, permanganates, e.g. potassium permanganate, Fluorine, metal acetylides, hexalithium disilicide

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Hydrogen chloride gas
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Hydrogen chloride gas
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available (Hydrochloric acid)

Inhalation: Inhalation may provoke the following symptoms: Respiratory irritation Cough Difficulty in breathing Pneumonia (Hydrochloric acid)

Skin corrosion/irritation
Skin - Rabbit (Hydrochloric acid)
Result: Causes burns.

Serious eye damage/eye irritation
Eyes - Rabbit (Hydrochloric acid)
Result: Corrosive to eyes

Respiratory or skin sensitisation
Did not cause sensitisation on laboratory animals. (Hydrochloric acid)

Germ cell mutagenicity
No data available (Hydrochloric acid)

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification. (Hydrochloric acid)

(Hydrochloric acid)

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Hydrochloric acid)

Reproductive toxicity

No data available (Hydrochloric acid)

Specific target organ toxicity - single exposure
The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation. (Hydrochloric acid)

Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
No aspiration toxicity classification (Hydrochloric acid)

Additional Information
RTECS: MW4025000

Inhalation of vapors may cause:, burning sensation, Cough, wheezing, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema (Hydrochloric acid)

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 24,6 mg/l - 96 h (Hydrochloric acid)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 4,91 mg/l - 48 h (Hydrochloric acid)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available (Hydrochloric acid)

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

May be harmful to aquatic organisms due to the shift of the pH. Do not empty into drains.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1789 IMDG: 1789 IATA: 1789

14.2 UN proper shipping name

ADR/RID: HYDROCHLORIC ACID
IMDG: HYDROCHLORIC ACID
IATA: Hydrochloric acid

14.3 Transport hazard class(es)

ADR/RID: 8 IMDG: 8 IATA: 8

14.4 Packaging group

ADR/RID: II IMDG: II IATA: II

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 16-Nov-2010 **Revision Date** 24-May-2017 **Revision Number** 2

1. Identification

Product Name **Sodium dichromate dihydrate**

Cat No. : **S258-3; S258-4; S258-5**

Synonyms Sodium bichromate

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Oxidizing solids	Category 2
Acute oral toxicity	Category 3
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Dusts and Mists	Category 2
Skin Corrosion/irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Respiratory Sensitization	Category 1
Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1B
Reproductive Toxicity	Category 1B
Specific target organ toxicity (single exposure) Target Organs - Respiratory system.	Category 3
Specific target organ toxicity - (repeated exposure) Target Organs - Liver, Kidney, Blood.	Category 1

Label Elements

Signal Word
Danger

Hazard Statements
May intensify fire; oxidizer

Toxic if swallowed
Harmful in contact with skin
Causes severe skin burns and eye damage
May cause respiratory irritation
May cause an allergic skin reaction
Fatal if inhaled
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause genetic defects
May cause cancer
May damage fertility. May damage the unborn child
Causes damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear respiratory protection
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep/Store away from clothing/ other combustible materials
Take any precaution to avoid mixing with combustibles
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
Wash contaminated clothing before reuse
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
Rinse mouth
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING! This product contains a chemical known in the State of California to cause cancer, birth defects or other reproductive harm.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Sodium dichromate dihydrate	7789-12-0	>95
Sodium dichromate	10588-01-9	-

4. First-aid measures

General Advice Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects Causes burns by all exposure routes. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause allergic skin reaction. . Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature
Explosion Limits
Upper No data available
Lower No data available
Oxidizing Properties Oxidizer

Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
The product causes burns of eyes, skin and mucous membranes. Oxidizer: Contact with combustible/organic material may cause fire. May ignite combustibles (wood paper, oil, clothing, etc.). Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products
Highly toxic fumes Sodium oxides Chromium oxide
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
4	0	1	OX

6. Accidental release measures

Personal Precautions Use personal protective equipment. Evacuate personnel to safe areas. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid dust formation.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. Should not be released into the environment. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Sweep up and shovel into suitable containers for disposal.

7. Handling and storage

Handling Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not ingest. Do not breathe vapors/dust. Avoid dust formation. Keep away from clothing and other combustible materials.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area. Do not store near combustible materials.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Sodium dichromate dihydrate	TWA: 0.05 mg/m³	(Vacated) Ceiling: 0.1 mg/m³ Ceiling: 0.1 mg/m³	IDLH: 15 mg/m³ TWA: 0.0002 mg/m³	TWA: 0.05 mg/m³ TWA: 0.5 mg/m³
Sodium dichromate	TWA: 0.05 mg/m³	(Vacated) Ceiling: 0.1 mg/m³ Ceiling: 0.1 mg/m³	IDLH: 15 mg/m³ TWA: 0.0002 mg/m³	TWA: 0.05 mg/m³ TWA: 0.5 mg/m³

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Tightly fitting safety goggles. Face-shield.

Skin and body protection Long sleeved clothing.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Orange
Odor	Odorless
Odor Threshold	No information available
pH	3.5-3.9 5% aq.sol
Melting Point/Range	357 °C / 674.6 °F
Boiling Point/Range	400 °C / 752 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	
Decomposition Temperature	400 °C
Viscosity	Not applicable
Molecular Formula	Cr2 Na2 O7 . 2 H2 O
Molecular Weight	298

10. Stability and reactivity

Reactive Hazard Yes

Stability Stable under normal conditions. Oxidizer: Contact with combustible/organic material may cause fire.

Conditions to Avoid Incompatible products. Excess heat. Combustible material.

Incompatible Materials Organic materials, Acids, Water, Strong bases, Acid anhydrides, Metals, Reducing agents, Powdered metals, Strong reducing agents, Combustible material

Hazardous Decomposition Products Highly toxic fumes, Sodium oxides, Chromium oxide

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sodium dichromate	LD50 = 46 mg/kg (Rat)	LD50 = 960 mg/kg (Rabbit)	LC50 = 0.124 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes burns by all exposure routes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium dichromate dihydrate	7789-12-0	Not listed	Known	A1	X	A1
Sodium dichromate	10588-01-9	Group 1	Known	A1	X	A1

IARC: (International Agency for Research on Cancer)

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects Mutagenic

Reproductive Effects Possible risk of impaired fertility.

Developmental Effects No information available.

Teratogenicity Teratogenic effects have occurred in experimental animals.

STOT - single exposure Respiratory system
STOT - repeated exposure Liver Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment. May cause long-term adverse effects in the environment. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium dichromate	Not listed	LC50: = 213 mg/L, 96h static (Lepomis macrochirus) LC50: = 69 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: = 33.2 mg/L, 96h flow-through (Pimephales promelas)	Not listed	EC50: = 1.4 mg/L, 24h (Daphnia magna) EC50: 0.098 - 0.129 mg/L, 48h (Daphnia magna)

Persistence and Degradability based on information available. May persist

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN3087
Proper Shipping Name	OXIDIZING SOLID, TOXIC, N.O.S.
Proper technical name	Sodium dichromate dihydrate
Hazard Class	5.1
Subsidiary Hazard Class	6.1
Packing Group	II

TDG

UN-No	UN3087
Proper Shipping Name	OXIDIZING SOLID, TOXIC, N.O.S.
Hazard Class	5.1
Subsidiary Hazard Class	6.1
Packing Group	II

IATA

UN-No	UN3087
Proper Shipping Name	OXIDIZING SOLID, TOXIC, N.O.S.
Hazard Class	5.1
Subsidiary Hazard Class	6.1
Packing Group	II

IMDG/IMO

UN-No	UN3087
Proper Shipping Name	OXIDIZING SOLID, TOXIC, N.O.S.
Hazard Class	5.1
Subsidiary Hazard Class	6.1
Packing Group	II

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Sodium dichromate dihydrate	-	-	-	-	-		X	-	X	X	-
Sodium dichromate	X	X	-	234-190-3	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants

that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)

Component	TSCA 12(b)
Sodium dichromate dihydrate	Section 6
Sodium dichromate	Section 6

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Sodium dichromate dihydrate	7789-12-0	>95	0.1
Sodium dichromate	10588-01-9	-	0.1

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	Yes

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Sodium dichromate dihydrate	-	-	X	-
Sodium dichromate	X	10 lb	X	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Sodium dichromate dihydrate	X		-
Sodium dichromate	X		-

OSHA Occupational Safety and Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Sodium dichromate dihydrate	5 µg/m³ TWA 2.5 µg/m³ Action Level	-
Sodium dichromate	5 µg/m³ TWA 2.5 µg/m³ Action Level	-

CERCLA

Component	Hazardous Substances RQs	CERCLA EHS RQs
Sodium dichromate	10 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Sodium dichromate dihydrate	7789-12-0	Carcinogen Developmental Female Reproductive Male Reproductive	0.001 µg/day	Developmental Carcinogen
Sodium dichromate	10588-01-9	Carcinogen Developmental Female Reproductive Male Reproductive	0.001 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Sodium dichromate	-	X	X	X	X

dihydrate					
Sodium dichromate	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

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Revision Date 24-May-2017
Print Date 24-May-2017
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.4 Revision Date 08.03.2016
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Boric acid
Product Number	:	B6768
Brand	:	Sigma
Index-No.	:	005-007-00-2
REACH No.	:	01-2119486683-25-XXXX
CAS-No.	:	10043-35-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Reproductive toxicity (Category 1B), H360FD

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word	Danger
Hazard statement(s)	
H360FD	May damage fertility. May damage the unborn child.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.

Supplemental Hazard Statements: none

Restricted to professional users.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	H_3BO_3
Molecular weight	:	61,83 g/mol
CAS-No.	:	10043-35-3
EC-No.	:	233-139-2
Index-No.	:	005-007-00-2
Registration number	:	01-2119486683-25-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Boric acid Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No. EC-No. Index-No. Registration number	10043-35-3 233-139-2 005-007-00-2 01-2119486683-25-XXXX	Repr. 1B; H360FD Concentration limits: >= 5,5 %: Repr. 1B, H360FD;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid formation of dust and aerosols.Avoid exposure - obtain special instructions before use.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Moisture sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	5,1 at 1,8 g/l at 25 °C
e)	Melting point/freezing point	Melting point/range: 160 °C - dec.
f)	Initial boiling point and boiling range	300 °C
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	3,5 hPa at 20 °C
l)	Vapour density	No data available
m)	Relative density	1,440 g/cm3
n)	Water solubility	soluble
o)	Partition coefficient: n-	No data available

	octanol/water	
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
Potassium, Acid anhydrides

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Borane/boron oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2.660 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
fetotoxicity
Presumed human reproductive toxicant

Presumed human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: ED4550000

Toxicity reported for borates in humans: ingestion or absorption may cause nausea, vomiting, diarrhea, abdominal cramps, anderythematous lesions on the skin and mucous membranes. Other symptoms include: circulatory collapse, tachycardia, cyanosis, delirium, convulsions, and coma. Death has been reported to occur in infants from less than 5 grams and in adults from 5 to 20 grams.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Ptychocheilus lucius - 279 mg/l - 96 h
	LC0 - Lepomis macrochirus (Bluegill) - > 1.021 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 53,2 mg/l - 21 d
	EC50 - Daphnia magna (Water flea) - 133 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

Authorisations and/or restrictions on use

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)	: Boric acid
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	: Boric acid

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H360FD	May damage fertility. May damage the unborn child.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 4.9 Revision Date 22.07.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Ethylene glycol butyl ether
Product Number	:	537551
Brand	:	Sigma-Aldrich
Index-No.	:	603-014-00-0
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	111-76-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)	
H302 + H312 + H332	Harmful if swallowed, in contact with skin or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.
Precautionary statement(s)	
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
Rapidly absorbed through skin.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	2-Butoxyethanol Butyl glycol EB Solvent
Formula	:	$C_6H_{14}O_2$
Molecular weight	:	118,17 g/mol
CAS-No.	:	111-76-2
EC-No.	:	203-905-0
Index-No.	:	603-014-00-0

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
2-Butoxyethanol			
CAS-No. EC-No. Index-No.	111-76-2 203-905-0 603-014-00-0	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; H302, H332, H312, H315, H319	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Combustible liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid

		Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -75 °C - lit.
f)	Initial boiling point and boiling range	169 - 172,5 °C - lit.
g)	Flash point	67 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 12,7 %(V) Lower explosion limit: 1,1 %(V)
k)	Vapour pressure	13 hPa at 81 °C < 1 hPa at 20 °C
l)	Vapour density	4,08 - (Air = 1.0)
m)	Relative density	0,902 g/cm3 at 25 °C
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0,81 at 25 °C
p)	Auto-ignition temperature	230 °C at 1.013 hPa
q)	Decomposition temperature	No data available
r)	Viscosity	3,642 mm2/s at 20 °C -
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	65,03 mN/m at 20 °C
Relative vapour density	4,08 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 880 mg/kg
(OECD Test Guideline 401)

LD50 Dermal - Rabbit - male - 1.060 mg/kg
(OECD Test Guideline 402)

LD50 Intraperitoneal - Rat - 220 mg/kg

LD50 Intravenous - Rat - 307 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 20 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
Hamster
ovary
Result: negative

OECD Test Guideline 474
Mouse - male
Result: negative

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (2-Butoxyethanol)

Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity: Rat - male - Oral - NOAEL : < 69 mg/kg - OECD Test Guideline 408
RTECS: KJ8575000

Human exposure above 200 ppm can be expected to cause narcosis, damage to the kidney and liver and present an abnormal blood picture showing erythropenia, reticulocytosis, granulocytosis, leukocytosis, and would be likely to cause fragility of erythrocytes and hematuria. Swallowing of 2-butoxyethanol results in a sour taste that turns to a burning sensation and is followed by numbness of the tongue which indicates paralysis of the sensory nerve endings., Central nervous system depression, Headache, narcosis

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Oncorhynchus mykiss (rainbow trout) - 1.474 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 1.550 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Growth inhibition EC50 - Pseudokirchneriella subcapitata (green algae) - 1.840 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 90,4 % - Readily biodegradable (OECD Test Guideline 301B) Remarks: The 10 day time window criterion is not fulfilled.
Ratio BOD/ThBOD	88 %

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H302 + H312 + H332	Harmful if swallowed, in contact with skin or if inhaled
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.3 Revision Date 09.08.2017
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sodium tetraborate decahydrate

Product Number : S9640
Brand : Sigma-Aldrich
Index-No. : 005-011-01-1
REACH No. : 01-2119490790-32-XXXX
CAS-No. : 1303-96-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Reproductive toxicity (Category 1B), H360FD

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H360FD May damage fertility. May damage the unborn child.

Precautionary statement(s)
P201 Obtain special instructions before use.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

P308 + P313	IF exposed or concerned: Get medical advice/ attention.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	BoraxdecahydrateSodium boratedecahydrate
Formula	:	$B_4Na_2O_7 \cdot 10H_2O$
Molecular weight	:	381,37 g/mol
CAS-No.	:	1303-96-4
EC-No.	:	215-540-4
Index-No.	:	005-011-01-1
Registration number	:	01-2119490790-32-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Disodium tetraborate decahydrate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No. EC-No. Index-No. Registration number	1303-96-4 215-540-4 005-011-01-1 01-2119490790-32-XXXX	Repr. 1B; H360FD Concentration limits: >= 8,5 %: Repr. 1B, H360FD;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of

contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: white
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	9,2 at 10 g/l
e)	Melting point/freezing point	62 °C
f)	Initial boiling point and boiling range	Decomposes below the boiling point.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available

k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1,73 g/cm3 at 25 °C
n)	Water solubility	38,1 g/l at 20 °C - completely soluble
o)	Partition coefficient: n-octanol/water	log Pow: -1,53
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong reducing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Borane/boron oxides, Sodium oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 4.500 - 5.000 mg/kg

LC50 Inhalation - Rat - 4 h - > 2,04 mg/l
(OECD Test Guideline 403)

LD50 Dermal - Rabbit - 10.000 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
Presumed human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: VZ2275000

Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes. Studies with the chemically related boric acid in the rat, mouse and rabbit, at high doses, demonstrate developmental effects on the fetus, including fetal weight loss and minor skeletal variations. The doses administered were many times in excess of those to which humans would normally be exposed. Human epidemiological studies show no increase in pulmonary disease in occupational populations with cronic exposures to boric acid dust and sodium borate dust. A recent epidemiological study under the conditions of normal occupational eposure to borate dusts indicated no effect on fertility.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Carassius auratus (goldfish) - 178 mg/l - 72 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 1.085 - 1.402 mg/l - 48 h
Toxicity to algae	IC50 - Desmodesmus subspicatus (green algae) - 158 mg/l - 96 h

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No bioaccumulation is to be expected (log Pow <= 4).

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -	IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

Authorisations and/or restrictions on use

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)	: Disodium tetraborate decahydrate
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	: Disodium tetraborate decahydrate

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H360FD	May damage fertility. May damage the unborn child.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 14.01.2015
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Hexamethylenediamine
Product Number	:	H11696
Brand	:	Aldrich
Index-No.	:	612-104-00-9
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	124-09-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Dermal (Category 4), H312
Skin corrosion (Category 1B), H314
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

C	Corrosive	R34
Xn	Harmful	R21/22
Xi	Irritant	R37

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word	Danger
Hazard statement(s)	
H302 + H312	Harmful if swallowed or in contact with skin
H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.
Precautionary statement(s)	
P261	Avoid breathing dust.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	1,6-Diaminohexane 1,6-Hexanediamine
Formula	:	$C_6H_{16}N_2$
Molecular weight	:	116,20 g/mol
CAS-No.	:	124-09-4
EC-No.	:	204-679-6
Index-No.	:	612-104-00-9

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Hexamethylenediamine			
CAS-No. EC-No. Index-No.	124-09-4 204-679-6 612-104-00-9	Acute Tox. 4; Skin Corr. 1B; STOT SE 3; H302 + H312, H314, H335	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Hexamethylenediamine			
CAS-No. EC-No. Index-No.	124-09-4 204-679-6 612-104-00-9	C, R21/22 - R34 - R37	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Hygroscopic. Store under inert gas.
Storage class (TRGS 510): Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 60 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	12,4 at 100 g/l at 25 °C
e)	Melting point/freezing point	Melting point/range: 42 - 45 °C - lit.
f)	Initial boiling point and boiling range	204 - 205 °C
g)	Flash point	80 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 6,3 %(V) Lower explosion limit: 0,7 %(V)
k)	Vapour pressure	No data available
l)	Vapour density	4,01 - (Air = 1.0)
m)	Relative density	0,89 g/cm3 at 25 °C
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 0,02
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	4,01 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
hygroscopic
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
acids, Acid chlorides, Acid anhydrides, Strong oxidizing agents, Carbon dioxide (CO2)

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 750 mg/kg

LD50 Dermal - Rabbit - 1.110 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: MO1180000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Leuciscus idus (Golden orfe) - 62 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 23,4 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Harmful to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2280	IMDG: 2280	IATA: 2280

14.2 UN proper shipping name

ADR/RID:	HEXAMETHYLENEDIAMINE, SOLID
IMDG:	HEXAMETHYLENEDIAMINE, SOLID
IATA:	Hexamethylenediamine, solid

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
H302	Harmful if swallowed.
H302 + H312	Harmful if swallowed or in contact with skin
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.
Skin Corr.	Skin corrosion

Full text of R-phrases referred to under sections 2 and 3

C	Corrosive

R21/22	Harmful in contact with skin and if swallowed.
R34	Causes burns.
R37	Irritating to respiratory system.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.3 Revision Date 14.01.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Hydroquinone
Product Number	:	H9003
Brand	:	Sigma-Aldrich
Index-No.	:	604-005-00-4
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	123-31-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Serious eye damage (Category 1), H318
Skin sensitisation (Category 1), H317
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

		R40
		R68
Xn	Harmful	R22
Xi	Irritant	R41
		R43
N	Dangerous for the environment	R50

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word	Danger
Hazard statement(s)	
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H341	Suspected of causing genetic defects.
H351	Suspected of causing cancer.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501	Dispose of contents/ container to an approved waste disposal plant.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	1,4-Benzenediol 1,4-Dihydroxybenzene
Formula	:	$C_6H_6O_2$
Molecular weight	:	110,11 g/mol
CAS-No.	:	123-31-9
EC-No.	:	204-617-8
Index-No.	:	604-005-00-4

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Hydroquinone			
CAS-No. EC-No. Index-No.	123-31-9 204-617-8 604-005-00-4	Acute Tox. 4; Eye Dam. 1; Skin Sens. 1; Muta. 2; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H317, H318, H341, H351, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Hydroquinone			
CAS-No. EC-No. Index-No.	123-31-9 204-617-8 604-005-00-4	Xn, N, Carc.Cat.3, Mut.Cat.3, R22 - R40 - R41 - R43 - R68 - R50	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Air and light sensitive.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	3,7 at 70 g/l
e)	Melting point/freezing point	Melting point/range: 172 - 175 °C - lit.
f)	Initial boiling point and boiling range	285 °C - lit.
g)	Flash point	165 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1 hPa at 132 °C
l)	Vapour density	3,80 - (Air = 1.0)
m)	Relative density	1,332 g/cm3
n)	Water solubility	50 g/l
o)	Partition coefficient: n-octanol/water	log Pow: 0,59
p)	Auto-ignition temperature	515,56 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	550 - 650 kg/m3
Solubility in other solvents	Methanol Diethylether
Relative vapour density	3,80 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Air Light.

10.5 Incompatible materials
Strong bases, Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 367,3 mg/kg
(OECD Test Guideline 401)

LD50 Dermal - Rabbit - > 2.000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Respiratory or skin sensitisation
in vivo assay - Mouse
Result: May cause sensitisation by skin contact.
May cause allergic skin reaction.
(OECD Test Guideline 429)

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vitro tests showed mutagenic effects

DNA repair
Rat - Liver cells
Result: negative

Mutagenicity (micronucleus test)
Mouse
Result: positive

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Hydroquinone)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: MX3500000

Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0,04 - 0,1 mg/l - 96,0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0,13 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 0,335 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability: Biotic/Aerobic - Exposure time 14 d
Result: 86 % - Readily biodegradable

12.3 Bioaccumulative potential

Bioaccumulation: Leuciscus idus (Golden orfe) - 3 d
- 50 µg/l

Bioconcentration factor (BCF): 40

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077 IMDG: 3077 IATA: 3077

14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Hydroquinone)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Hydroquinone)
IATA: Environmentally hazardous substance, solid, n.o.s. (Hydroquinone)

14.3 Transport hazard class(es)

ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Dam.	Serious eye damage
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H341	Suspected of causing genetic defects.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xn	Harmful
R22	Harmful if swallowed.
R40	Limited evidence of a carcinogenic effect.
R41	Risk of serious damage to eyes.
R43	May cause sensitisation by skin contact.
R50	Very toxic to aquatic organisms.
R68	Possible risk of irreversible effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 5.8 Revision Date 16.10.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Cumene hydroperoxide

Product Number : 247502
Brand : Aldrich
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 80-15-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 3), H226
Organic peroxides (Type F), H242
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 4), H312
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 2), H373
Aspiration hazard (Category 1), H304
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram	
Signal word	Danger
Hazard statement(s)	
H226	Flammable liquid and vapour.
H242	Heating may cause a fire.
H302 + H312	Harmful if swallowed or in contact with skin
H304	May be fatal if swallowed and enters airways.
H314	Causes severe skin burns and eye damage.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	α,α-Dimethylbenzyl hydroperoxide
Formula	:	$C_9H_{12}O_2$
Molecular weight	:	152,19 g/mol
CAS-No.	:	80-15-9

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Cumene hydroperoxide			
CAS-No. EC-No. Index-No.	80-15-9 201-254-7 617-002-00-8	Org. Perox. E; Acute Tox. 4; Acute Tox. 3; Acute Tox. 4; Skin Corr. 1B; STOT RE 2; Aquatic Chronic 2; H242, H302, H331, H312, H314, H373, H411 Concentration limits: >= 10 %: Skin Corr. 1B, H314; 3 - < 10 %: Skin Irrit. 2, H315; 3 - < 10 %: Eye Dam. 1, H318; 1 - < 3 %: Eye Irrit. 2, H319; >= 1 %: STOT SE 3,	>= 80 - < 90 %

		H335;	
Cumene			
CAS-No. EC-No. Index-No.	98-82-8 202-704-5 601-024-00-X	Flam. Liq. 3; STOT SE 3; Asp. Tox. 1; Aquatic Chronic 2; H226, H335, H304, H411	>= 20 - < 25 %
2-Phenylpropan-2-ol			
CAS-No. EC-No.	617-94-7 210-539-5	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; STOT SE 3; H302, H315, H319, H335	>= 5 - < 10 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.Keep away from heat and sources of ignition.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in original container. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

Recommended storage temperature 2 - 8 °C
Storage class (TRGS 510): Organic peroxides and self-reacting hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: 240 min

Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	100 - 101 °C at 11 hPa - lit.
g)	Flash point	79 °C - closed cup56,1 °C
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	0,5 hPa at 55 °C < 0,04 hPa at 20 °C
l)	Vapour density	5,25 - (Air = 1.0)
m)	Relative density	1,03 g/mL at 25 °C
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	70 °C - Self-Accelerating decomposition temperature (SADT)

r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density 5,25 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Self-Accelerating decomposition temperature (SADT) 70°C
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Do not expose to temperatures above: 40°C
Heat, flames and sparks.

10.5 Incompatible materials
Powdered metals, Organic materials, Heavy metal salts, metal salts, Combustible material, Acids, Alkalis, Reducing agents, Rust, charcoal, Amines, Copper, Lead, Cobalt/cobalt oxides

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Cumene)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: MX2450000

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID:	IMDG: 3109	IATA: 3109

14.2 UN proper shipping name

ADR/RID:

IMDG: ORGANIC PEROXIDE TYPE F, LIQUID (CUMYL HYDROPEROXIDE)

IATA: Organic peroxide type F, liquid (Cumyl hydroperoxide)

14.3 Transport hazard class(es)

ADR/RID:	IMDG: 5.2 (8)	IATA: 5.2 (HEAT, 8)

14.4 Packaging group

ADR/RID:	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapour.
H242	Heating may cause a fire.
H302	Harmful if swallowed.
H302 + H312	Harmful if swallowed or in contact with skin
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 4.9 Revision Date 18.06.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Dibutyl phthalate

Product Number : 524980
Brand : Aldrich
Index-No. : 607-318-00-4
REACH No. : 01-2119493042-44-XXXX
CAS-No. : 84-74-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Reproductive toxicity (Category 1B), H360Df
Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

		R61
		R62
N	Dangerous for the environment	R50

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)	
H360Df	May damage the unborn child. Suspected of damaging fertility.
H400	Very toxic to aquatic life.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P273	Avoid release to the environment.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
Supplemental Hazard Statements	none

Restricted to professional users.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	*n*-Butyl phthalate Phthalic acid dibutyl ester DBP
Formula	:	$C_{16}H_{22}O_4$
Molecular weight	:	278,34 g/mol
CAS-No.	:	84-74-2
EC-No.	:	201-557-4
Index-No.	:	607-318-00-4
Registration number	:	01-2119493042-44-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Dibutyl phthalate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No.	84-74-2	Repr. 1B; Aquatic Acute 1; H360Df, H400	<= 100 %
EC-No.	201-557-4		
Index-No.	607-318-00-4		
Registration number	01-2119493042-44-XXXX		

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Dibutyl phthalate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No.	84-74-2	T, N, Repr.Cat.2, Repr.Cat.3, R61 - R50 - R62	<= 100 %
EC-No.	201-557-4		
Index-No.	607-318-00-4		
Registration number	01-2119493042-44-XXXX		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid exposure - obtain special instructions before use.Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0,6 mm
Break through time: 480 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 77 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -35 °C - lit.
f)	Initial boiling point and boiling range	340 °C - lit.
g)	Flash point	171,0 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 0,47 %(V)
k)	Vapour pressure	1,3 hPa at 147,0 °C
l)	Vapour density	No data available
m)	Relative density	1,043 g/cm3 at 25 °C
n)	Water solubility	0,0114 g/l at 25 °C - OECD Test Guideline 105 - slightly soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	402,0 °C
q)	Decomposition temperature	No data available
r)	Viscosity	18,8 mm2/s at 20 °C -
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Nitrates, Bases, acids, Chlorine

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 8.000 mg/kg

LC50 Inhalation - Rat - 4.250 mg/m3

LD50 Dermal - Rabbit - > 20.860 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
Presumed human reproductive toxicant

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: TI0875000

Nausea, Dizziness, Headache, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 0,85 mg/l - 96,0 h
	NOEC - Pimephales promelas (fathead minnow) - 0,32 mg/l - 96,0 h
Toxicity to daphnia and other aquatic	LC50 - Daphnia magna (Water flea) - 3,7 mg/l - 48 h

invertebrates

12.2 Persistence and degradability

Biodegradability Result: 81 % - Readily biodegradable
(C.4-C of the COUNCIL REGULATION (EC) No 440/2008)

12.3 Bioaccumulative potential

Bioaccumulation Pimephales promelas (fathead minnow) - 11 d
- 0,0348 mg/l

Bioconcentration factor (BCF): 2.165
Remarks: Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Very toxic to aquatic life.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3082 IMDG: 3082 IATA: 3082

14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dibutyl phthalate)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dibutyl phthalate)
IATA: Environmentally hazardous substance, liquid, n.o.s. (Dibutyl phthalate)

14.3 Transport hazard class(es)

ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: yes IMDG Marine pollutant: yes IATA: yes

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Authorisations and/or restrictions on use

Dibutyl phthalate CAS-No.: 84-74-2
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).

Toxic for reproduction (article 57c)
ED/67/2008

Dibutyl phthalate CAS-No.: 84-74-2
REACH - List of substances subject to authorisation (Annex XIV)
Toxic for reproduction (category 1B)
Sunset Date: 21.02.2015
Exempted (Categories of) Uses: Uses in the immediate packaging of medicinal products covered under Regulation (EC) No 726/2004, Directive 2001/82/EC, and/or Directive 2001/83/EC.

Dibutyl phthalate CAS-No.: 84-74-2
REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)
Toxic to reproduction: category 1B
Restricted to professional users.
See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction

Dibutyl phthalate CAS-No.: 84-74-2
REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)
Shall not be used in toys
See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
H360Df	May damage the unborn child. Suspected of damaging fertility.
H400	Very toxic to aquatic life.
Repr.	Reproductive toxicity

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
T	Toxic
R50	Very toxic to aquatic organisms.
R61	May cause harm to the unborn child.
R62	Possible risk of impaired fertility.
Repr.Cat.2	Toxic to Reproduction Category 2
Repr.Cat.3	Toxic to Reproduction Category 3

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.1 Revision Date 23.06.2016
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Diethanolamine
Product Number	:	D8885
Brand	:	Sigma-Aldrich
Index-No.	:	603-071-00-1
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	111-42-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Specific target organ toxicity - repeated exposure (Category 2), H373
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)	
H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H373	May cause damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.
Precautionary statement(s)	
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Bis(2-hydroxyethyl)amine 2,2′-Iminodiethanol
Formula	:	$C_4H_{11}NO_2$
Molecular weight	:	105,14 g/mol
CAS-No.	:	111-42-2
EC-No.	:	203-868-0
Index-No.	:	603-071-00-1

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Diethanolamine			
CAS-No. EC-No. Index-No.	111-42-2 203-868-0 603-071-00-1	Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; STOT RE 2; Aquatic Chronic 3; H302, H315, H318, H373, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Air sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0,6 mm
Break through time: 480 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 30 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: viscous liquid Colour: colourless
b)	Odour	ammoniacal
c)	Odour Threshold	No data available
d)	pH	11,0 - 12 at 105 g/l at 25 °C
e)	Melting point/freezing point	Melting point/range: 28 °C
f)	Initial boiling point and boiling range	217 °C at 200 hPa
g)	Flash point	138 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 10,6 %(V) Lower explosion limit: 1,6 %(V)
k)	Vapour pressure	1 hPa at 108 °C
l)	Vapour density	3,63 - (Air = 1.0)
m)	Relative density	1,097 g/mL at 25 °C
n)	Water solubility	105 g/l at 20 °C - completely soluble
o)	Partition coefficient: n-octanol/water	log Pow: -2,18
p)	Auto-ignition temperature	355 °C at 1.013 hPa
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Dissociation constant	8,92 at 23 °C
Relative vapour density	3,63 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Absorbs carbon dioxide (CO_2) from air.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents, Copper, Zinc, Iron

10.6 Hazardous decomposition products
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 1.600 mg/kg
(OECD Test Guideline 401)

LD50 Dermal - Rabbit - 12.200 mg/kg

LD50 Intraperitoneal - Rat - 120 mg/kg

LD50 Intravenous - Rat - 778 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Risk of serious damage to eyes.
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test - Guinea pig
Did not cause sensitisation on laboratory animals.
(OECD Test Guideline 406)

Germ cell mutagenicity
Micronucleus test
lymphocyte
Result: negative

Mutagenicity (micronucleus test)
Mouse - male and female
Result: negative

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Diethanolamine)

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
Kidney, Liver, Blood

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity: Rat - male and female - Oral - LOAEL : 25 mg/kg - OECD Test Guideline 408
RTECS: KL2975000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 1.460 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 30,1 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability: aerobic - Exposure time 28 d
Result: 93 % - Readily biodegradable
(OECD Test Guideline 301F)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Harmful to aquatic life with long lasting effects.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H373	May cause damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 03.07.2013
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Diisobutylene
Product Number	:	38180
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	25167-70-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Specific target organ toxicity - single exposure (Category 3), H335
Aspiration hazard (Category 1), H304
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

F	Highly flammable	R11
Xn	Harmful	R65
Xi	Irritant	R36/37/38
N	Dangerous for the environment	R51/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P331	Do NOT induce vomiting.

Supplemental Hazard Statements none

According to European Directive 67/548/EEC as amended.

Hazard symbol(s)

F	Highly flammable
Xn	Harmful
N	Dangerous for the environment

R-phrase(s)

R11	Highly flammable.
R36/37/38	Irritating to eyes, respiratory system and skin.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65	Harmful: may cause lung damage if swallowed.

S-phrase(s)

S16	Keep away from sources of ignition - No smoking.
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S61	Avoid release to the environment. Refer to special instructions/ Safety data sheets.
S62	If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Chemical characterization : Natural product

Synonyms : 2,4,4-Trimethyl-1-pentene + 2,4,4-Trimethyl-2-pentene

Formula : C_8H_{16}

Molecular Weight : 112,21 g/mol

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
2,4,4-Trimethylpent-1-ene			
CAS-No.	107-39-1	Flam. Liq. 2; Aquatic Chronic	50 - 100 %

EC-No. Index-No.	203-486-4 601-031-00-8	2; H225, H411	
2,4,4-Trimethylpent-2-ene			
CAS-No. EC-No.	107-40-4 203-488-5	Flam. Liq. 2; Skin Irrit. 2; Eye Irrit. 2; STOT SE 3; Asp. Tox. 1; H225, H304, H315, H319, H335	25 - 50 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
2,4,4-Trimethylpent-1-ene			
CAS-No. EC-No. Index-No.	107-39-1 203-486-4 601-031-00-8	F, N, R11 - R51/53	50 - 100 %
2,4,4-Trimethylpent-2-ene			
CAS-No. EC-No.	107-40-4 203-488-5	F, N, Xn, R11 - R36/37/38 - R65 - R51/53	25 - 50 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

A part from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: colourless
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	101 - 103 °C
g)	Flash point	-6 °C - closed cup
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	0,716 g/cm3
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available

q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2050	IMDG: 2050	IATA: 2050

14.2 UN proper shipping name

ADR/RID:	DIISOBUTYLENE, ISOMERIC COMPOUNDS
IMDG:	DIISOBUTYLENES, ISOMERIC COMPOUNDS
IATA:	Diisobutylene, isomeric compound

14.3 Transport hazard class(es)

ADR/RID: 3	IMDG: 3	IATA: 3

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user
no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H411	Toxic to aquatic life with long lasting effects.
Skin Irrit.	Skin irritation
STOT SE	Specific target organ toxicity - single exposure

Full text of R-phrases referred to under sections 2 and 3

F	Highly flammable
N	Dangerous for the environment
R11	Highly flammable.
R36/37/38	Irritating to eyes, respiratory system and skin.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65	Harmful: may cause lung damage if swallowed.
Xn	Harmful

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.4 Revision Date 21.10.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : 1,2-Dichloroethane

Product Number : 284505
Brand : Sigma-Aldrich
Index-No. : 602-012-00-7
REACH No. : 01-2119484658-20-XXXX
CAS-No. : 107-06-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 3), H331
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

F	Highly flammable	R11
		R45
Xn	Harmful	R22
Xi	Irritant	R36/37/38
T	Toxic	R23

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram	
Signal word	Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H350	May cause cancer.

Precautionary statement(s)

P201	Obtain special instructions before use.
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P261	Avoid breathing vapours.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P311	Call a POISON CENTER or doctor/ physician.

Supplemental Hazard Statements	none

Restricted to professional users.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Ethylene dichloride Ethylene chloride
Formula	:	$C_2H_4Cl_2$
Molecular weight	:	98,96 g/mol
CAS-No.	:	107-06-2
EC-No.	:	203-458-1
Index-No.	:	602-012-00-7
Registration number	:	01-2119484658-20-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Ethylene dichloride Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No. EC-No. Index-No. Registration number	107-06-2 203-458-1 602-012-00-7 01-2119484658-20-XXXX	Flam. Liq. 2; Acute Tox. 4; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2; Carc. 1B; STOT SE 3; H225, H302, H315, H319, H331, H335, H350	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Ethylene dichloride Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No. EC-No. Index-No.	107-06-2 203-458-1 602-012-00-7	F, T, Carc.Cat.2, R45 - R11 - R36/37/38 - R23 - R22	<= 100 %

Registration number 01-2119484658-20-XXXX		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid exposure - obtain special instructions before use.Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 62 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -35 °C - lit.
f)	Initial boiling point and boiling range	83 °C - lit.
g)	Flash point	13,0 °C - closed cup - Tested according to Annex V of Directive 67/548/EEC.
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 16,2 %(V) Lower explosion limit: 6,2 %(V)
k)	Vapour pressure	33,3 hPa at 0 °C 86 hPa at 20 °C - Tested according to Annex V of Directive 67/548/EEC. 312 hPa at 50 °C
l)	Vapour density	No data available
m)	Relative density	1,256 g/mL at 25 °C - lit.
n)	Water solubility	8,69 g/l at 20 °C - Tested according to Annex V of Directive 67/548/EEC. - slightly soluble10,3 g/l at 56 °C
o)	Partition coefficient: n-octanol/water	log Pow: 1,48 at 20 °C - Tested according to Annex V of Directive 67/548/EEC.
p)	Auto-ignition temperature	413,0 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	32,9 mN/m at 15 °C 32,2 mN/m at 20 °C 30,8 mN/m at 30 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 670,0 mg/kg

LC50 Inhalation - Rat - 4 h - 3,879 mg/l

LD50 Dermal - Rabbit - 2.800 mg/kg
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Lacrimation.

Skin corrosion/irritation
Skin - Rabbit
Result: irritating - 72 h
(Draize Test)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Moderate eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Ames test
S. typhimurium
Result: positive

Carcinogenicity

Carcinogenicity - Rat - Oral
Tumorigenic:Carcinogenic by RTECS criteria. Gastrointestinal:Tumors. Skin and Appendages: Other: Tumors.

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Ethylene dichloride)

Reproductive toxicity

Reproductive toxicity - Rat - Inhalation
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KI0525000

Acts as a simple asphyxiant by displacing air., anesthetic effects, Difficulty in breathing, Headache, Dizziness, Prolonged or repeated contact with skin may cause:, defatting, Dermatitis, Contact with eyes can cause:, Redness, Blurred vision, Provokes tears., Effects due to ingestion may include:, Gastrointestinal discomfort, Central nervous system depression, Paresthesia., Drowsiness, Convulsions, Conjunctivitis., Pulmonary edema. Effects may be delayed., Irregular breathing., Stomach/intestinal disorders, Nausea, Vomiting, Increased liver enzymes., Weakness, Heavy or prolonged skin exposure may result in the absorption of harmful amounts of material.

Pancreas. -

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 225,00 mg/l - 96 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 130 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 540,00 mg/l - 24 h
	Immobilization EC50 - Daphnia magna (Water flea) - 160 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability	Biotic/Aerobic - Exposure time 21 d Result: < 20 % - Not readily biodegradable. Remarks: Not applicable

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 14 d - 95,6 µg/l
	Bioconcentration factor (BCF): 2

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1184 IMDG: 1184 IATA: 1184

14.2 UN proper shipping name

ADR/RID: ETHYLENE DICHLORIDE
IMDG: ETHYLENE DICHLORIDE
IATA: Ethylene dichloride

14.3 Transport hazard class(es)

ADR/RID: 3 (6.1) IMDG: 3 (6.1) IATA: 3 (6.1)

14.4 Packaging group

ADR/RID: II IMDG: II IATA: II

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Authorisations and/or restrictions on use

Ethylene dichloride CAS-No.: 107-06-2
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).
Carcinogenic (article 57a)

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.

H350	May cause cancer.
Skin Irrit.	Skin irritation

Full text of R-phrases referred to under sections 2 and 3

F	Highly flammable
T	Toxic
R11	Highly flammable.
R22	Harmful if swallowed.
R23	Toxic by inhalation.
R36/37/38	Irritating to eyes, respiratory system and skin.
R45	May cause cancer.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.3 Revision Date 16.05.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	2,5-Di-*tert*-butylhydroquinone
Product Number	:	112976
Brand	:	Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	88-58-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Specific target organ toxicity - single exposure (Category 3), H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xn	Harmful	R22
Xi	Irritant	R36/37/38

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)	
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
Precautionary statement(s)	
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_{14}H_{22}O_2$
Molecular Weight	:	222,32 g/mol
CAS-No.	:	88-58-4
EC-No.	:	201-841-8

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
2,5-Di-tert-butylhydroquinone		
CAS-No. 88-58-4 EC-No. 201-841-8	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; STOT SE 3; H302, H315, H319, H335	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component	Classification	Concentration
2,5-Di-tert-butylhydroquinone		
CAS-No. 88-58-4 EC-No. 201-841-8	Xn, R22 - R36/37/38	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: beige
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 216 - 218 °C - lit.
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or	no data available

	explosive limits	
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - mouse - 1.000 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

Carcinogenicity - Hamster - Oral
Tumorigenic:Neoplastic by RTECS criteria. Gastrointestinal:Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: MX5160000

Depending on the intensity and duration of exposure, effects may vary from mild irritation to severe destruction of tissue., prolonged or repeated exposure can cause:, Damage to the lungs., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
Skin Irrit.	Skin irritation

Full text of R-phrases referred to under sections 2 and 3

Xn	Harmful
R22	Harmful if swallowed.
R36/37/38	Irritating to eyes, respiratory system and skin.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.3 Revision Date 08.05.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	1,3-Diphenylguanidine
Product Number	:	D207756
Brand	:	Aldrich
Index-No.	:	612-149-00-4
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	102-06-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 3), H301
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Reproductive toxicity (Category 2), H361f
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

N	Dangerous for the environment	R51/53
Xn	Harmful	R62
Xi	Irritant	R36/37/38
T	Toxic	R25

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word	Danger

Hazard statement(s)

H301	Toxic if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H361f	Suspected of damaging fertility.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P261	Avoid breathing dust.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_{13}H_{13}N_3$
Molecular weight	:	211,26 g/mol
CAS-No.	:	102-06-7
EC-No.	:	203-002-1
Index-No.	:	612-149-00-4

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
1,3-Diphenylguanidine			
CAS-No. EC-No. Index-No.	102-06-7 203-002-1 612-149-00-4	Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2; Repr. 2; STOT SE 3; Aquatic Chronic 2; H301, H315, H319, H335, H361f, H411	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
1,3-Diphenylguanidine			
CAS-No. EC-No. Index-No.	102-06-7 203-002-1 612-149-00-4	T, N, Repr.Cat.3, R25 - R36/37/38 - R51/53 - R62	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 146 - 148 °C - lit.
f)	Initial boiling point and boiling range	> 250 °C at ca.1.010 hPa - OECD Test Guideline 103
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	0,325 g/l at 20 °C - OECD Test Guideline 105 - soluble
o)	Partition coefficient: n-octanol/water	Pow: 2,42 at 21,1 °C
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	ca.58,8 mN/m at 23 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 111 mg/kg
(OECD Test Guideline 401)

LD50 Oral - Rat - female - 107 mg/kg
(OECD Test Guideline 401)

LD50 Dermal - Rabbit - male and female - > 2.000 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irritating to eyes. - 24 h
(Draize Test)

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
in vitro assay
lymphocyte
Result: negative

Result: Not mutagenic in Ames Test

Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Rat - male and female
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
Suspected human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity - Mouse - male and female - No observed adverse effect level - 75 mg/kg - Lowest observed adverse effect level - 114 mg/kg
RTECS: MF0875000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Pimephales promelas (fathead minnow) - 4,2 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 17 mg/l - 48 h
Toxicity to algae	static test EC50 - Desmodesmus subspicatus (Scenedesmus subspicatus) - 7,5 mg/l - 72 h
Toxicity to bacteria	Respiration inhibition EC50 - Sludge Treatment - 147 mg/l - 3 h (OECD Test Guideline 209)

12.2 Persistence and degradability

Biodegradability: Biotic/Aerobic - Exposure time 28 d
Result: 55 - 71 % - Not readily biodegradable.
(OECD Test Guideline 301B)

12.3 Bioaccumulative potential

Bioaccumulation: Cyprinus carpio (Carp) - 42 d
- 0,1 mg/l

Bioconcentration factor (BCF): < 2
(OECD Test Guideline 305C)

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2811 IMDG: 2811 IATA: 2811

14.2 UN proper shipping name

ADR/RID: TOXIC SOLID, ORGANIC, N.O.S. (1,3-Diphenylguanidine)
IMDG: TOXIC SOLID, ORGANIC, N.O.S. (1,3-Diphenylguanidine)
IATA: Toxic solid, organic, n.o.s. (1,3-Diphenylguanidine)

14.3 Transport hazard class(es)

ADR/RID: 6.1 IMDG: 6.1 IATA: 6.1

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards
ADR/RID: yes IMDG Marine pollutant: yes IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H301	Toxic if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H361f	Suspected of damaging fertility.
H411	Toxic to aquatic life with long lasting effects.
Repr.	Reproductive toxicity
Skin Irrit.	Skin irritation

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
T	Toxic
R25	Toxic if swallowed.
R36/37/38	Irritating to eyes, respiratory system and skin.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R62	Possible risk of impaired fertility.
Repr.Cat.3	Toxic to Reproduction Category 3

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 13.05.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	*tert*-Dodecylmercaptan
Product Number	:	44210
Brand	:	Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	25103-58-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xi, N	Irritant, Dangerous for the environment	R36/38, R50/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)	
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501	Dispose of contents/ container to an approved waste disposal plant.
Supplemental Hazard Statements	none

2.3 Other hazards

Stench.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_{12}H_{26}S$
Molecular Weight	:	202,40 g/mol
CAS-No.	:	25103-58-6
EC-No.	:	246-619-1

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
tert-Dodecanethiol			
CAS-No. EC-No.	25103-58-6 246-619-1	Skin Irrit. 2; Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 1; H315, H319, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
tert-Dodecanethiol			
CAS-No. EC-No.	25103-58-6 246-619-1	Xi, N, R36/38 - R50/53	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Normal measures for preventive fire protection.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: > 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 361 min
Material tested:

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: light brown
b)	Odour	Stench.
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: < -30 °C
f)	Initial boiling point and boiling range	227 - 248 °C - lit.
g)	Flash point	97 °C - closed cup
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available

j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	0,8 hPa at 50 °C 0,03 hPa at 20 °C
l)	Vapour density	6,99 - (Air = 1.0)
m)	Relative density	0,86 g/mL at 20 °C
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	log Pow: 6,1
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	350 °C -
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Relative vapour density 6,99 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 4.400 - 12.000 mg/kg

LD50 Dermal - rabbit - 12.600 mg/kg

Skin corrosion/irritation
Skin - rabbit
Result: Skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit
Result: Moderate eye irritation

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: JR3150000

Nausea, Headache, Vomiting, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Salmo salar (Atlantic salmon) - 0,9 mg/l
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia - 0,5 mg/l - 48 h
Toxicity to algae	EC50 - Desmodesmus subspicatus (green algae) - 81 - 100 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability	Result: 10,40 % - Not readily biodegradable.

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Very toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3082	IMDG: 3082	IATA: 3334

14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (tert-Dodecanethiol)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (tert-Dodecanethiol)
IATA: Aviation regulated liquid, n.o.s. (tert-Dodecanethiol)

14.3 Transport hazard class(es)

ADR/RID: 9	IMDG: 9	IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xi	Irritant
R36/38	Irritating to eyes and skin.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held

liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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1225 West Market St., Akron OH 44313
Phone: 330-869-0500, Fax: 330-869-0518
www.sovchem.net

Safety Data Sheet

Dusantox® 6PPD

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

Manufacturer DUSLO, A. S. 927 03 Šaľa 836 03 Bratislava, Slovakia Republic Phone (42) 0706/2561 drop 4100 Fax (42) 0706/5643 Fax (42) 0706/3000	***Emergency Contact*** Chemtrec: 1-800-424-9300 (continental USA) (1)703-527-3887 (outside continental USA) Duslo (in Slovakia): 00421/706/754112
Trade Name(s): Dusantox® 6PPD Pastille	***Synonyms:*** 6PPD, 1,4-benzenediamine, N-(1,3 dimethyl-butyl)-N'-phenyl
Chemical Name: N-(1,3-dimethylbutyl) -N'-phenyl-p-phenylenediamine	***CAS Number:*** 793-24-8
Relevant identified uses of the substance or mixture and uses advised against: No further relevant information available.	***Application of the substance/the preparation:*** Rubber Compounding.
Issued By: Sovereign Chemical Company According to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS	***SDS Number:*** 1174 ***Date of Issue:*** November 1, 2013 ***Revision Number:*** 10 (Supersedes May 13, 2009) ***Change(s):*** Update to GHS requirement.

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

Classification according to Regulation (EC) No 1272/2008

The following Hazard Statements are applicable only to the EU regulations and not the US GHS regulation: H400, H410

GHS09 Environment
Aquatic Acute 1 H400 Very toxic to aquatic life
Aquatic Chronic 1 H410 Very toxic to aquatic life with long lasting effects

GHS07
Eye Irrit. 2 H319 Causes serious eye irritation.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

Xn; Harmful
R22 Harmful if swallowed.

Xi; Irritant
R36 Irritating to eyes.

N; Dangerous for the environment.
R50/53 Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

Information concerning particular hazards for human and environment: Not applicable.

2.2 Label elements

Labeling according to Regulation (EC) No 1272/2008

The product is classified and labeled according to the CLP regulation.

Hazard pictograms

GHS07 GHS09

Signal word: Warning

Hazard statements

The following Hazard Statements are applicable only to the EU regulations and not the US GHS regulation: H410.

H319	Causes serious eye irritation.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statements

P280	Wear protective gloves/protective clothing/eye protection/face protection.
P273	Avoid release to the environment.
P264	Wash thoroughly after handling.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.
P391	Collect spillage.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard description

WHMIS-symbols

D2B –Toxic material causing other toxic effects

NFPA ratings (scale 0-4)

Health = 2
Fire = 1
Reactivity = 0

HMIS ratings (scale 0-4)

Health = 2
Fire = 1
Reactivity = 0

HMIS Long Term Health Hazard Substances: Substance is not listed.

2.3 Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

· **CAS No. Description:** 793-24-8, N-(1,3-dimethylbutyl) -N'-phenyl-p-phenylenediamine

· **Identification number(s)**

· **EC number:** 212-344-0

4. FIRST AID MEASURES

4.1 Description of first aid measures

General information: Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.

After inhalation: Supply fresh air; consult doctor in case of complaints.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

If skin irritation continues, consult a doctor.

After eye contact

Remove contact lenses if worn.

Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

After swallowing

Rinse out mouth and then drink plenty of water.

Do not induce vomiting; call for medical help immediately.

4.2 Most important symptoms and effects, both acute and delayed: Gastric or intestinal disorders.

Hazards: No further relevant information available.

4.3 Indication of any immediate medical attention and special treatment needed: No further relevant information available.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing agents: Use fire extinguishing methods suitable to surrounding conditions.

For safety reasons unsuitable extinguishing agents: None.

5.2 Special hazards arising from the substance or mixture: Formation of toxic gases is possible during heating or in case of fire.

5.3 Advice for firefighters

Protective equipment

Wear self-contained respiratory protective device.

Wear fully protective suit.

Additional information: Cool endangered receptacles with water spray.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

6.2 Environmental precautions

Inform respective authorities in case of seepage into water course or sewage system.

Do not allow to enter sewers/ surface or ground water.

6.3 Methods and material for containment and cleaning up

Pick up mechanically.

Send for recovery or disposal in suitable receptacles.

Dispose contaminated material as waste according to item 13.

6.4 Reference to other sections

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Prevent formation of dust.

Any unavoidable deposit of dust must be regularly removed.

Information about fire and explosion protection: No special measures required.

7.2 Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles

Store in a cool location.
Protect from humidity and water.
Avoid storage near extreme heat, ignition sources or open flame.

Information about storage in one common storage facility

Store away from foodstuffs.
Do not store together with oxidizing and acidic materials.

Further information about storage conditions: Store in cool, dry conditions in well-sealed receptacles.

7.3 Specific end use(s): No further relevant information available.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

Additional information about design of technical facilities: No further data; see item 7.

8.1 Control parameters

Ingredients with limit values that require monitoring at the workplace: Not required.

DNELs: No further relevant information available.

PNECs: No further relevant information available.

Additional information: The lists valid during the making were used as basis.

8.2 Exposure controls

Personal protective equipment

General protective and hygienic measures

Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.

Respiratory protection

Use suitable respiratory protective device in case of insufficient ventilation.
Use suitable respiratory protective device when high concentrations are present.

Protection of hands

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.

Material of gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Penetration time of glove material

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection

Safety glasses

Body protection: Protective work clothing.

Limitation and supervision of exposure into the environment: No further relevant information available.

Risk management measures

See Section 7 for additional information.
No further relevant information available.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

General Information

Appearance **Form:** Solid. **Color**: Not determined.	**Change in Condition** **Melting Point/Melting Range:** Undetermined. **Boiling Point/Boiling Range:** Undetermined.

Odor: Characteristic	**Octanol/Water Partition Coefficient:** Not determined.
Odor threshold: Not determined.	**pH Value:** Not applicable.
Vapor pressure: Not applicable.	**Flash point:** 399°F/204°C.
Density at 20 °C: 1.06 g/cm³.	**Flammability (solid, gaseous):** Product is not flammable.
Relative density: Not determined.	**Ignition temperature:** Not determined.
Vapor density: Not applicable.	**Decomposition temperature:** Not determined.
Evaporation rate Not applicable.	**Self-igniting:** Not determined
Solubility in / Miscibility with water: Insoluble.	**Danger of explosion:** Product does not present an explosion hazard.
Viscosity **Dynamic:** Not applicable. **Kinematic:** Not applicable.	**Explosion limits** **Lower:** Not determined. **Upper:** Not determined.

9.2 Other information: No further relevant information available.

10. STABILITY AND REACTIVITY

10.1 Reactivity

10.2 Chemical stability

Thermal decomposition/conditions to be avoided: No decomposition if used and stored according to specifications.

10.3 Possibility of hazardous reactions: Reacts with strong acids and oxidizing agents.

10.4 Conditions to avoid: No further relevant information available.

10.5 Incompatible materials: No further relevant information available.

10.6 Hazardous decomposition products

Nitrogen oxides.

Carbon monoxide and carbon dioxide.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD/LC50 values relevant for classification:		
793-24-8 N-(1,3-dimethylbutyl) -N'-phenyl-p-phenylenediamine		
Oral	LD50	3500-5000 mg/kg (rat)

Primary irritant effect

On the skin: Slight irritating effect on skin and mucous membranes.

On the eye: Irritating effect.

Sensitization: No sensitizing effects known.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Aquatic toxicity: Toxic for aquatic organisms

12.2 Persistence and degradability: Not easily biodegradable.

12.3 Bio-accumulative potential: No further relevant information available.

12.4 Mobility in soil: No further relevant information available.

Ecotoxical effects

Remark: Very toxic for fish.

Additional ecological information

General notes

This statement was deduced from products with a similar structure or composition.

Avoid transfer into the environment.

Due to available data on eliminability/decomposition and bioaccumulation potential prolonged term damage of the environment cannot be excluded.

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

Also poisonous for fish and plankton in water bodies.

Very toxic for aquatic organisms

12.5 Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

12.6 Other adverse effects: No further relevant information available.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Recommendation

Must not be disposed together with household garbage. Do not allow product to reach sewage system. Can be burned with household garbage after consulting with the waste disposal facility operator and the pertinent authorities and adhering to the necessary technical regulations.

Un-cleaned packaging

Recommendation: Disposal must be made according to official regulations.

14. TRANSPORTATION INFORMATION

14.1 UN-Number

DOT	N/A
ADR, IMDG, IATA	UN3077

14.2 UN proper shipping name:

DOT	N/A
ADR	3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S (N-(1,3-dimethylbutyl) -N'-phenyl-p-phenylenediamine)
IMDG	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S (N-(1,3-dimethylbutyl) -N'-phenyl-p-phenylenediamine), MARINE POLLUTANT
IATA	ENVIRONMENTALLY HAZARDOUS SUBSTANCE SOLID, N.O.S (N-(1,3-dimethylbutyl) N'-phenyl-p-phenylenediamine)

14.3 Transport hazard class(es)

DOT, Class	N/A
ADR	

Class	9 (M7) Miscellaneous dangerous substances and articles.
Label	9

· **IMDG, IATA**

Class	9 Miscellaneous dangerous substances and articles.
Label	9

14.4 Packing group

DOT	N/A
ADR, IMDG, IATA	III

14.5 Environmental hazards	Product contains environmentally hazardous substances: (N-(1,3-dimethylbutyl) N'-phenyl-p-phenylenediamine)
Marine pollutant	Yes Symbol (fish and tree)
Special Marking (ADR)	Symbol (fish and tree)
Special Marking (IATA)	Symbol (fish and tree)
14.6 Special precautions for user	**Warning:** Miscellaneous dangerous substances and articles
Danger code (Kemler)	90
EMS Number	F-A, S-F.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

Transport/Additional information

ADR

Limited quantities (LQ)	5 kg
Transport category	3
Tunnel restriction code	E
UN "Model Regulation"	UN3077, ENVIRONMENT ALLY HAZ ARDO US SUBSTANCE, SOLID, N.O.S. (N-isopropyl-N'-phenyl-p-phenylenediamine), 9, III

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

United States (USA)

SARA Section 355 (extremely hazardous substances)	Substance is not listed.
SARA Section 313 (Specific toxic chemical listings)	Substance is not listed.
TSCA (Toxic Substances Control Act)	Substance is listed.
Proposition 65 (California)	
Chemicals known to cause cancer	Substance is not listed.
Chemicals known to cause reproductive toxicity for females	Substance is not listed.
Chemicals known to cause reproductive toxicity for males	Substance is not listed.
Chemicals known to cause developmental toxicity	Substance is not listed.
Carcinogenic Categories	
EPA (Environmental Protection Agency)	Substance is not listed.
IARC (International Agency for Research on Cancer)	Substance is not listed.
TLV (Threshold Limit Value established by ACGIH)	Substance is not listed.
NIOSH-Ca (National Institute for Occupational Safety and Health)	Substance is not listed.
OSHA-Ca (Occupational Safety & Health Administration)	Substance is not listed.
Canada	
Canadian Domestic Substances List (DSL)	Substance is listed.
Canadian Ingredient Disclosure list (limit 0.1%)	Substance is not listed.
Canadian Ingredient Disclosure list (limit 1%)	Substance is not listed.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16. OTHER INFORMATION

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Abbreviations and acronyms

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labeling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent

Sources

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Safety Data Sheet

Sovchem® ETU

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

Manufacturer: Sovereign Chemical Company 1225 West Market Street Akron, OH 44313	***Emergency Contact:*** Chemtrec: 1-800-424-9300 (continental USA) (1)703-527-3887 (outside continental USA)
Trade Name(s): Sovchem® ETU Oiled Powder	***Synonyms:*** ETU, 2-mercaptoimidazoline, 2-imidazolidinethione
Chemical Name: Ethylene thiourea	***CAS Number:*** 96-45-7
Relevant identified uses of the substance or mixture and uses advised against: No further relevant information available.	***Application of the substance/the preparation:*** Chemicals for synthesis.
Issued By: Sovereign Chemical Company	***SDS Number:*** 1843 ***Date of Issue:*** June 24, 2013 ***Revision Number:*** 2 (supersedes August 17, 2010) ***Change(s):*** Revision to GHS requirement

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008
The following Hazard Statements are applicable only to the EU regulations and not the US GHS regulation: H360D.
The following Hazard Statements are applicable only according to OSHA regulations within the United States.
These Statements are not applicable for the CLP regulation (1272/2008/EC) in the EU. H360.

H360: May damage fertility or the unborn child

GHS08 Health hazard
Repr. 1B H360D May damage the unborn child.

GHS07
Acute Tox. 4 H302 Harmful if swallowed.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

T; Toxic
Repr. Cat.2
R61: May cause harm to the unborn child.

Xn; Harmful
R22 Harmful if swallowed.

Information concerning particular hazards for human and environment: Not applicable.

2.2 Label elements
Labeling according to Regulation (EC) No 1272/2008
The substance is classified and labeled according to the CLP regulation.
Hazard pictograms


GHS07


GHS08

Signal word: Danger
Hazard-determining components of labeling: ethylene thiourea
Hazard statements
The following Hazard Statements are applicable only to the EU regulations and not the US GHS regulation: H360D.

H360	May damage fertility or the unborn child. (USA)
H302	Harmful if swallowed.
H360D	May damage the unborn child.

Precautionary statements

P281	Use personal protective equipment as required.
P264	Wash thoroughly after handling.
P202	Do not handle until all safety precautions have been read and understood.
P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P330	Rinse mouth.

Additional information: Restricted to professional users.
Hazard description
WHMIS-symbols
D1B - Toxic material causing immediate and serious toxic effects
D2A - Very toxic material causing other toxic effects

NFPA ratings (scale 0-4)

Health = 3
Fire = 1
Reactivity = 0

HMIS ratings (scale 0-4)

Health = *3
Fire = 1
Reactivity = 0

* - Indicates a long term health hazard from repeated or prolonged exposures.
HMIS Long Term Health Hazard Substances: 96-45-7, ethylene thiourea
2.3 Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
CAS No., Description: 96-45-7, ethylene thiourea
Identification number(s)
EC number: 202-506-9
· **Index number:** 613-039-00-9

Dangerous components

CAS: 8042-47-5 EINECS: 232-455-8	White Mineral Oil Xn R65 Asp. Tox. 1, H304	<5.0%

4. FIRST AID MEASURES

4.1 Description of first aid measures

General information

Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.

After inhalation: Supply fresh air; consult doctor in case of complaints.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

If skin irritation continues, consult a doctor.

After eye contact

Remove contact lenses if worn.

Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

After swallowing

Rinse out mouth and then drink plenty of water.

Do not induce vomiting; call for medical help immediately.

Call for a doctor immediately.

4.2 Most important symptoms and effects, both acute and delayed

Gastric or intestinal disorders

Dizziness

Hazards: No further relevant information available.

4.3 Indication of any immediate medical attention and special treatment needed

Treat skin and mucous membrane with antihistamine and corticoid preparations.

If necessary oxygen respiration treatment.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing agents: CO_2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

For safety reasons unsuitable extinguishing agents: None.

5.2 Special hazards arising from the substance or mixture

Formation of toxic gases is possible during heating or in case of fire.

5.3 Advice for firefighters

Protective equipment

Wear self-contained respiratory protective device.

Wear fully protective suit.

Additional information: Cool endangered receptacles with water fog or haze.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use respiratory protective device against the effects of fumes/dust/aerosol.

Ensure adequate ventilation.

Wear protective equipment. Keep unprotected persons away.

Isolate area and prevent access.

6.2 Environmental precautions: Do not allow to enter sewers/ surface or ground water.

6.3 Methods and material for containment and cleaning up

Pick up mechanically.

Do not flush with water or aqueous cleansing agents.

Dispose contaminated material as waste according to item 13.

6.4 Reference to other sections

See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Open and handle receptacle with care.
Prevent formation of dust.
Use only in well ventilated areas.

Information about fire and explosion protection: Keep respiratory protective device available.

7.2 Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles

Store in a cool location.
Avoid storage near extreme heat, ignition sources or open flame.
Use only receptacles specifically permitted for this substance/product.

Information about storage in one common storage facility

Store away from foodstuffs.
Do not store together with oxidizing and acidic materials.
Store away from reducing agents.

Further information about storage conditions

Store in cool, dry conditions in well-sealed receptacles.
Protect from humidity and water.
Store receptacle in a well-ventilated area.

7.3 Specific end use(s): No further relevant information available.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

Additional information about design of technical facilities: No further data; see item 7.

8.1 Control parameters

Ingredients with limit values that require monitoring at the workplace

96-45-7 ethylene thiourea

REL (USA) Use in encapsulated form; See Pocket Guide App. A.

DNELs No further relevant information available.

PNECs No further relevant information available.

Additional information: The lists valid during the making were used as basis.

8.2 Exposure controls

Personal protective equipment

General protective and hygienic measures:

The usual precautionary measures are to be adhered to when handling chemicals.
Pregnant women should strictly avoid inhalation or skin contact.
Do not inhale dust / smoke / mist.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.

Respiratory protection

Combined Organic Vapor and Particulate Respirator is recommended for use during all processing activities.

Protection of hands

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.

Material of gloves

Neoprene gloves

Nitrile rubber, NBR

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Penetration time of glove material

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection

Safety glasses

Body protection: Impervious protective clothing

Limitation and supervision of exposure into the environment: No further relevant information available.

Risk management measures

See Section 7 for additional information.

No further relevant information available.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

General Information

Appearance **Form:** Powder **Color:** White	**Change in Condition** **Melting Point/Melting Range:** 200-203 °C (392-397 °F) **Boiling Point/Boiling Range:** Undetermined
Odor: Odorless	**Octanol/Water Partition Coefficient:** Not determined
Odor threshold: Not determined	**Solvent Content: Organic solvents:** Not determined
pH: Not applicable	**Solids content:** Not determined
Vapor Pressure: Not applicable	**Flash point:** Not applicable
Density at 20 °C: 1.45 g/cm³	**Flammability (solid, gaseous):** Product is not flammable
Relative density: Not determined	**Ignition temperature:** Not determined
Vapor Density: Not applicable	**Decomposition temperature:** Not determined
Evaporation rate Not applicable	**Self-igniting:** Not determined
Solubility in / Miscibility with water at 20 °C: 19 g/l.	**Danger of explosion:** Product does not present an explosion hazard
Viscosity **Dynamic:** Not applicable **Kinematic:** Not applicable	**Explosion limits** **Lower:** Not determined. **Upper:** Not determined

9.2 Other information No further relevant information available.

10. STABILITY AND REACTIVITY

10.1 Reactivity

10.2 Chemical stability

Thermal decomposition / conditions to be avoided No decomposition if used and stored according to specifications.

10.3 Possibility of hazardous reactions

Reacts with oxidizing agents.

Toxic fumes may be released if heated above the decomposition point.

10.4 Conditions to avoid: Keep away from heat and direct sunlight.

10.5 Incompatible materials: No further relevant information available.

10.6 Hazardous decomposition products

Sulphur oxides (SOx)

Carbon monoxide and carbon dioxide

Nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Acute toxicity
LD/LC50 values relevant for classification: 96-45-7 ethylene thiourea Oral LD50 1832 mg/kg (rat)
· **Primary irritant effect**
on the skin: No irritant effect.
on the eye: No irritant effect..
Sensitization: Sensitizing effect by skin contact is possible by prolonged exposure.
Additional toxicological information: Harmful.
Repeated dose toxicity: May cause damage to organs through prolonged or repeated exposure.
CMR effects (carcinogenity, mutagenicity and toxicity for reproduction): Repr. 1B

12. ECOLOGICAL INFORMATION

12.1 Toxicity
Aquatic toxicity: The material is harmful to the environment.
12.2 Persistence and degradability: biodegradable
12.3 Bioaccumulative potential: Does not accumulate in organisms.
12.4 Mobility in soil: No further relevant information available.
Ecotoxical effects
Remark: Harmful to water fleas.
Additional ecological information
General notes
The declarations are valid for the component with the highest toxicological risk.
The product may not be released into the environment without control.
Due to available data on eliminability/decomposition and bioaccumulation potential a prolonged damage of the environment is unlikely.
Harmful to aquatic organisms
Water Hazard Class (Self-classification) in the concentrate.
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
12.5 Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
12.6 Other adverse effects: No further relevant information available.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Recommendation
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Can be burned with household garbage after consulting with the waste disposal facility operator and the pertinent authorities and adhering to the necessary technical regulations.
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous.
Uncleaned packaging
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agents: Water, if necessary together with cleansing agents.

14. TRANSPORTATION INFORMATION

14.1 UN-Number
DOT, ADR, IMDG, IATA UN3077
14.2 UN proper shipping name
DOT Environmentally hazardous substances, solid, n.o.s. (Ethylenethiourea)
ADR 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Ethylenethiourea)
· **IMDG** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (E thylenethiourea), MARINE POLLUTANT
· **IATA** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Ethylenethiourea)
14.3 Transport hazard class(es)
DOT

Class 9 Miscellaneous dangerous substances and articles.
· **Label** 9
ADR, IMDG, IATA

Class 9 Miscellaneous dangerous substances and articles.
· **Label** 9
14.4 Packing group
DOT, ADR, IMDG, IATA III
14.5 Environmental hazards
Marine pollutant Symbol (fish and tree)
· **Special marking (ADR)** Symbol (fish and tree)
· **Special marking (IATA)** Symbol (fish and tree)
14.6 Special precautions for user Warning: Miscellaneous dangerous substances and articles.
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.
· · **Transport/Additional information:** This product is non-hazardous for transport for packages less than 10 lbs.
· **ADR: Limited quantities (LQ)** 5 kg
· **UN "Model Regulation"** UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S., 9, III

15. REGULATORY INFORMATION

5.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
United States (USA)

SARA Section 355 (extremely hazardous substances)	Substance is not listed.
SARA Section 313 (Specific toxic chemical listings)	96-45-7 ethylene thiourea
TSCA (Toxic Substances Control Act)	Substance is listed.
Proposition 65 (California)	
Chemicals known to cause cancer	96-45-7 ethylene thiourea
Chemicals known to cause reproductive toxicity for females	Substance is not listed.
Chemicals known to cause reproductive toxicity for males	Substance is not listed.
Chemicals known to cause developmental toxicity	96-45-7 ethylene thiourea
Carcinogenic Categories	
EPA (Environmental Protection Agency)	Substance is not listed.
IARC (International Agency for Research on Cancer)	96-45-7 ethylene thiourea. 3
TLV (Threshold Limit Value established by ACGIH)	Substance is not listed.

NIOSH-Ca (National Institute for Occupational Safety and Health)	96-45-7 ethylene thiourea
OSHA-Ca (Occupational Safety & Health Administration)	Substance is not listed.
Canada	
Canadian Domestic Substances List (DSL)	Substance is listed.
Canadian Ingredient Disclosure list (limit 0.1%)	96-45-7 ethylene thiourea
Canadian Ingredient Disclosure list (limit 1%)	Substance is not listed.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16. OTHER INFORMATION

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant phrases

H304 May be fatal if swallowed and enters airways.
R65 Harmful: may cause lung damage if swallowed.

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labeling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent

Sources

SDS Prepared by:
ChemTel Inc.
1305 North Florida Avenue
Tampa, Florida USA 33602-2902
Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573
Website: www.chemtelinc.com

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 5.1 Revision Date 12.10.2015
Print Date 23.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Araldite® 506 epoxy resin
Product Number	:	A3183
Brand	:	Sigma-Aldrich
Index-No.	:	603-074-00-8
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	25068-38-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Skin sensitisation (Category 1), H317
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H315 Causes skin irritation.

H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P391	Collect spillage.

Supplemental Hazard Statements: none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

CAS-No. : 25068-38-6
Index-No. : 603-074-00-8

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Reaction product: bisphenol-A-(epichlorhydrin) and epoxy resin (number average molecular weight <= 700)			
CAS-No. EC-No. Index-No.	25068-38-6 500-033-5 603-074-00-8	Skin Irrit. 2; Eye Irrit. 2; Skin Sens. 1; Aquatic Chronic 2; H315, H319, H317, H411 Concentration limits: >= 5 %: Eye Irrit. 2, H319; >= 5 %: Skin Irrit. 2, H315;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of

contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Semi-solid melting to a liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-15 - 5 °C
f)	Initial boiling point and boiling range	No data available
g)	Flash point	252 °C
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available

k)	Vapour pressure	0,04 hPa at 77 °C
l)	Vapour density	No data available
m)	Relative density	1,168 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 2,8
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, acids, Amines, Bases

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 13.600 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Lungs, Thorax, or Respiration:Dyspnea. Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
Germ cell mutagenicity
No data available

Ames test
Result: positive

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KC2100000

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
Biodegradability Result: - According to the results of tests of biodegradability this product is not readily biodegradable.
Remarks: No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Toxic to aquatic life with long lasting effects.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 3082 IMDG: 3082 IATA: 3082

14.2 UN proper shipping name
ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Reaction product: bisphenol-A-(epichlorhydrin) and epoxy resin (number average molecular weight <= 700))
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Reaction product: bisphenol-A-(epichlorhydrin) and epoxy resin (number average molecular weight <= 700))
IATA: Environmentally hazardous substance, liquid, n.o.s. (Reaction product: bisphenol-A-(epichlorhydrin) and epoxy resin (number average molecular weight <= 700))

14.3 Transport hazard class(es)

ADR/RID: 9	IMDG: 9	IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H411	Toxic to aquatic life with long lasting effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.3 Revision Date 17.02.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Ethyl acetate

Product Number : 270989
Brand : Sigma-Aldrich
Index-No. : 607-022-00-5
REACH No. : 01-2119475103-46-XXXX
CAS-No. : 141-78-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Eye irritation (Category 2), H319
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

F	Highly flammable	R11
Xi	Irritant	R36
		R66
		R67

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.

H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.

Precautionary statement(s)

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261	Avoid breathing vapours.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard information (EU)

EUH066	Repeated exposure may cause skin dryness or cracking.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_4H_8O_2$
Molecular weight	:	88,11 g/mol
CAS-No.	:	141-78-6
EC-No.	:	205-500-4
Index-No.	:	607-022-00-5
Registration number	:	01-2119475103-46-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Ethyl acetate			
CAS-No.	141-78-6	Flam. Liq. 2; Eye Irrit. 2; STOT SE 3; H225, H319, H336, EUH066	<= 100 %
EC-No.	205-500-4		
Index-No.	607-022-00-5		
Registration number	01-2119475103-46-XXXX		

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Ethyl acetate			
CAS-No.	141-78-6	F, Xi, R11 - R36 - R66 - R67	<= 100 %
EC-No.	205-500-4		
Index-No.	607-022-00-5		
Registration number	01-2119475103-46-XXXX		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Acute systemic effects	1468 mg/m3
Workers	Inhalation	Acute local effects	1468 mg/m3
Workers	Skin contact	Long-term systemic effects	63mg/kg BW/d
Workers	Inhalation	Long-term systemic effects	734 mg/m3
Workers	Inhalation	Long-term local effects	734 mg/m3
Consumers	Inhalation	Acute local effects, Acute systemic effects	734 mg/m3
Consumers	Skin contact	Long-term systemic effects	37mg/kg BW/d
Consumers	Inhalation	Long-term systemic effects	367 mg/m3
Consumers	Ingestion	Long-term systemic effects	4,5mg/kg BW/d
Consumers	Inhalation	Long-term local effects	367 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	0,24 mg/kg
Marine water	0,026 mg/l
Fresh water	0,26 mg/l
Marine sediment	0,125 mg/kg
Fresh water sediment	1,25 mg/kg

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 113 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of

anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -84 °C
f)	Initial boiling point and boiling range	76,5 - 77,5 °C
g)	Flash point	-2,99 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	May form explosive dust-air mixture.
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 11,5 %(V) Lower explosion limit: 2,2 %(V)
k)	Vapour pressure	97,3 hPa at 20,0 °C
l)	Vapour density	No data available
m)	Relative density	0,90 g/cm3 at 20 °C
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0,73
p)	Auto-ignition temperature	427,0 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	24,0 mN/m at 20,0 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 5.620 mg/kg

LC50 Inhalation - Mouse - 2 h - 45.000 mg/m3

LD50 Dermal - Rabbit - > 18.000 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: AH5425000

Inhalation of high concentrations may cause:, Headache, Drowsiness, Dizziness, Vomiting, narcosis, anemia, Central nervous system depression

Kidney - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 350,00 - 600,00 mg/l - 96 h
	LC50 - Pimephales promelas (fathead minnow) - 220,00 - 250,00 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 2.300,00 - 3.090,00 mg/l - 24 h
	LC50 - Daphnia magna (Water flea) - 560 mg/l - 48 h
Toxicity to algae	EC50 - Algae - 4.300,00 mg/l - 24 h
	EC50 - SELENASTRUM - 1.800,00 - 3.200,00 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability Result: 79 % - Readily biodegradable
(OECD Test Guideline 301D)

12.3 Bioaccumulative potential

Bioaccumulation - 3 d

Bioconcentration factor (BCF): 30

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1173 IMDG: 1173 IATA: 1173

14.2 UN proper shipping name

ADR/RID: ETHYL ACETATE
IMDG: ETHYL ACETATE
IATA: Ethyl acetate

14.3 Transport hazard class(es)

ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

EUH066	Repeated exposure may cause skin dryness or cracking.
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
STOT SE	Specific target organ toxicity - single exposure

Full text of R-phrases referred to under sections 2 and 3

F	Highly flammable
Xi	Irritant
R11	Highly flammable.
R36	Irritating to eyes.
R66	Repeated exposure may cause skin dryness or cracking.
R67	Vapours may cause drowsiness and dizziness.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 27.05.2015
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Ethylene glycol dimethacrylate
Product Number	:	335681
Brand	:	Aldrich
Index-No.	:	607-114-00-5
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	97-90-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Skin sensitisation (Category 1), H317
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

		R43
Xi	Irritant	R37

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H317 May cause an allergic skin reaction.

H335	May cause respiratory irritation.
Precautionary statement(s)	
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	1,2-Ethanediol dimethacrylate Ethylene dimethacrylate
Formula	:	$C_{10}H_{14}O_4$
Molecular weight	:	198,22 g/mol
CAS-No.	:	97-90-5
EC-No.	:	202-617-2
Index-No.	:	607-114-00-5

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Ethylene dimethacrylate			
CAS-No. EC-No. Index-No.	97-90-5 202-617-2 607-114-00-5	Skin Sens. 1; STOT SE 3; H317, H335	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Ethylene dimethacrylate			
CAS-No. EC-No. Index-No.	97-90-5 202-617-2 607-114-00-5	Xi, R37 - R43	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C
Storage class (TRGS 510): Combustible liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0,6 mm
Break through time: 60 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: light yellowcolourless
b)	Odour	ester-like
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-19,99 °C
f)	Initial boiling point and boiling range	98 - 100 °C at 7 hPa - lit.
g)	Flash point	101,5 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1 hPa at 20 °C
l)	Vapour density	6,84 - (Air = 1.0)
m)	Relative density	1,051 g/cm3 at 25 °C
n)	Water solubility	5 g/l at 20 °C
o)	Partition coefficient: n-octanol/water	log Pow: 1,22
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	3,038 mm2/s at 20 °C -
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	6,84 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.
Contains the following stabiliser(s):
Mequinol (>=90 - <110 ppm)

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

May polymerize on exposure to light. Exposure to light.

10.5 Incompatible materials
Strong acids, Strong oxidizing agents, Strong bases, Reducing agents, Amines, Heavy metals, Peroxides, Free radical initiators

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 3.300 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(Draize Test)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Germ cell mutagenicity
Mouse
lymphocyte
Mutation in mammalian somatic cells.

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: OZ4400000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 15,95 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to bacteria	

12.2 Persistence and degradability
Biodegradability Result: 71,6 % - Readily biodegradable

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Harmful to aquatic life.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -	IMDG: -	IATA: 3334

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Aviation regulated liquid, n.o.s. (Ethylene dimethacrylate)

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: 9

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: III

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H317	May cause an allergic skin reaction.
H335	May cause respiratory irritation.
Skin Sens.	Skin sensitisation
STOT SE	Specific target organ toxicity - single exposure

Full text of R-phrases referred to under sections 2 and 3

Xi	Irritant
R37	Irritating to respiratory system.

R43 May cause sensitisation by skin contact.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.5 Revision Date 13.12.2016
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Ethylene glycol

Product Number : 324558
Brand : Sigma-Aldrich
Index-No. : 603-027-00-1
REACH No. : 01-2119456816-28-XXXX
CAS-No. : 107-21-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Specific target organ toxicity - repeated exposure, Oral (Category 2), Kidney, H373

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H373 May cause damage to organs (Kidney) through prolonged or repeated exposure if swallowed.

Precautionary statement(s)	
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	1,2-Ethanediol
Formula	:	$C_2H_6O_2$
Molecular weight	:	62,07 g/mol
CAS-No.	:	107-21-1
EC-No.	:	203-473-3
Index-No.	:	603-027-00-1
Registration number	:	01-2119456816-28-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Ethylene glycol			
CAS-No.	107-21-1	Acute Tox. 4; STOT RE 2; H302, H373	<= 100 %
EC-No.	203-473-3		
Index-No.	603-027-00-1		
Registration number	01-2119456816-28-XXXX		

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Hygroscopic.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Long-term local effects	35 mg/m3
Workers	Skin contact	Long-term systemic effects	106mg/kg BW/d
Consumers	Inhalation	Long-term local effects	7 mg/m3
Consumers	Skin contact	Long-term systemic effects	53mg/kg BW/d

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	1,53 mg/kg
Marine water	1 mg/l

Fresh water	10 mg/l
Marine sediment	3,7 mg/kg
Fresh water sediment	37 mg/kg
Sewage treatment plant	199,5 mg/l
Aquatic intermittent release	10 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: liquid

		Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -13 °C
f)	Initial boiling point and boiling range	196 - 198 °C
g)	Flash point	111 °C - closed cup
h)	Evaporation rate	1
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 15,3 %(V) Lower explosion limit: 3,2 %(V)
k)	Vapour pressure	0,11 hPa at 20 °C
l)	Vapour density	2,14 - (Air = 1.0)
m)	Relative density	1,113 g/mL at 25 °C
n)	Water solubility	completely miscible soluble
o)	Partition coefficient: n-octanol/water	log Pow: -1,36
p)	Auto-ignition temperature	400 °CAuto-flammability
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	2,14 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong acids, Strong oxidizing agents, Strong bases, Aldehydes, Aluminum

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 4.700 mg/kg

LD50 Dermal - Rabbit - 10.626 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is probably not carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
Laboratory experiments have shown teratogenic effects.

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Oral - May cause damage to organs through prolonged or repeated exposure. - Kidney

Aspiration hazard
No data available

Additional Information
RTECS: KW2975000

When ingested early symptoms mimic alcohol inebriation and are followed by nausea, vomiting, abdominal pain, weakness, muscle tenderness, respiratory failure, convulsions, cardiovascular collapse, pulmonary edema, hypocalcemic tetany, and severe metabolic acidosis. Without treatment, death may occur in 8 to 24 hours. Victims who survive the initial toxicity period usually develop renal failure along with brain and liver damage., Exposure to and/or consumption of alcohol may increase toxic effects.

Central nervous system - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 18.500 mg/l - 96 h
	LC50 - Leuciscus idus (Golden orfe) - > 10.000 mg/l - 48 h
	NOEC - Pimephales promelas (fathead minnow) - 32.000 mg/l - 7 d
	NOEC - Pimephales promelas (fathead minnow) - 39.140 mg/l - 96 h
Toxicity to daphnia and	EC50 - Daphnia magna (Water flea) - 74.000 mg/l - 24 h

other aquatic invertebrates

NOEC - Daphnia (water flea) - 24.000 mg/l - 48 h

LC50 - Daphnia magna (Water flea) - 41.000 mg/l - 48 h

12.2 Persistence and degradability
No data available

Ratio BOD/ThBOD 0,78 %

12.3 Bioaccumulative potential
Does not bioaccumulate.
Bioaccumulation other fish - 61 d
- 50 mg/l

Bioconcentration factor (BCF): 0,60

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H373	May cause damage to organs through prolonged or repeated exposure if swallowed.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.16 Revision Date 22.03.2016
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sodium dodecyl sulfate

Product Number : L3771
Brand : Sigma
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 151-21-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable solids (Category 2), H228
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)	
H228	Flammable solid.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.
Precautionary statement(s)	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
Possible sensitizer.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Lauryl sulfate sodium salt Sodium dodecyl sulphate Sodium dodecyl sulfate Sodium lauryl sulfate Dodecyl sodium sulfate Dodecyl sulfate sodium salt SDS
Formula	:	$C_{12}H_{25}NaO_4S$
Molecular weight	:	288,38 g/mol
CAS-No.	:	151-21-3
EC-No.	:	205-788-1

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Sodium dodecyl sulphate			
CAS-No. EC-No.	151-21-3 205-788-1	Flam. Sol. 2; Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; STOT SE 3; Aquatic Chronic 3; H228, H302, H332, H315, H318, H335, H412 Concentration limits: 10 - < 20 %: Eye Irrit. 2, H319; >= 20 %: Eye Dam. 1, H318;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic
Storage class (TRGS 510): Flammable solid hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Rods Colour: white
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	9,1 at 10 g/l
e)	Melting point/freezing point	Melting point/range: 204 - 207 °C - lit.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	170 °C
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 2.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	0,0018 hPa at 20 °C
l)	Vapour density	No data available
m)	Relative density	0,370 g/cm3
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0,83 at 22 °C
p)	Auto-ignition temperature	310,5 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Solubility in other solvents	Ethanol - partly soluble

Surface tension	25,2 mN/m at 23 °C
Dissociation constant	1,31 at 20 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides, Sodium oxides
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 1.200 mg/kg

LC50 Inhalation - Rat - 1 h - > 3.900 mg/m3

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 24 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Risk of serious damage to eyes.
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Information given is based on data obtained from similar substances.

Germ cell mutagenicity
No data available

Ames test
S. typhimurium
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: WT1050000

sneezing, The sodium salt of dodecyl sulfate has been reported to cause pulmonary sensitization resulting in hyperactive airway dysfunction and pulmonary allergy accompanied by fatigue, malaise, and aching. Significant symptoms of exposure can persist for more than two years and can be activated by a variety of nonspecific environmental stimuli such as automobile exhaust, perfumes, and passive smoking.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 29 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia dubia (water flea) - 5,55 mg/l - 48 h
	NOEC - Daphnia dubia (water flea) - 0,684 mg/l - 7 d
Toxicity to algae	Growth inhibition LOEC - Pseudokirchneriella subcapitata - 2,68 mg/l - 6 d
	static test EC50 - Desmodesmus subspicatus (Scenedesmus subspicatus) - > 120 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 95 % - Readily biodegradable (OECD Test Guideline 301B)
Ratio BOD/ThBOD	95,9 %

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 72 h
	Bioconcentration factor (BCF): 3,9 - 5,3

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1325	IMDG: 1325	IATA: 1325

14.2 UN proper shipping name

ADR/RID: FLAMMABLE SOLID, ORGANIC, N.O.S. (Sodium dodecyl sulphate)
IMDG: FLAMMABLE SOLID, ORGANIC, N.O.S. (Sodium dodecyl sulphate)
IATA: Flammable solid, organic, n.o.s. (Sodium dodecyl sulphate)

14.3 Transport hazard class(es)

ADR/RID: 4.1	IMDG: 4.1	IATA: 4.1

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H228	Flammable solid.
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

GEO SPECIALTY CHEMICALS

SAFETY DATA SHEET

Revision date 2016-12-13 **Revision number** 1.01

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name Lomar® PW
Product code 6287
Synonyms Sulfonated Naphthalene Condensate, Sodium Salt

1.2 Relevant identified uses of the substance or mixture and uses advised against

Recommended use [RU] No information available
Uses advised against None known

1.3 Details of the supplier of the safety data sheet

Supplier
GEO Specialty Chemicals, Inc.
701 Wissahickon Avenue
Cedartown, GA 30125
+1-770-748-1200
Hours: Monday-Friday 9:00-5:00 EST (Eastern Standard Time)

Only representative
GEO Specialty Chemicals UK Ltd
Charleston Road, Hardley, Hythe
Southampton, Hampshire SO45 3ZG
United Kingdom
Phone: +44 (0)23 80894666
Fax No: +44 (0)23 80243113

Responsibility Statement For further information, please contact **safety-data-sheet-fp@geosc.com**

1.4 Emergency telephone number

Emergency telephone 24 Hour Emergency Phone Number
GEO Specialty Chemicals UK Ltd
+44 (0)23 80891806

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

This mixture is classified as not hazardous according to regulation (EC) 1272/2008 [GHS].

2.2 Label elements

Labeling according to Regulation (EC) No. 1272/2008 [CLP]

Signal word Not classified

Hazard statements
None

Precautionary statements
None

2.3 Other Information

None known

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Not applicable

3.2 Mixtures

Component	EU EINECS	weight-%	Classification according to Regulation (EC) No. 1272/2008 [CLP]	(REACh) Regulation (EC 1907/2006)
Naphthalenesulfonic acid, formaldehyde polymer, sodium salt 9084-06-4	Not applicable	> 80%	Not Classified as Hazardous	In compliance
Sodium Sulfate 7757-82-6	231-820-9	< 10%	Not Classified as Hazardous	In compliance
Water 7732-18-5	231-791-2	< 10%	Not Classified as Hazardous	In compliance

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye contact
Remove contact lenses, if worn. Immediately flush with plenty of water for at least 15 minutes, holding eyelids apart to ensure flushing of the entire surface. Washing within one minute is essential to achieve maximum effectiveness. If eye irritation persists: Get medical advice/attention.

Skin contact
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical advice/attention.

Ingestion
Do NOT induce vomiting. If vomiting should occur spontaneously, keep airway clear. Never give anything by mouth to an unconscious person. Get medical attention.

Inhalation
Remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

4.2 Most important symptoms and effects, both acute and delayed

Most important symptoms and effects
No information available.

Aggravated Medical Conditions
Existing skin, eye and lung conditions.

4.3 Indication of any immediate medical attention and special treatment needed

Note to physicians
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Water mist. Carbon dioxide (CO2). Foam. Dry chemical.

Extinguishing media which must not be used for safety reasons
No information available.

5.2 Special hazards arising from the substance or mixture

Special Hazard
Use water spray to cool fire exposed surfaces.

5.3 Advice for firefighters

Special protective equipment for firefighters
Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

Firefighting measures
Cool exposed containers with water spray after extinguishing fire.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions
Wear suitable protective clothing and gloves.

6.2 Environmental precautions

Environmental precautions
Do not permit run-off to get into sewers or surface waterways.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up
Stop leaks. Clear spills immediately. Shovel into labeled waste container for reuse or disposal. Do not use vacuum truck because of corrosive nature of product. Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Provide adequate ventilation to spill area.

6.4 Reference to other sections

See Section 12 for additional Ecological Information

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Advice on safe handling
Hygroscopic
Keep container closed when not in use
Avoid contact with eyes, skin and clothing
Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing.
Wash thoroughly after handling
Avoid creating dust. Avoid breathing dust. Use only with adequate ventilation. Use respiratory protection where dust may be generated.
FOR INDUSTRIAL USE ONLY.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Store in a cool, dry place to prevent product from caking

7.3 Specific end use(s)

Specific use(s)
Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Occupational exposure limit value

Component	European Union	United Kingdom	Spain	Germany	Turkey
Naphthalenesulfonic acid, formaldehyde polymer, sodium salt 9084-06-4	NAV	NAV	NAV	NAV	NAV
Sodium Sulfate 7757-82-6	NAV	NAV	NAV	NAV	NAV

Biological limit values

Component	European Union	United Kingdom	Spain	Germany	Turkey
Naphthalenesulfonic acid, formaldehyde polymer, sodium salt 9084-06-4	NAV	NAV	NAV	NAV	NAV
Sodium Sulfate 7757-82-6	NAV	NAV	NAV	NAV	NAV

Legend
NAV - Not available

8.2 Exposure controls

Personal Protective Equipment

Eye/face Protection
Dust protection eye glasses.

Hand Protection
Appropriate chemical resistant gloves should be worn.

Skin and body protection
Wear suitable protective clothing.

Respiratory protection
NIOSH/MSHA approved respirator if necessary. Follow manufacturer's recommendations.

Other personal protection data
Eyewash fountains and safety showers must be easily accessible.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls
No information available.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	solid
Color	tan
Appearance	fine powder
Odor	bland
Odor threshold	No information available

Property	Values	Remarks
pH	9.0 - 10.5	solution (10 %)
Melting / freezing point	No information available	No information available
Boiling point / boiling range	No information available	No information available
Flash point	No information available	No information available
Evaporation rate	No information available	No information available
Flammability (solid, gas)	No information available	No information available
Flammability Limit in Air		
Upper flammability limit	No information available	No information available
Lower flammability limit	No information available	No information available
Vapor pressure	No information available	No information available
Vapor density	No information available	No information available
Specific gravity	0.60	No information available
Solubility (water)	clear	solution (20 %)
Solubility in other solvents	No information available	No information available
Partition coefficient: n-octanol/water	No information available	No information available
Autoignition temperature	No information available	No information available
Decomposition temperature	No information available	No information available
Kinematic viscosity	Not applicable	No information available
Dynamic viscosity	Not applicable	No information available
Density	5.5 lb/gal	No information available

9.2 Other information

Bulk Density	No information available
Explosive properties	No information available.
Oxidizing properties	No information available.
Softening point	No information available
Molecular weight	3,000 max
Volatile Organic Compound (VOC) content, wt.%	No information available
Percent Volatile, wt.%	5.0 % max w/w

10. STABILITY AND REACTIVITY

10.1 Reactivity

Reactivity
No information available.

10.2 Chemical stability

Chemical stability
Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous polymerization
Not anticipated under normal or recommended handling and storage conditions.

10.4 Conditions to avoid

Conditions to avoid
None.

10.5 Incompatible materials

Materials to avoid
Oxidizing agents.

10.6 Hazardous decomposition products

Hazardous decomposition products
Carbon oxides. Sulphur oxides.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute health hazard

Eye contact
May cause mild, transient eye irritation.

Skin contact
Possible mild, transient skin irritation on prolonged contact.

Ingestion
May be harmful if swallowed.

Inhalation
Not considered hazardous under normal conditions of use. Inhalation of dust may cause irritation of the respiratory system.

Acute toxicity - Product Information

Oral LD50	> 2,000 mg/kg
Dermal LD50	No information available
Inhalation LC50	No information available

Acute toxicity - Component Information

Component	Oral LD50	Dermal LD50	Inhalation LC50
Naphthalenesulfonic acid, formaldehyde polymer, sodium salt 9084-06-4 (> 80%)	= 3800 mg/kg (Rat)	--	--
Sodium Sulfate 7757-82-6 (< 10%)	> 10000 mg/kg (Rat)	--	--

Skin corrosion/irritation
Mild skin irritation

Serious eye damage/eye irritation
Mild eye irritation

Sensitization
No information available

Germ cell mutagenicity
No information available

Carcinogenicity
No information available

Reproductive toxicity
No information available

Specific target organ toxicity - Single exposure
No information available.

Specific target organ toxicity - Repeated exposure
No information available

Aspiration hazard
No information available

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Acute aquatic toxicity - Product Information

Fish No information available

Crustacea No information available

Algae/aquatic plants No information available

Acute aquatic toxicity - Component Information

Component	Algae/aquatic plants	Fish	Toxicity to daphnia and other aquatic invertebrates
Sodium Sulfate 7757-82-6 (< 10%)	--	LC50 (96 h) 13500 - 14500 mg/L (Pimephales promelas) LC50 (96 h) = 13500 mg/L (Lepomis macrochirus) LC50 (96 h static) 3040 - 4380 mg/L (Lepomis macrochirus) LC50 (96 h static) > 6800 mg/L (Pimephales promelas)	EC50 (96 h) = 630 mg/L (Daphnia magna) EC50 (48 h) = 2564 mg/L (Daphnia magna)

12.2 Persistence and degradability

Persistence and degradability
No information available

12.3 Bioaccumulative potential

Bioaccumulative potential
No information available

12.4 Mobility in soil

Mobility
No information available

12.5 Results of PBT and vPvB assessment

PBT and vPvB assessment
No information available

12.6 Other adverse effects

Other information
No other ecological studies have been carried out on this product.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Disposal of wastes
Do not put solutions containing this product into sewer systems. Dispose of according to regulations.

Contaminated packaging
Since empty containers retain product residue, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

US DOT Not regulated
14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group
14.5. Environmental hazards
14.6. Special precautions for user

Land transport (ADR/RID) Not regulated
14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group
14.5. Environmental hazards
14.6. Special precautions for user

Inland waterway transport (ADN) Not regulated
14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group
14.5. Environmental hazards
14.6. Special precautions for user

Air transport (ICAO-TI / IATA-DGR) Not regulated
14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group
14.5. Environmental hazards
14.6. Special precautions for user

Sea transport (IMDG) Not regulated
14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group
14.5. Environmental hazards
14.6. Special precautions for user

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable

Harmonized Tariff Number 3911.90

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories

Australia (AICS)
All ingredients are on the inventory or exempt from listing

Canada (DSL)
All ingredients are on the inventory or exempt from listing

Canada (NDSL)
None of the ingredients are on the inventory.

China (IECSC)
All ingredients are on the inventory or exempt from listing

EINECS (European Inventory of Existing Chemical Substances)
All ingredients are on the inventory or exempt from listing

ELINCS (European List of Notified Chemical Substances)
None of the ingredients are on the inventory.

ENCS (Japan)
All ingredients are on the inventory or exempt from listing

South Korea (KECL)
All ingredients are on the inventory or exempt from listing

Philippines (PICCS)
All ingredients are on the inventory or exempt from listing

TSCA (United States)
All ingredients are on the inventory or exempt from listing

Legend
AICS - Australian Inventory of Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
IECSC - China Inventory of Existing Chemical Substances
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

15.2 Chemical Safety Report

No information available.

16. OTHER INFORMATION

Product code	6287
Revision date	2016-12-13

Full text of H-Statements referred to under sections 2 and 3
None

Key or legend to abbreviations and acronyms used in the safety data sheet
NAV - Not available

This safety data sheet complies with the requirements of: Regulation (EC) No. 1907/2006.

Additional information
None

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 30.11.2012
Print Date 23.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : Sodium 2-naphthalenesulfonate

Product Number : 109673
Brand : Aldrich
CAS-No. : 532-02-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
Skin irritation (Category 2)
Eye irritation (Category 2)
Specific target organ toxicity - single exposure (Category 3)

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Irritating to eyes, respiratory system and skin.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 [CLP]
Pictogram

Signal word Warning

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary statement(s)
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard Statements none

According to European Directive 67/548/EEC as amended.
Hazard symbol(s)

R-phrase(s)

R36/37/38	Irritating to eyes, respiratory system and skin.

S-phrase(s)

S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36	Wear suitable protective clothing.

2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : C10H7NaO3S
Molecular Weight : 230,22 g/mol

Component		Concentration
Sodium naphthalene-2-sulphonate		
CAS-No.	532-02-5	-
EC-No.	208-523-8	

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Sulphur oxides, Sodium oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Hygroscopic.

7.3 Specific end use(s)
no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash protection
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evaporation rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
no data available

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 13.900 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes serious eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: QK3678000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 135 mg/l - 4,2 d

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
no data available

12.6 Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number

ADR/RID: -	IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine Pollutant: no	IATA: no

14.6 Special precautions for user
no data available

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
no data available

15.2 Chemical Safety Assessment
no data available

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 02.06.2017 Version 28.3

SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Catalogue No.	102445
Product name	Chloroform for analysis EMSURE® ACS,ISO,Reag. Ph Eur
REACH Registration Number	01-2119486657-20-XXXX
CAS-No.	67-66-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Reagent for analysis, Chemical production In compliance with the conditions described in the annex to this safety data sheet.

1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number

Please contact the regional company representation in your country.

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 4, Oral, H302
Acute toxicity, Category 3, Inhalation, H331
Skin irritation, Category 2, H315
Eye irritation, Category 2, H319
Carcinogenicity, Category 2, H351
Reproductive toxicity, Category 2, H361d
Specific target organ toxicity - repeated exposure, Category 1, Liver, Kidney, H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms

Signal word

Danger

Hazard statements

H302 Harmful if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H331 Toxic if inhaled.
H351 Suspected of causing cancer.
H361d Suspected of damaging the unborn child.
H372 Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure.

Precautionary statements

Response

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact

lenses, if present and easy to do. Continue rinsing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

For use in industrial installations only.

Reduced labelling (≤125 ml)

Hazard pictograms

Signal word
Danger

Hazard statements
H331 Toxic if inhaled.
H351 Suspected of causing cancer.
H361d Suspected of damaging the unborn child.
H372 Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure.

Precautionary statements
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Index-No. 602-006-00-4

2.3 Other hazards

None known.

SECTION 3. Composition/information on ingredients

3.1 Substance

Formula	$CHCl_3$	$CHCl_3$ (Hill)
Index-No.	602-006-00-4	
EC-No.	200-663-8	
Molar mass	119,38 g/mol	

Hazardous components (REGULATION (EC) No 1272/2008)

Chemical name (Concentration)

CAS-No.	Registration number	Classification
Chloroform *(>= 50 % - <= 100 %)*		
Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.		
67-66-3	01-2119486657-20-XXXX	Carcinogenicity, Category 2, H351 Reproductive toxicity, Category 2, H361d Acute toxicity, Category 3, H331 Acute toxicity, Category 4, H302 Specific target organ toxicity - repeated exposure, Category 1, H372 Eye irritation, Category 2, H319 Skin irritation, Category 2, H315
ethanol *(>= 1 % - < 3 %)*		
Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.		
64-17-5	01-2119457610-43-XXXX	Flammable liquid, Category 2, H225 Eye irritation, Category 2, H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

3.2 Mixture

Not applicable

SECTION 4. First aid measures

4.1 Description of first aid measures

General advice

First aider needs to protect himself.

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

After eye contact: rinse out with plenty of water. Call in ophthalmologist.

After swallowing: caution if victim vomits. Risk of aspiration! Keep respiratory tract clear. Pulmonary failure possible after aspiration of vomit. Call a physician immediately. Subsequently administer: activated charcoal (20 - 40 g in 10% slurry).

4.2 Most important symptoms and effects, both acute and delayed

irritant effects, Cough, Shortness of breath, respiratory arrest, Dizziness, narcosis, agitation, spasms, inebriation, Nausea, Vomiting, Stomach/intestinal disorders, cardiovascular disorders, Headache, ataxia (impaired locomotor coordination)
Drying-out effect resulting in rough and chapped skin.

4.3 Indication of any immediate medical attention and special treatment needed

Laxative: Sodium sulfate (1 tablespoon/1/4 l water).

SECTION 5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Not combustible.
Ambient fire may liberate hazardous vapours.
Fire may cause evolution of:
Hydrogen chloride gas, Phosgene

5.3 Advice for firefighters

Special protective equipment for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information

Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders: Protective equipment see section 8.

6.2 Environmental precautions

Do not empty into drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills.
Observe possible material restrictions (see sections 7 and 10).
Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area. Do not inhale vapours.

6.4 Reference to other sections

Indications about waste treatment see section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Observe label precautions.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Protected from light. Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorised persons.

Recommended storage temperature see product label.

7.3 Specific end use(s)

See exposure scenario in the Annex to this MSDS.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL)

Worker DNEL, acute	Systemic effects	inhalation	333 mg/m³
Worker DNEL, longterm	Systemic effects	inhalation	2,5 mg/m³
Worker DNEL, longterm	Systemic effects	dermal	0,94 mg/kg Body weight
Worker DNEL, longterm	Local effects	inhalation	2,5 mg/m³
Consumer DNEL, longterm	Systemic effects	inhalation	0,18 mg/m³

Predicted No Effect Concentration (PNEC)

PNEC Fresh water	0,146 mg/l
PNEC Fresh water sediment	0,45 mg/kg
PNEC Marine water	0,015 mg/l
PNEC Marine sediment	0,09 mg/kg
PNEC Aquatic intermittent release	0,133 mg/l
PNEC Soil	0,56 mg/kg
PNEC Sewage treatment plant	0,048 mg/l

8.2 Exposure controls

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection

Safety glasses

Hand protection

full contact:

Glove material:	Viton (R)
Glove thickness:	0,70 mm
Break through time:	> 480 min

splash contact:

Glove material:	butyl-rubber
Glove thickness:	0,7 mm
Break through time:	> 10 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 890 Vitoject® (full contact), KCL 898 Butoject® (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet<(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment

protective clothing

Respiratory protection

required when vapours/aerosols are generated.
Recommended Filter type: Filter AX (EN 371)
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Environmental exposure controls

Do not empty into drains.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	liquid
Colour	colourless
Odour	sweet
Odour Threshold	84,9 - 201,5 ppm
pH	No information available.
Melting point	-63 °C
Boiling point/boiling range	ca. 61 °C at 1.013 hPa
Flash point	Method: DIN 51755 Part 1 does not flash
Evaporation rate	No information available.
Flammability (solid, gas)	Not applicable
Lower explosion limit	Not applicable
Upper explosion limit	Not applicable
Vapour pressure	211 hPa at 20 °C
Relative vapour density	4,25

Density	1,48 g/cm3 at 20 °C
Relative density	No information available.
Water solubility	8,7 g/l at 23 °C Method: OECD Test Guideline 105
Partition coefficient: n-octanol/water	log Pow: 2 (25 °C) (experimental) (IUCLID) Bioaccumulation is not expected.
Auto-ignition temperature	No information available.
Decomposition temperature	Distillable in an undecomposed state at normal pressure.
Viscosity, dynamic	0,57 mPa.s at 20 °C
Explosive properties	Not classified as explosive.
Oxidizing properties	none

9.2 Other data

Ignition temperature	not combustible

SECTION 10. Stability and reactivity

10.1 Reactivity

See section 10.3

10.2 Chemical stability

heat-sensitive

Sensitivity to light

Stabilizer

ethanol

10.3 Possibility of hazardous reactions

Risk of explosion with:

Ammonia, Amines, nitrogen oxides, bases, Oxygen, alkali amides, organic nitro compounds, strong alkalis, Fluorine, peroxi compounds, Alkaline earth metals, Alkali metals, Powdered metals

Methanol, with, alcoholates

Methanol, with, strong alkalis

Iron, in powder form

various alloys, sensitive to shock

Methanol, with, Sodium hydroxide

magnesium, in powder form

Oxygen, with, alkali compounds

Aluminium, in powder form

Acetone, with, alkali compounds

Potassium, sensitive to shock

sodium, sensitive to shock

Violent reactions possible with:

phosphines, bis(dimethylamino)dimethyl tin, nonmetallic hydrogen compounds, Powdered metals, Light metals, Ketones, mineral acids, Strong oxidizing agents, semimetallic hydrogen compounds

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

rubber, various plastics

10.6 Hazardous decomposition products

in the event of fire: See section 5.

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity

LD50 Rat: 695 mg/kg

(RTECS)

Symptoms: Nausea, Vomiting, Risk of aspiration upon vomiting., Aspiration may cause pulmonary oedema and pneumonitis.

absorption

Acute inhalation toxicity

Acute toxicity estimate: 0,5 mg/l; aerosol

Symptoms: Cough, Shortness of breath, Possible damages:, mucosal irritations

absorption

Acute dermal toxicity

LD50 Rabbit: > 3.980 mg/kg

(IUCLID)

absorption

Skin irritation

Rabbit

Result: slight irritation

(IUCLID)

Drying-out effect resulting in rough and chapped skin.

Causes skin irritation.

Eye irritation

Causes serious eye irritation.

Sensitisation

This information is not available.

Germ cell mutagenicity

Genotoxicity in vitro

Ames test

Salmonella typhimurium

Result: negative

Method: OECD Test Guideline 471

Carcinogenicity

This information is not available.

Reproductive toxicity

This information is not available.

Teratogenicity

This information is not available.

CMR effects

Carcinogenicity:

Suspected of causing cancer.

Teratogenicity:

Suspected of damaging the unborn child.

Specific target organ toxicity - single exposure

This information is not available.

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

Target Organs: Liver, Kidney

Aspiration hazard

This information is not available.

11.2 Further information

Systemic effects:

After absorption:

Dizziness, inebriation, agitation, spasms, narcosis, respiratory arrest
After long-term exposure to the chemical:
drop in blood pressure, Headache, ataxia (impaired locomotor coordination), Stomach/intestinal disorders, cardiovascular disorders
Damage to:
Liver, Kidney, Cardiac
Effect potentiated by: ethanol
Other dangerous properties can not be excluded.
This substance should be handled with particular care.

SECTION 12. Ecological information

12.1 Toxicity

Toxicity to fish

LC50 Lepomis macrochirus (Bluegill sunfish): 18 mg/l; 96 h
(IUCLID)

Toxicity to daphnia and other aquatic invertebrates

EC50 Daphnia magna (Water flea): 79 mg/l; 48 h
(IUCLID)

EC5 E.sulcatum: > 6.560 mg/l; 72 h
(IUCLID) (maximum permissible toxic concentration)

Toxicity to algae

IC5 Scenedesmus quadricauda (Green algae): 1.100 mg/l; 8 d
(IUCLID) (maximum permissible toxic concentration)

Toxicity to bacteria

EC5 Pseudomonas putida: 125 mg/l; 16 h
(IUCLID) (maximum permissible toxic concentration)

EC50 activated sludge: 1.010 mg/l; 3 h
OECD Test Guideline 209

12.2 Persistence and degradability

Biodegradability

0 %; 14 d
OECD Test Guideline 301C
Not readily biodegradable.

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water

log Pow: 2 (25 °C)

(experimental)

(IUCLID) Bioaccumulation is not expected.

12.4 Mobility in soil

Distribution among environmental compartments

Adsorption/Soil

log Koc: 1,72

(experimental)

Mobile in soils

12.5 Results of PBT and vPvB assessment

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

12.6 Other adverse effects

Henry constant

14084 Pa*m³/mol

Method: (experimental)

(IUCLID) Distribution preferentially in air.

Discharge into the environment must be avoided.

SECTION 13. Disposal considerations

Waste treatment methods

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 UN number	UN 1888
14.2 Proper shipping name	CHLOROFORM
14.3 Class	6.1
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
Tunnel restriction code	E

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

14.1 UN number	UN 1888
14.2 Proper shipping name	CHLOROFORM
14.3 Class	6.1
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	no

Sea transport (IMDG)

14.1 UN number	UN 1888
14.2 Proper shipping name	CHLOROFORM
14.3 Class	6.1
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
EmS	F-A S-A

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant

SECTION 15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Major Accident Hazard	SEVESO III
Legislation	ACUTE TOXIC H2 Quantity 1: 50 t Quantity 2: 200 t
Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.
Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated
Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated

Substances of very high concern (SVHC)	This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w).

National legislation

Storage class 6.1 D

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

SECTION 16. Other information

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H351	Suspected of causing cancer.
H361d	Suspected of damaging the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.

Training advice

Provide adequate information, instruction and training for operators.

Labelling

Hazard pictograms

Signal word

Danger

Hazard statements

H302 Harmful if swallowed.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H331 Toxic if inhaled.

H351 Suspected of causing cancer.

H361 Suspected of damaging fertility or the unborn child.

H372 Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure.

Precautionary statements

Response

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Further information

For use in industrial installations only.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Regional representation

This information is given on the authorised Safety Data Sheet for your country.

EXPOSURE SCENARIO 1 (Industrial use)

1. Industrial use Reagent for analysis, Chemical production)

Sectors of end-use

SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
SU9	Manufacture of fine chemicals
SU 10	Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

Chemical product category

PC19	Intermediate
PC21	Laboratory chemicals

Process categories

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
PROC8a	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
PROC8b	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC15	Use as laboratory reagent

Environmental Release Categories

ERC1	Manufacture of substances
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)

2. Contributing scenarios: Operational conditions and risk management measures

2.1 Contributing scenario controlling environmental exposure for: ERC1

Amount used

Daily amount per site (Msafe)	829.589 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	365
Emission or Release Factor: Air	0,07 %
Emission or Release Factor: Water	0,006 %

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	10.000 m3/d
Percentage removed from waste water	85,6 %
Sludge Treatment	Sewage sludge should not be applied to natural soils.

Conditions and measures related to external treatment of waste for disposal

Disposal methods	All liquid and solid waste should be incinerated.

2.2 Contributing scenario controlling environmental exposure for: ERC6a

Amount used

Daily amount per site (Msafe)	4.800 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	300
Emission or Release Factor: Air	0,5 %
Emission or Release Factor: Water	0,7 %

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	10.000 m3/d
Percentage removed from waste water	85,6 %
Sludge Treatment	Sewage sludge should not be applied to natural soils.

Conditions and measures related to external treatment of waste for disposal

Disposal methods	All liquid and solid waste should be incinerated.

2.3 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC15

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	High volatile liquid

Frequency and duration of use

Frequency of use	8 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with local exhaust ventilation (LEV)
Outdoor / Indoor	Outdoor

Technical conditions and measures

Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374), coverall and eye protection. Wear respiratory protection.

3. Exposure estimation and reference to its source

Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC1	829589 kg/day	All compartments	< 1	EUSES
2.2	ERC6a	4800 kg/day	All compartments	< 1	EUSES

Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.3	PROC1	longterm, combined, systemic	< 1	ECETOC TRA
2.3	PROC2	longterm, combined, systemic	< 1	ECETOC TRA
2.3	PROC3	longterm, combined, systemic	< 1	ECETOC TRA
2.3	PROC8a	longterm, combined, systemic	< 1	ECETOC TRA
2.3	PROC8b	longterm, combined, systemic	< 1	ECETOC TRA
2.3	PROC9	longterm, combined, systemic	< 1	ECETOC TRA
2.3	PROC15	longterm, combined, systemic	< 1	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

EXPOSURE SCENARIO 2 (Professional use)

1. Professional use Reagent for analysis, Chemical production)

Sectors of end-use

SU 22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Chemical product category

PC21 Laboratory chemicals

Process categories

PROC15 Use as laboratory reagent

Environmental Release Categories

ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)

ERC8a Wide dispersive indoor use of processing aids in open systems

2. Contributing scenarios: Operational conditions and risk management measures

2.1 Contributing scenario controlling environmental exposure for: ERC6a

Amount used

Daily amount per site (Msafe)	4.800 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	300
Emission or Release Factor: Air	0,5 %
Emission or Release Factor: Water	0,7 %

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	10.000 m3/d

Percentage removed from waste water	85,6 %
Sludge Treatment	Sewage sludge should not be applied to natural soils.

Conditions and measures related to external treatment of waste for disposal

Disposal methods	All liquid and solid waste should be incinerated.

2.2 Contributing scenario controlling environmental exposure for: ERC8b

Amount used

Daily amount per site (Msafe)	5 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	365

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	none

Conditions and measures related to external treatment of waste for disposal

Disposal methods	All liquid and solid waste should be incinerated.

2.3 Contributing scenario controlling worker exposure for: PROC15

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	High volatile liquid

Frequency and duration of use

Frequency of use	8 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with local exhaust ventilation (LEV)

Technical conditions and measures

Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves (tested to EN374), coverall and eye protection.

3. Exposure estimation and reference to its source

Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC6a	4800 kg/day	All compartments	< 1	EUSES
2.2	ERC8b	< 5 l/day	All compartments	< 1	EUSES

Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.3	PROC15	longterm, combined, systemic	< 1	ECETOC TRA

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

FRED HOLMBERG & CO

MATERIAL SAFETY DATA SHEET

Produced date: 2012-04-13

1. Identification of the substance/preparation and the company

Commercial product name	**Chlorinated paraffin (CP70%)**
Use of the substance/preparation	High-pressure lubricants, as flame retardants in plastics and textiles, as plasticizer for polyvinyl chloride in polyethylene sealants, and in detergents
Synonyms	Chlorinated paraffin wax, alkanes C14-C17, chloroparaffins
CAS-nr	85535-85-9
EC-nr	287-477-0
REACH reg. nr	01-2119519269-33-0000
Company	Fred Holmberg & Co AB
Adress	Box 60056 S-216 10 Limhamn Sweden
Telephone number	+46 (0)40 15 79 20
Fax	+46 (0)40 16 22 95
e-mail	fred.info@holmberg.se
Contact person	Fred Holmberg
Emergency telephone number	Fred Holmberg 040-15 79 20 (office hours) or. 08-33 12 31 toxicity information central (office hours), 112 for emergency central
Created by	Linus Olofsson, Fred Holmberg & Co AB, Tel. +46 (0)480-42 20 00

2. Hazards Identification

Classification acc. to CLP: H362, H400, H410 See point 15 for explanation.
Previous classification: Xn; R64, R66, N; R50-53 See point 15 for explanation.

Health hazard:
May cause harm to breast-fed children. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

3. Composition/Information on ingredients

EG-nr	**CAS-nr**	**Substance name**	**%-weight**	**Classification**
287-477-0	85535-85-9	2-aminoethanol	100	H362, H400, H410 (CLP) Xn; R64, R66, N; R50-53

4. First aid measures

Inhalation	Move person to fresh air; if effects occur, consult a physician.
Skin contact	Take off contaminated clothing. Wash skin with plenty of water, If effects occur, consult a physician,
Eye contact	Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.
Ingestion	Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. If effects occur, consult a physician,
Protection of first-aiders	No special precautions required.
Notes to physician	Treat symptomatically.

5. Fire-fighting measures

Suitable extinguishing media	Use dry chemical, CO2, water spray or alcohol resistant foam.
Extinguishing media which must not be used for safety reason	None
Hazards from Combustion Products	Product may emit hydrochloric acid. Burning produces obnoxious and toxic fumes. CO, CO2, NOx. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Cool containers / tanks with spray water.
Special protective equipment for firefighters	Wear personal protective equipment. Wear self contained breathing apparatus for firefighting if necessary.

6. Accidental release measures

Personal precautions	Sweep-up to prevent slipping hazard. Evacuate personnel to safe areas. Avoid contact with skin and eyes. Wear personal protective equipment. Eliminate all sources of ignition. Increase ventilation. Use spark-proof equipment.
Environmental precautions	Prevent product from entering drains.
Methods for cleaning up	Adsorb with inert material (e.g. sand, kieselguhr, acid binder, universal binder, sawdust) Sweep up and shovel into suitable containers for disposal. Dispose of in accordance with local regulations.

7. Handling and storage

Storage	Handle in accordance with good industrial hygiene and safety practice for diagnostics. Keep in properly labelled containers. Keep tightly closed in a dry, cool (<40 °C) and well-ventilated place. **Storage Life** 2 Years if stored in accordance to the advice given above.
Handling	Impervious gloves. Wear personal protective equipment. When using, do not eat, drink or smoke. Handle in accordance with good industrial hygiene and safety practice.

8. Exposure controls/personal protection

Respiratory protection	In case of insufficient ventilation wear suitable respiratory equipment.
Hand protection	Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur
Skin and body protection	When prolonged or frequently repeated contact could occur, use protective clothing chemically resistant to this material.
Eye protection	Face-shield Safety glasses
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance	Pale yellow clear viscous liquid
Chlorine Content	70 + 2 (ISI-1448-77)
Paraffin Range	C14 - C17
pH	6.0 - 6.5
Sp. Gravity at 20°C	1.540 + 0.02 (ASTM-D-1045)
Viskositet (50°C (poise))	2000 – 5000
Color (HU) Max	150 (ASTM-1045)
Heat Stability at 180°C for 1 Hr.	Color turns to dark yellow / brown
Volatile loss (% Max)	1.0% (at 130°C / 3 Hr.)

Boiling point	> 200 °C
Solubility in water	Non-soluble

10. Stability and reactivity

Stability	Stable at normal use conditions/temperatures.
Materials to avoid	strong acids, strong oxidants, alkali metals.
Conditions to avoid	high temperature.
Hazardous decomposition products	carbon oxides (CO, CO2), hydrogen chloride (HCl).

11. Toxicological information

Acute toxicity:
Low toxicity when swallowed, LD50 (oral): 4000 mg/kg bw

Possible health effects:

Inhalation: May be irritating if inhaled.

Ingestion: May be harmful if swallowed.

Skin: Repeated exposure may cause skin dryness or cracking.

Eyes: May irritate eyes upon exposure.

12. Ecotoxicological information

Ecotoxicity:

Toxicity to aquatic species:
Daphnia magna 48 hr – EC50 = 0.0059 mg/l
Fish (Albumus albumus) 96 hr – LC50 = > 5000 mg/l
Crustacean (Gammarus pulex) 96 hr – LC50 = 1.0 mg/l
Harpacticoid (Nitocra spinipes) 96 hr – LC50 = 9 mg/l
Algae (Selenastrum capricornutum) 96 hr – EC50 (biomas) = > 3.2 mg/l

Biodegradability: The product is partially removed in biological treatment process. Biodegradation appears to occur
under both aerobic and anaerobic conditions, but the data is poor.

Bio-Accumulation: No relevant data is available.

Mobility: If released into water the product will sink. The product is involatile and insoluble and will accumulate in the
ground.

13. Disposal considerations

Contaminated packaging	Empty containers should be transported/delivered to local recyclers for disposal.
Any disposal practice must be in compliance with all local and national laws and regulations. Do not dump into any sewers, on the ground, or into any body of water.	

14.Transport information

Proper shipping name Environmentally Hazardous Substance, Liquid, N.O.S (Chlorinated Paraffin , C14-C17)

ROAD TRANSPORT (ADR):

UN no. road	3082
ADR class	9
ADR Hazard labels	90
ADR packing group	llI

RAIL TRANSPORT (RID):

UN no. rail road	3082
RID class no.	9
RID Hazard labels	90
RID packing group	llI

SEA TRANSPORT (IMDG):

UN no. sea	3082
IMDG class	9
IMDG packing group	llI
EmS no.	F-E, S-D

15. Regulatory information

Labelling according Regulation (EC) No 1272/2008 [CLP]

Pictogram 

Signal word Warning

Hazard statement(s)
H362: May cause harm to breast-fed children.
H400: Very toxic to aquatic life.
H410: Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201: Obtain special instructions before use.
P260: Do not breathe dust/fumes/gas/mist/vapors/spray.
P263: Avoid contact during pregnancy/during nursing.
P264: Wash with soap and water thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P273: Avoid release to the environment.
P308+P313: If exposed or concerned, get medical advice/attention.
P391: Collect spillage.
P501: Dispose off contents/container as hazardous waste according to local regulations.

According to European Directive 67/548/EEC as amended.

Hazard symbol(s) 

R-phrase(s)
R64: May cause harm to breastfed babies.
R66: Repeated exposure may cause skin dryness or cracking.
N; R50/53: Very toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

S-phrase(s)

S2: Keep out of the reach of children.
S24: Avoid contact with skin.
S60: This material and its container must be disposed of as hazardous waste.
S61: Avoid release to the environment. Refer to special instructions / safety data sheets.

16. Remaining information

The information in this data sheet is considered to be correct according to present knowledge and experience, but there is no guarantee that it is complete. It is therefore in the user's interest to ensure that the information is sufficient for the area it is intended for.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.3 Revision Date 24.10.2014
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sulfuric acid

Product Number : 339741
Brand : Aldrich
Index-No. : 016-020-00-8
REACH No. : 01-2119458838-20-XXXX
CAS-No. : 7664-93-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Corrosive to metals (Category 1), H290
Skin corrosion (Category 1A), H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
C Corrosive R35

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary statement(s)
P280 Wear protective gloves/ protective clothing/ eye protection/ face

	protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	H_2O_4S
Molecular weight	:	98,08 g/mol
CAS-No.	:	7664-93-9
EC-No.	:	231-639-5
Index-No.	:	016-020-00-8
Registration number	:	01-2119458838-20-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Sulfuric acid			
CAS-No.	7664-93-9	Met. Corr. 1; Skin Corr. 1A; H290, H314	<= 100 %
EC-No.	231-639-5		
Index-No.	016-020-00-8		
Registration number	01-2119458838-20-XXXX		

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Sulfuric acid			
CAS-No.	7664-93-9	C, R35	<= 100 %
EC-No.	231-639-5		
Index-No.	016-020-00-8		
Registration number	01-2119458838-20-XXXX		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Sulphur oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Acute local effects	0,1 mg/m3
Workers	Inhalation	Long-term local effects	0,05 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Marine water	0,00025 mg/l

Fresh water	0,0025 mg/l
Marine sediment	0,002 mg/kg
Fresh water sediment	0,002 mg/kg
Onsite sewage treatment plant	8,8 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: clear, liquid

b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	1,2 at 5 g/l
e)	Melting point/freezing point	3 °C
f)	Initial boiling point and boiling range	290 °C - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1,33 hPa at 145,8 °C
l)	Vapour density	3,39 - (Air = 1.0)
m)	Relative density	1,84 g/cm3 at 25 °C
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	55,1 mN/m at 20 °C
Relative vapour density	3,39 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metals

10.6 Hazardous decomposition products
Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2.140 mg/kg

LC50 Inhalation - Rat - 2 h - 510 mg/m3

Skin corrosion/irritation
Skin - Rabbit
Result: Extremely corrosive and destructive to tissue.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive to eyes

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

The International Agency for Research on Cancer (IARC) has determined that occupational exposure to strong-inorganic-acid mists containing sulfuric acid is carcinogenic to humans (group 1).

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: WS5600000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Gambusia affinis (Mosquito fish) - 42 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 29 mg/l - 24 h

12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1830	IMDG: 1830	IATA: 1830

14.2 UN proper shipping name

ADR/RID:	SULPHURIC ACID
IMDG:	SULPHURIC ACID
IATA:	Sulphuric acid

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
Met. Corr.	Corrosive to metals
Skin Corr.	Skin corrosion

Full text of R-phrases referred to under sections 2 and 3

C	Corrosive
R35	Causes severe burns.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.3 Revision Date 24.10.2014
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sulfuric acid

Product Number : 339741
Brand : Aldrich
Index-No. : 016-020-00-8
REACH No. : 01-2119458838-20-XXXX
CAS-No. : 7664-93-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Corrosive to metals (Category 1), H290
Skin corrosion (Category 1A), H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
C Corrosive R35

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary statement(s)
P280 Wear protective gloves/ protective clothing/ eye protection/ face

	protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	H_2O_4S
Molecular weight	:	98,08 g/mol
CAS-No.	:	7664-93-9
EC-No.	:	231-639-5
Index-No.	:	016-020-00-8
Registration number	:	01-2119458838-20-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Sulfuric acid			
CAS-No.	7664-93-9	Met. Corr. 1; Skin Corr. 1A; H290, H314	<= 100 %
EC-No.	231-639-5		
Index-No.	016-020-00-8		
Registration number	01-2119458838-20-XXXX		

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Sulfuric acid			
CAS-No.	7664-93-9	C, R35	<= 100 %
EC-No.	231-639-5		
Index-No.	016-020-00-8		
Registration number	01-2119458838-20-XXXX		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Sulphur oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Acute local effects	0,1 mg/m3
Workers	Inhalation	Long-term local effects	0,05 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Marine water	0,00025 mg/l

Fresh water	0,0025 mg/l
Marine sediment	0,002 mg/kg
Fresh water sediment	0,002 mg/kg
Onsite sewage treatment plant	8,8 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: clear, liquid

b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	1,2 at 5 g/l
e)	Melting point/freezing point	3 °C
f)	Initial boiling point and boiling range	290 °C - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1,33 hPa at 145,8 °C
l)	Vapour density	3,39 - (Air = 1.0)
m)	Relative density	1,84 g/cm3 at 25 °C
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	55,1 mN/m at 20 °C
Relative vapour density	3,39 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metals

10.6 Hazardous decomposition products
Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2.140 mg/kg

LC50 Inhalation - Rat - 2 h - 510 mg/m3

Skin corrosion/irritation
Skin - Rabbit
Result: Extremely corrosive and destructive to tissue.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive to eyes

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

The International Agency for Research on Cancer (IARC) has determined that occupational exposure to strong-inorganic-acid mists containing sulfuric acid is carcinogenic to humans (group 1).

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: WS5600000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Gambusia affinis (Mosquito fish) - 42 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 29 mg/l - 24 h

12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1830	IMDG: 1830	IATA: 1830

14.2 UN proper shipping name

ADR/RID:	SULPHURIC ACID
IMDG:	SULPHURIC ACID
IATA:	Sulphuric acid

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
Met. Corr.	Corrosive to metals
Skin Corr.	Skin corrosion

Full text of R-phrases referred to under sections 2 and 3

C	Corrosive
R35	Causes severe burns.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.3 Revision Date 24.10.2014
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sulfuric acid

Product Number : 339741
Brand : Aldrich
Index-No. : 016-020-00-8
REACH No. : 01-2119458838-20-XXXX
CAS-No. : 7664-93-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Corrosive to metals (Category 1), H290
Skin corrosion (Category 1A), H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
C Corrosive R35

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary statement(s)
P280 Wear protective gloves/ protective clothing/ eye protection/ face

	protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	H_2O_4S
Molecular weight	:	98,08 g/mol
CAS-No.	:	7664-93-9
EC-No.	:	231-639-5
Index-No.	:	016-020-00-8
Registration number	:	01-2119458838-20-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Sulfuric acid			
CAS-No.	7664-93-9	Met. Corr. 1; Skin Corr. 1A; H290, H314	<= 100 %
EC-No.	231-639-5		
Index-No.	016-020-00-8		
Registration number	01-2119458838-20-XXXX		

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Sulfuric acid			
CAS-No.	7664-93-9	C, R35	<= 100 %
EC-No.	231-639-5		
Index-No.	016-020-00-8		
Registration number	01-2119458838-20-XXXX		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Sulphur oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Acute local effects	0,1 mg/m3
Workers	Inhalation	Long-term local effects	0,05 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Marine water	0,00025 mg/l

Fresh water	0,0025 mg/l
Marine sediment	0,002 mg/kg
Fresh water sediment	0,002 mg/kg
Onsite sewage treatment plant	8,8 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: clear, liquid

b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	1,2 at 5 g/l
e)	Melting point/freezing point	3 °C
f)	Initial boiling point and boiling range	290 °C - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1,33 hPa at 145,8 °C
l)	Vapour density	3,39 - (Air = 1.0)
m)	Relative density	1,84 g/cm3 at 25 °C
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	55,1 mN/m at 20 °C
Relative vapour density	3,39 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metals

10.6 Hazardous decomposition products
Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2.140 mg/kg

LC50 Inhalation - Rat - 2 h - 510 mg/m3

Skin corrosion/irritation
Skin - Rabbit
Result: Extremely corrosive and destructive to tissue.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive to eyes

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

The International Agency for Research on Cancer (IARC) has determined that occupational exposure to strong-inorganic-acid mists containing sulfuric acid is carcinogenic to humans (group 1).

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: WS5600000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Gambusia affinis (Mosquito fish) - 42 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 29 mg/l - 24 h

12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1830	IMDG: 1830	IATA: 1830

14.2 UN proper shipping name

ADR/RID:	SULPHURIC ACID
IMDG:	SULPHURIC ACID
IATA:	Sulphuric acid

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
Met. Corr.	Corrosive to metals
Skin Corr.	Skin corrosion

Full text of R-phrases referred to under sections 2 and 3

C	Corrosive
R35	Causes severe burns.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.6 Revision Date 14.06.2014
Print Date 23.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Potassium hexacyanoferrate(III)

Product Number : 455946
Brand : Aldrich
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 13746-66-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

R32

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram none

Signal word none

Hazard statement(s) none

Precautionary statement(s) none

Supplemental Hazard information (EU)
EUH032 Contact with acids liberates very toxic gas.

2.3 Other hazards

Contact with acids liberates very toxic gas.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Red prussiate Potassium ferricyanide
Formula	:	$C_6FeK_3N_6$
Molecular Weight	:	329,24 g/mol
CAS-No.	:	13746-66-2
EC-No.	:	237-323-3

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, nitrogen oxides (NOx), Potassium oxides, Iron oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	6,0 - 9 at 329 g/l at 25 °C
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	1,890 g/cm3
n)	Water solubility	329 g/l at 20 °C - completely soluble
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

SECTION 10: Stability and reactivity

10.1 Reactivity
Contact with acids liberates very toxic gas.

10.2 Chemical stability
May discolor on exposure to light.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong acids, Strong oxidizing agents, Ammonia, hydrochloric acid, Cyanides

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - mouse - 2.970 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: LJ8225000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 869 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 549 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of R-phrases referred to under sections 2 and 3

R32 Contact with acids liberates very toxic gas.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.4 Revision Date 04.12.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Potassium chloride
Product Number	:	P9333
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7447-40-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	KCl
Molecular weight	:	74,55 g/mol
CAS-No.	:	7447-40-7
EC-No.	:	231-211-8

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Hydrogen chloride gas, Potassium oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline, powder Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	7
e)	Melting point/freezing point	Melting point/range: 770 °C
f)	Initial boiling point and boiling range	1.500 °C
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1,98 g/mL at 25 °C
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture.

10.5 Incompatible materials
Strong acids, Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: TS8050000

hyperkalemia, Nausea, Vomiting, Abdominal pain, Diarrhoea, Constipation., Paresthesia., Thirst, Dizziness, Rash, pruritus, Weakness, muscle cramps, minor psychiatric changes, minor visual changes

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 880 mg/l - 96 h
	mortality NOEC - Pimephales promelas (fathead minnow) - 500 mg/l - 7 d
	mortality LOEC - Pimephales promelas (fathead minnow) - 1.000 mg/l - 7 d
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - > 440 mg/l - 48 h (OECD Test Guideline 202)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 03.07.2013
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Calcium chloride solution ~1 M in H2O

Product Number : 21115
Brand : Sigma
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Eye irritation (Category 2), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.
Not a hazardous substance or mixture according to EC-directives 67/548/EEC or 1999/45/EC.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H319 Causes serious eye irritation.

Precautionary statement(s)
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard Statements none

According to European Directive 67/548/EEC as amended.

Hazard symbol(s)	none
R-phrase(s)	none
S-phrase(s)	none

Safety data sheet available on request for professional users.

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Chemical characterization	:	Natural product
Formula	:	$CaCl_2$
Molecular Weight	:	110,98 g/mol

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Calcium chloride			
CAS-No. EC-No. Index-No.	10043-52-4 233-140-8 017-013-00-2	Eye Irrit. 2; H319	10 - 20 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Calcium chloride			
CAS-No. EC-No. Index-No.	10043-52-4 233-140-8 017-013-00-2	Xi, R36	10 - 20 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Hydrogen chloride gas, Calcium oxide

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
A part from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber

Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	6,0 - 8,0 at 25 °C
e)	Melting point/freezing point	0,0 °C
f)	Initial boiling point and boiling range	100,0 °C
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	1,086 g/mL at 20 °C
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	no data available

p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -	IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
H319	Causes serious eye irritation.

Full text of R-phrases referred to under sections 2 and 3

Xi	Irritant
R36	Irritating to eyes.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 02.01.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Gum rosin
Product Number	:	60895
Brand	:	Aldrich
Index-No.	:	650-015-00-7
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	8050-09-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Skin sensitisation (Category 1), H317

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
R43

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H317 May cause an allergic skin reaction.

Precautionary statement(s)
P280 Wear protective gloves.

Supplemental Hazard Statements none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Colophony
Rosin, gum

Molecular weight : 302 g/mol
CAS-No. : 8050-09-7
EC-No. : 232-475-7
Index-No. : 650-015-00-7

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Colophony			
CAS-No.	8050-09-7	Skin Sens. 1; H317	<= 100 %
EC-No.	232-475-7		
Index-No.	650-015-00-7		

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Colophony			
CAS-No.	8050-09-7	Xi, R43	<= 100 %
EC-No.	232-475-7		
Index-No.	650-015-00-7		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of

contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Solidified mass or fragments Colour: dark yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 66,5 - 93,4 °C at ca.1.013,0 hPa
f)	Initial boiling point and boiling range	No data available
g)	Flash point	188 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	0,06 hPa at ca.20 °C

l)	Vapour density	No data available
m)	Relative density	ca.1.034 kg/m3 at 20 °C
n)	Water solubility	0,0009 g/l at 20 °C - OECD Test Guideline 105 - soluble
o)	Partition coefficient: n-octanol/water	log Pow: 1,9 - 7,7
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 2.800 mg/kg

LD50 Dermal - Rat - male and female - > 2.000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: VL0480000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Brachydanio rerio (zebrafish) - 60,3 mg/l - 96 h (OECD Test Guideline 203)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 58 % - Not readily biodegradable. (OECD Test Guideline 301B)

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H317	May cause an allergic skin reaction.
Skin Sens.	Skin sensitisation

Full text of R-phrases referred to under sections 2 and 3

Xi	Irritant
R43	May cause sensitisation by skin contact.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

VORONEZHSYNTHEZKAUCHUK JSC

SAFETY DATA SHEET

According to 1 907/2006/EC, article 31 (REACH)

BUTADIENE RUBBER (BR)
GRADE SKD-Nd, BR -1243 Nd
(polybutadiene, solution)

Version: 2.1
Created: 26/012/2011
Regulation: EC No 1272/2008

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

1.1 Product identifier

Name of Substance:	Cis-(poly)butadiene
Name of IUPAC	butadiene- 1,3 polymer
Synonyms	cis- 1 ,4-(poly)butadiene; Polybutadiene (cis); 1.3-Butadiene, homopolymer
TRADE NAMES:	Butadiene Rubber (BR)
PRODUCT GRADES	BR -1243 Nd
Registration #: for 1.3-butadiene	01-2119471988-16-0034
(CAS #106-99-0; EC *#203-450-8)*	01-2119471988-16-0033
Index No(CLP):601-013-00-X	

1.2 Relevant identified uses of the substance

Most common technical function of cis-(poly)butadiene: tyre production, technical rubber parts (profiles, hoses, shoe soles, belt production, technical rubber goods), rubber compound.

DISCLAIMER

This product is a polymer and is not classified as dangerous under criteria of Directives No 6714581EEC, No 19991451EC and Regulation (EC) No 127212008 (Regulation CLP). This polymer does not contain substances classified as dangerous under Article 59.2 Regulation (EC) No 1272/2008, namely:

- in an individual concentration of? 1 % by weight for non-gaseous mixtures posing human health or environmental; or
- in an individual concentration of? 0.1 % by weight for non-gaseous mixtures that is carcinogenic category 2 or toxic to reproduction category JA, lB and 2, skin sensitiser category 1, respiratory sensitiser category 1, or has effects on or via lactation or is persistent, bioaccumulative and toxic (PBT) in accordance with the criteria set out in Annex XIII or very persistent and very bioaccumulative (vPvB) in accordance with the criteria set out in Annex XIII; or
- a substance for which there are Community workplace exposure limits.

In accordance with mentioned above, this product does not require and official e-SDS as per Regulations (EC) No 190712006 (articles 31.1; 31.2) and Commission Regulation (EU) No 45312010.

This e-SDS is developed in good faith to provide a customer with sufficient information allowing to take necessary measures to comply with relevant HSE requirements.

1.3 Details of the supplier of the safety data **sheet**

Only representative

Company name:	Gazprom Marketing and Trading France
Address:	68 avenue des Champs-Elysées, *75008,* Paris, France
Contact Telephone:	*+33142997350*
Fax:	+33 142 99 73 99

Suppliers

Company name:	Voronezhsynthezkauchuk JSC
Address:	2, Leninsky avenue, Voronezh, Russian Federation, 394014
Phone:	+7 4732 20-65-26
Emergency phone:	+7 4732 20-67-40

Emergency phone in the 112 (Please note that emergency numbers may vary depending country **of delivery:** upon the country of delivery though 112 remains valid as universal number)

SECTION 2. HAZARDS IDENTIFICATION

Classification:
ANNEX I OF DIRECTIVE 67/548/EEC
Physical/Chemical Hazards:
None.
Health Hazards:
None.
Environmental hazards:
None.

EU CLP 2008
Physical / Chemical Hazards:
None.
Health Hazards:
None.
Environmental hazards:
None.

Specific hazard:
No significant health hazard in normal industrial use conditions.
Contact of melted/ heated product may cause thermal burns.
Processing vapours, which can irritate eyes and respiratory tract, may form when product is heated at high temperatures.
Combustible solid.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a synthetic rubber consisting of at least *98.5%* polymerised 1.3-butadiene and antioxidants (CAS#128-37-0 /EC#204-881-4 or CAS#1 19-47-1/ EC# 204-327-1 or CAS#1 *10553-*27-0/ EC#402-860-6).

Formula: (-CH2-CH=CH-CH2-)

Component	Conc. %	CAS / EC #	Classification EC# *67/548/EEC* and EC#1 272/2008 (CLP
Cis-(poly)butadiene	*?98.5*	9003-17-2/ none	none

The product does not contain impurities or additives that could affect product's labelling and classification according to Regulation (EC) No 67/548/EEC and Regulation (EC) No 1272/2008 (CLP) in the concentration ranges specified.

SECTION 4. FIRST-AID MEASURES

General information:
Spontaneous penetration of butadiene rubber into human organism is impossible.
If heated over 300 °C rubber thermo destruction is possible.
Butadiene rubber is a stable product under normal conditions. Non-volatile, causes non-exhaustive effects. Inhalation poisoning is unlikely.
Contact with eyes may cause mechanical damage.
Contact with skin has no effects.

Inhalation:
Move any exposed person to fresh air at once. Keep warm and at rest. If there is respiratory distress give oxygen. If respiration stops or shows signs of failing, apply artificial respiration. Get medical attention.

Ingestion:
Wash out mouth with water and give plenty of water to drink, provided person is conscious. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have the exposed person lean forward. Get medical aid.

Skin contact:
Remove contaminated clothing and wash skin with plenty of running water, under a shower if affected area is large enough to warrant this. Get medical attention.

Eye contact:
Rinse immediately eye with plenty of low pressure water for at least 15 minutes.
Remove any contact lenses. Get medical attention.

SECTION *5.* FIRE-FIGHTING MEASURES

Extinguishing media:
The substance is combustible. Use foam, dry chemical, carbon dioxide, or water spray.

Special fire fighting procedures:
Keep away from sources of ignition - no smoking.

Unusual fire & explosion hazards:
None.

Specific hazards:
Combustion generates irritating and toxic fumes.

Protective measures in fire:
Wear full protective clothing and MSHAINIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
See section 8.
Environmental precautions:
Take precautionary measures against discharges into the environment.
Spill clean up methods:
Sweep spilled substance into containers. Avoid generating dusty conditions and provide ventilation. All equipment must be grounded.

SECTION 7. HANDLING AND STORAGE

Usage precaution:
Wash thoroughly after handling. Avoid contact with eyes and skin. Do not ingest or inhale. Minimise dust generation and accumulation. Remove all sources of ignition. All equipment must be grounded.

Storage precautions:
Store in a cool, dry, well-ventilated area away from direct sunlight and incompatible substances in a closed container. Keep away from source of open fire.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits:
None listed.

Protective equipment:
Protective gloves, safety goggles and protective clothing.

Respiratory equipment: Wear positive pressure self-contained breathing apparatus if warranted by workplace conditions.

Hand protection:
Wear approved protective gloves.

Eye protection:
Wear approved safety goggles.

Hygiene measures:
Wash at the end of each work shift and before eating, drinking, smoking or using the toilet.

Skin protection:
Wear protective clothing.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	elastic solid (briquette)
Colour	light brown to dark-brown
Odour	peculiar
pH value	not applicable, insoluble in water
Melting point	above 160 °C
Decomposition temperature	above 300 °C
Glass transition temperature	102 °C 332°C 292
Auto-ignition temperature	°C 0.910-0.930
Ignition temperature	g/cm^3
Specific Gravity	insoluble in water
Solubility	soluble in hexane, toluene, benzene, chloroform, tetrachloride carbon
	non explosive
Explosive properties	not applicable, substance is not marketed or used in granular form.
Granulometry	

SECTION 10. STABILITY AND REACTIVITY

Stability:
Stable under normal temperatures and pressures.

Materials to avoid:
Strong acids, alkalis, strong oxidising agents, organic solvents.

Conditions to avoid:
High temperature, oxygen, ozone, naked flame, sparks, long exposure to sunlight, contact with incompatible materials.

Hazardous decomposition products:
Carbon monoxide, carbon dioxide.

SECTION 11. TOXICOLOGICAL INFORMATION

General:
C is-(poly)butadiene:

LD *50* (oral, rat): 20000 mg/kg (Russian Register of Potentially Hazardous Chemical and Biological Substances /FBEPH)

Inhalation:
Cis-(poly)butadiene has no local irritating effect on the gastrointestinal tract when inhaled, conjunctiva, skin-resorptive and sensitizing effect.

Ingestion:
Not applicable.

Skin contact:
There is no irritant effect on skin.

Eye contact:
There is no irritant effect on eyes.

SECTION 12. ECOLOGICAL INFORMATION

Aquatic toxicity:
Cis-(poly)butadiene (Russian Register of Potentially Hazardous Chemical and Biological Substances /FBEPH):
LC50 (96 h): >100 mg/L (Oncorhynchus mykiss)
LC50 (48 h): >100 mg/L *(Daphnia Magna)*
LC50 (48 h): >100 mg/L *(Algae)*

Ecotoxicity:
The product is poorly biodegradable but does not pose a hazard to the environment.

Water hazard classification:
According to the German VwVwS: WGK- I (low danger for water pollution).

SECTION 13. DISPOSAL CONSIDERATIONS

General information:
Place into a suitable closed container for disposal.

Disposal methods:
Dispose of in accordance with local and national regulations.

SECTION 14. TRANSPORT INFORMATION

General:
The product is not covered by international regulations on the transport of dangerous goods.

UN: none.

SECTION 15. REGULATORY **INFORMATION**

REGULATORY
Chemical Safety Report has been performed for monomer: 1.3-butadiene (CAS #106-99-0; EC #203-450-8) (CAS #106-99-0; EC #203-450-8).

SECTION 16. OTHER INFORMATION

16.1 Indication of changes

VERSION I Date of change	I Section I Descriotion of	
Version: 1.0 1 05/03/2010		First edition created according to recommendations of Regulations (EC) #1907/2006 (Article 31.1).
Version: 2.0 1 07/02/2011 Version: 2.1 26/12/2011	1.1,2 1.1;3; 4; 9; 10; 11; 12; *15;* 16	Section 1. 111 2 was updated 1 Product name BR SKD-ND was renamed into BR -1243 Nd. 2. Section 1.1 was updated. 3. DISCLAIMER was added on the first page. 4. "General information" subsection was added in Section 4. *5* "General" subsection was added in Section 11. 6. "Aquatic toxicity" subsection was added in Section 12. 7. Sections 3, 9,10; *15,* 16 were fully updated.

16.2 **Relevant R-phrases, Hazard- and** EU **Hazard-statements**

Labelling: none.

R-phrases: none.

Safety Advice (S-phrases):

S16	Keep away from sources of ignition - no smoking
S41	In case of fire and/or explosion do not breathe fumes
S47	Keep at temperature not exceeding 30°C

16.3 **Abbreviations and acronyms**

LDSO	Lethal Dose to *50%* of a test population (Median Lethal Dose)
LC50	Lethal Concentration to 50 % of a test population
PBT	Persistent, bioaccumulative, toxic chemical
vPvB	Very Persistent, Very Bioaccumulative
UN	United Nations
WGK	Wassergefiihrdungsklasse *(German: Water Hazard Class)*

16.4 Key literature references and sources
EU DIRECTIVES
REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending

Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Regulation (EC) No 1272/2008 REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives *67/548/EEC* and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

Regulations. Commission regulation (EU) no 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

DIRECTIVE 1 999/45/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labeling of dangerous substances.
COMMISSION DECISION of 16 January 2001 amending Decision 2000/532/EC as regards the list of wastes (notified under document number (200 1/118/EC).

NATIONAL REGULATIONS (GERMANY)
Major Accident Hazard Legislation 82/501/EWG.

Russian Register of Potentially Hazardous Chemical and Biological Substances (FBEPH). Cis-(poly)butadiene. Dossier for potentially hazardous chemical and biological substance # BT 001360, 1998, Ministry of Health of the Russian Federation.

DISCLAIMER

This information is based on our current level of knowledge. This information may be subject to revision as new knowledge and experience becomes available, and SIBUR makes no warranties and assumes no liability in connection with any use of this information. Since SIBUR cannot be aware of all aspects ofyour business and the impact the REACHRegulation has for your company, SIBUR strongly encourages you to get familiar with the REACH Regulation in order to comply with its requirements and timelines.

MATERIAL SAFETY DATA SHEET
STANDARD MALAYSIAN RUBBER (SMR)

Ref:HO-SMR/27.09.07
(Replaces Ref: HO140798-271202 & Ref: HO/CV140798-271202)

1. **Company Name** : **REGIONAL RUBBER TRADING CO. PTE LTD.**
65, Chulia Street, # 44 - 01,
OCBC Centre,
Singapore 049513.

Products Information : Tel. No. 65 - 65354055
Fax No. 65 - 65337341

Emergency Information

: Production Factory & Code	Telephone Number
Kota Trading, Batu Pahat (FU)	607 - 4319900
Kota Trading, Tampin (DR)	606 - 4381052
Lee Rubber, Bentung (BT)	609 – 2233883
Lee Rubber, Bukit Mertajam (CE)	604 – 5213033
Lee Rubber, Klang (GL)	603 – 33424611
Lee Rubber, Kuala Kangsar (CI)	605 – 7761545
Lee Rubber, Kuala Krai (BP1)	609 – 9606618
Lee Rubber, Labis (BQ)	607 – 9256211
Lee Rubber, Muar (EW)	606 – 9556552
Lee Rubber, Penang (EM)	604 - 8286148
Lee Rubber, Tanah Merah (BP)	609 – 9556164

Product Name : **STANDARD MALAYSIAN RUBBER**

SMR 5	**SMR 10**	**SMR 20**	
SMR GP	**SMR 10CV**	**SMR 20CV**	**OENR**

2. Composition / Information of Ingredients

Raw natural rubber consists essentially about 95 % of the hydrocarbon / 'cis - polyisoprene' together with small amount of other naturally occurring substances such as lipids (1.6 %), inositols & carbohydrates (1.6 %), proteinous substances (1.4 %), ash (0.5 %), proteinous and nitrogen compound (0.3%).
For 10CV, 20CV and GP grades , they contain very small amount of added substances such as crumbing agents (castor oil) and stabilizer Hydroxyamine Neutral Sulphate (HNS), however the residues are not more than 100 ppm.
Oil extended natural rubber (OENR) grades contain certain amount of rubber processing oil.

3. Possible Hazard

No possible hazard to man and environment.

4. First Aid

General first aid treatment applies.

5. Fire Fighting Action / Measures

Raw natural rubber in bale form is not readily ignitable. But, once ignited, it will burn readily with much evolution of heat, smoke and fumes. A rubber fire is difficult to extinguish as heat may soften the rubber and the burning material may flow readily and thus spread the fire. An added hazard is that raw rubber is lighter than water so that the burning material will float on any pool of water. Sprinkler installations and suitable extinguishing media (water or carbon dioxide) are recommended for fire control in storage areas.

6. Accidental Release Measures

Natural rubber in solid state has no environmental pollution impact.

7. Handling and Storage

A good ventilated storage and handling in warehouse and well protected against fire.

8. Exposure Control and Personal Protection

The usual precautions for the handling of industrial product must be observed.

9. Physical and Chemical Properties

Appearance	Soft Solid
Colour	Light Brown to Dark Brown (Depends on rubber grades produced by factory concerned)
Odour	Mild, Characteristic
Melting Point	Not Applicable
Boiling Point	Not Applicable
Specific gravity (20°C)	0.92
Bulk Density	0.91 g/cc

Vapour Pressure	Not Applicable
Viscosity (25°C)	Not Applicable
Solubility	Not Applicable
pH value	Not Applicable
Flash Point	Not Applicable
Autoignition Temperature	> 400°C
Explosion Limit	Not Applicable
Decomposition Point	Not Applicable
Decomposition Products	Not Applicable
Hazardous Reaction	None
Ash	0.5 %
Lipids	1.6 %
Proteinous Substances	1.4 %

10. Stability and Reactivity Data

Stability	: Subject to Storage Hardening
Conditions to avoid	: Exposure to Heat or Fire

11. Toxicological Information

Hazard decomposition products	: Dry rubber when ignited will give off toxic fumes and smoke.

12. Environmental Information

Natural rubber is biodegradable and harmless to environment.

13. Waste Disposal Information

Disposal method	: Must be dumped or incinerated in accordance with current national environmental laws or regulations.

14. Transport Information

Not classified as hazardous under transport regulations.

15. Regulatory Information

Labeling according to EEC directions is not required.

16. Other Information

The information contained herein is based on the present state of our knowledge and does not therefore guarantee certain properties. Recipients of our products must take responsibility for observing existing laws and regulations.
This Material Safety Data Sheet is made available on the basis that the users are responsible for their own interpretation of its content. No warranty representation is expressed or implied that the information is accurate, complete or representative. The producer assumes no responsibility for injury to the buyer, the buyer's employees or any third party caused by normal or abnormal use of the materials.

MATERIAL SAFETY DATA SHEET
STANDARD INDONESIAN RUBBER (SIR)

Ref:HO-SIR/27.09.07
(Replaces Ref: HO140798-271202)

1. **Company Name** : **REGIONAL RUBBER TRADING CO. PTE LTD.**
65, Chulia Street, # 44 - 01,
OCBC Centre,
Singapore 049513.

Products Information : Tel. No. 65 - 65354055
Fax No. 65 - 65337341

Emergency Information

: Production Factory & Code	Telephone Number
PT. Hock Lie, Medan (SDH)	061 – 4538044
PT. Hock Lie, Rantau Prapat (SCM)	0624 – 21250
PT. Hok Tong, Banjarmasin (KAU)	0511 – 3353437
PT. Hok Tong, Jambi (SCL)	0741 - 31911
PT. Hok Tong, Palembang (SCX)	0711 - 313905
PT. Hok Tong, Pontianak (KAZ)	0561 – 883015
PT. Remco, Jambi (SBG)	0741 - 581980
PT. Remco, Palembang (SDQ)	0711 - 358377
PT. Sunan Rubber, Palembang (SCY)	0711 - 356442

Product Name : **STANDARD INDONESIAN RUBBER**

SIR 10	SIR 20

2. **Composition / Information of Ingredients**

Raw natural rubber consists essentially about 95 % of the hydrocarbon / 'cis - polyisoprene' together with small amount of other naturally occurring substances such as lipids (1.6 %), inositols & carbohydrates (1.6 %), proteinous substances (1.4 %), ash (0.5 %), proteinous and nitrogen compound (0.3%).

3. **Possible Hazard**

No possible hazard to man and environment

4. First Aid

General first aid treatment applies.

5. Fire Fighting Action / Measures

Raw natural rubber in bale form is not readily ignitable. But, once ignited, it will burn readily with much evolution of heat, smoke and fumes. A rubber fire is difficult to extinguish as heat may soften the rubber and the burning material may flow readily and thus spread the fire. An added hazard is that raw rubber is lighter than water so that the burning material will float on any pool of water. Sprinkler installations and suitable extinguishing media (water or carbon dioxide) are recommended for fire control in storage areas.

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9. Physical and Chemical Properties

Appearance	Soft Solid
Colour	Light Brown to Dark Brown (Depends on rubber grades produced by factory concerned)
Odour	Mild, Characteristic
Melting Point	Not Applicable
Boiling Point	Not Applicable
Specific gravity (20°C)	0.92
Bulk Density	0.91 g/cc
Vapour Pressure	Not Applicable
Viscosity (25°C)	Not Applicable
Solubility	Not Applicable
pH value	Not Applicable
Flash Point	Not Applicable

Autoignition Temperature	> 400°C
Explosion Limit	Not Applicable
Decomposition Point	Not Applicable
Decomposition Products	Not Applicable
Hazardous Reaction	None
Ash	0.5 %
Lipids	1.6 %
Proteinous Substances	1.4 %

10. Stability and Reactivity Data

Stability	: Subject to Storage Hardening
Conditions to avoid	: Exposure to Heat or Fire

11. Toxicological Information

Hazard decomposition products : Dry rubber when ignited will give off toxic fumes and smoke.

12. Environmental Information

Natural rubber is biodegradable and harmless to environment.

13. Waste Disposal Information

Disposal method : Must be dumped or incinerated in accordance with current national environmental laws or regulations.

14. Transport Information

Not classified as hazardous under transport regulations.

15. Regulatory Information

Labeling according to EEC directions is not required.

16. Other Information

The information contained herein is based on the present state of our knowledge and does not therefore guarantee certain properties. Recipients of our products must take responsibility for observing existing laws and regulations.
This Material Safety Data Sheet is made available on the basis that the users are responsible for their own interpretation of its content. No warranty representation is expressed or implied that the information is accurate, complete or representative. The producer assumes no responsibility for injury to the buyer, the buyer's employees or any third party caused by normal or abnormal use of the materials.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 09.04.2013
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	2-Mercaptobenzothiazole
Product Number	:	M3302
Brand	:	Aldrich
Index-No.	:	613-108-00-3
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	149-30-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Skin sensitisation (Category 1), H317
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

N	Dangerous for the environment	R50/53 R43

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)	
H317	May cause an allergic skin reaction.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P273	Avoid release to the environment.
P280	Wear protective gloves.
P501	Dispose of contents/ container to an approved waste disposal plant.
Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	2-Benzothiazolethiol
Formula	:	$C_7H_5NS_2$
Molecular Weight	:	167,25 g/mol
CAS-No.	:	149-30-4
EC-No.	:	205-736-8
Index-No.	:	613-108-00-3

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Benzothiazole-2-thiol		
	Skin Sens. 1; Aquatic Acute 1; Aquatic Chronic 1; H317, H410	-

Hazardous ingredients according to Directive 1999/45/EC

Component	Classification	Concentration
Benzothiazole-2-thiol		
	Xi, N, R43 - R50/53	-

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, nitrogen oxides (NOx), Sulphur oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
A part from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of

contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: light yellow
b)	Odour	pungent
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 177 - 181 °C - lit.
f)	Initial boiling point and boiling range	> 260 °C - Decomposes on heating.
g)	Flash point	200 °C - closed cup
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 15 %(V)
k)	Vapour pressure	no data available

l)	Vapour density	no data available
m)	Relative density	1,42 g/cm3 at 20 °C
n)	Water solubility	0,118 g/l at 25 °C - insoluble
o)	Partition coefficient: n-octanol/water	log Pow: 2,41
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - male and female - 3.800 mg/kg

LC50 Inhalation - rat - > 1.270 mg/m3

LD50 Dermal - rabbit - male and female - > 7.940 mg/kg

Skin corrosion/irritation
Skin - rabbit
Result: No skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit
Result: No eye irritation - 24 h

Respiratory or skin sensitisation
Buehler Test - guinea pig
May cause allergic skin reaction.

Maximisation Test - guinea pig
May cause allergic skin reaction.

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

mouse - male and female
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information

Repeated dose toxicity - rat - male and female - Lowest observed adverse effect level - 2.500 mg/kg
RTECS: DL6475000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Oncorhynchus mykiss (rainbow trout) - 0,73 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 0,71 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Growth inhibition EC50 - Selenastrum capricornutum (green algae) - 0,5 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	Biotic/Aerobic - Exposure time 28 d Result: < 1 % - Not readily biodegradable.

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 42 d at 25 °C - 0,1 mg/l Bioconcentration factor (BCF): < 0,8

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077	IMDG: 3077	IATA: 3077

14.2 UN proper shipping name

ADR/RID:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzothiazole-2-thiol)
IMDG:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzothiazole-2-thiol)
IATA:	Environmentally hazardous substance, solid, n.o.s. (Benzothiazole-2-thiol)

14.3 Transport hazard class(es)

ADR/RID: 9	IMDG: 9	IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Skin Sens.	Skin sensitisation

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xi	Irritant
R43	May cause sensitisation by skin contact.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 18.06.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Calcium carbide

Product Number : 21039
Brand : Aldrich
Index-No. : 006-004-00-9
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 75-20-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
F, Xi Highly flammable, Irritant R15, R37/38, R41

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)	
H260	In contact with water releases flammable gases which may ignite spontaneously.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
Precautionary statement(s)	
P223	Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232	Handle under inert gas. Protect from moisture.
P261	Avoid breathing dust.
P280	Wear protective gloves/ eye protection/ face protection.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P422	Store contents under inert gas.
Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C_2Ca
Molecular Weight	:	64,10 g/mol
CAS-No.	:	75-20-7
EC-No.	:	200-848-3
Index-No.	:	006-004-00-9

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Calcium carbide			
CAS-No. EC-No. Index-No.	75-20-7 200-848-3 006-004-00-9	Water-react. 1; Skin Irrit. 2; Eye Dam. 1; STOT SE 3; H260, H315, H318, H335	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Calcium carbide			
CAS-No. EC-No. Index-No.	75-20-7 200-848-3 006-004-00-9	F, R15 - R37/38 - R41	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Calcium oxide

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Store under inert gas. Moisture sensitive. Reacts violently with water. Handle and store under inert gas.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	12,48 at 20 g/l
e)	Melting point/freezing point	Melting point/range: 2.300 °C
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	The product is not flammable. - Flammability (solids)
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	2,22 g/mL at 25 °C
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	390 °C
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	Not explosive
t)	Oxidizing properties	no data available

9.2 Other safety information

no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Reacts violently with water.

10.4 Conditions to avoid

Exposure to moisture.

10.5 Incompatible materials

Strong oxidizing agents, Reacts violently with water.

10.6 Hazardous decomposition products

Other decomposition products - no data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
Maximisation Test - guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: Not available

Cough, Shortness of breath, Headache, Nausea, Vomiting

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Oncorhynchus mykiss (rainbow trout) - > 50 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 4,62 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test EC50 - Desmodesmus subspicatus (Scenedesmus subspicatus) - 46 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Toxic to aquatic life.

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1402	IMDG: 1402	IATA: 1402

14.2 UN proper shipping name

ADR/RID: CALCIUM CARBIDE
IMDG: CALCIUM CARBIDE
IATA: Calcium carbide
Passenger Aircraft: Not permitted for transport

14.3 Transport hazard class(es)

ADR/RID: 4.3	IMDG: 4.3	IATA: 4.3

14.4 Packaging group

ADR/RID: I	IMDG: I	IATA: I

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Eye Dam.	Serious eye damage
H260	In contact with water releases flammable gases which may ignite spontaneously.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
Skin Irrit.	Skin irritation
STOT SE	Specific target organ toxicity - single exposure
Water-react.	Substances and mixtures, which in contact with water, emit flammable gases

Full text of R-phrases referred to under sections 2 and 3

F	Highly flammable
R15	Contact with water liberates extremely flammable gases.
R37/38	Irritating to respiratory system and skin.
R41	Risk of serious damage to eyes.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 29.11.2016
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Glacial Acetic Acid
Product Number	:	PHR1748
Brand	:	Sigma-Aldrich
Index-No.	:	607-002-00-6
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	64-19-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 3), H226
Skin corrosion (Category 1A), H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)

H226	Flammable liquid and vapour.
H314	Causes severe skin burns and eye damage.

Precautionary statement(s)	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P403 + P235	Store in a well-ventilated place. Keep cool.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Molecular weight	:	60,05 g/mol
CAS-No.	:	64-19-7
EC-No.	:	200-580-7
Index-No.	:	607-002-00-6

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Acetic acid			
CAS-No. EC-No. Index-No.	64-19-7 200-580-7 607-002-00-6	Flam. Liq. 3; Met. Corr. 1; Skin Corr. 1A; H226, H290, H314 Concentration limits: >= 90 %: Skin Corr. 1A, H314; 25 - < 90 %: Skin Corr. 1B, H314; 10 - < 25 %: Skin Irrit. 2, H315; 10 - < 25 %: Eye Irrit. 2, H319;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Store at Room Temperature.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	pungent
c)	Odour Threshold	No data available
d)	pH	2,4 at 60,05 g/l
e)	Melting point/freezing point	16,2 °C
f)	Initial boiling point and boiling range	117,0 - 118,0 °C
g)	Flash point	40,0 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or	Upper explosion limit: 19,9 %(V) Lower explosion limit: 4 %(V)

	explosive limits	
k)	Vapour pressure	73,3 hPa at 50,0 °C 15,2 hPa at 20,0 °C
l)	Vapour density	No data available
m)	Relative density	1,05 g/cm3
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -0,169
p)	Auto-ignition temperature	485,0 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	28,8 mN/m at 10,0 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Soluble carbonates and phosphates, Hydroxides, Metals, Peroxides, permanganates, e.g. potassium permanganate, Amines, Alcohols, Nitric acid

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 3.310 mg/kg

LC50 Inhalation - Mouse - 1 h - 5620 ppm
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Conjunctive irritation. Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Other. Blood:Other changes.

LC50 Inhalation - Rat - 4 h - 11,4 mg/l

LD50 Dermal - Rabbit - 1.112 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Causes severe burns.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive to eyes

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Ingestion or inhalation of concentrated acetic acid causes damage to tissues of the respiratory and digestive tracts. Symptoms include: hematemesis, bloody diarrhea, edema and/or perforation of the esophagus and pylorus, pancreatitis, hematuria, anuria, uremia, albuminuria, hemolysis, convulsions, bronchitis, pulmonary edema, pneumonia, cardiovascular collapse, shock, and death. Direct contact or exposure to high concentrations of vapor with skin or eyes can cause: erythema, blisters, tissue destruction with slow healing, skin blackening, hyperkeratosis, fissures, corneal erosion, opacification, iritis, conjunctivitis, and possible blindness., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - > 1.000 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - > 300,82 mg/l - 48 h (OECD Test Guideline 202)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 30 d Result: 99 % - Readily biodegradable. Remarks: Expected to be biodegradable
Biochemical Oxygen Demand (BOD)	880 mg/g

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Additional ecological information	No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2789	IMDG: 2789	IATA: 2789

14.2 UN proper shipping name

ADR/RID:	ACETIC ACID, GLACIAL
IMDG:	ACETIC ACID, GLACIAL
IATA:	Acetic acid, glacial

14.3 Transport hazard class(es)

ADR/RID: 8 (3)	IMDG: 8 (3)	IATA: 8 (3)

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapour.
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H319	Causes serious eye irritation.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 30.12.2014
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Polyacrylamide
Product Number	:	92560
Brand	:	Sigma
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	9003-05-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

CAS-No. : 9003-05-8

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available

c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 246 - 250 °C
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	May form combustible dust concentrations in air
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0,750 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 1.000 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 04.03.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Lead(II) chromate
Product Number	:	310441
Brand	:	Sigma-Aldrich
Index-No.	:	082-004-00-2
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7758-97-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Carcinogenicity (Category 1B), H350
Reproductive toxicity (Category 1A), H360Df
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

		R45 R61 R62 R33
N	Dangerous for the environment	R50/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word	Danger
Hazard statement(s)	
H350	May cause cancer.
H360Df	May damage the unborn child. Suspected of damaging fertility.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P273	Avoid release to the environment.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P501	Dispose of contents/ container to an approved waste disposal plant.
Supplemental Hazard Statements	none

Restricted to professional users.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	CrO_4Pb
Molecular weight	:	323,19 g/mol
CAS-No.	:	7758-97-6
EC-No.	:	231-846-0
Index-No.	:	082-004-00-2

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Lead chromate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No. EC-No. Index-No.	7758-97-6 231-846-0 082-004-00-2	Carc. 1B; Repr. 1A; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H350, H360Df, H373, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Lead chromate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No. EC-No. Index-No.	7758-97-6 231-846-0 082-004-00-2	T, N, Carc.Cat.2, Repr.Cat.1, Repr.Cat.3, R45 - R61 - R33 - R62 - R50/53	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Lead oxides, Chromium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Avoid exposure - obtain special instructions before use.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: dark yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	6,300 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Organic materials, Powdered metals

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Mouse - > 12.000 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Carcinogenicity - Rat - Intramuscular
Tumorigenic:Neoplastic by RTECS criteria. Kidney, Ureter, Bladder:Kidney tumors. Tumorigenic:Tumors at site or application.

Carcinogenicity - Rat - Subcutaneous
Tumorigenic:Neoplastic by RTECS criteria. Tumorigenic:Tumors at site or application.

Carcinogenicity - Rat - Subcutaneous
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

Human carcinogen.

IARC:	1 - Group 1: Carcinogenic to humans (Lead chromate)
	2A - Group 2A: Probably carcinogenic to humans (Lead chromate)
IARC:	1 - Group 1: Carcinogenic to humans (Lead chromate)
	2A - Group 2A: Probably carcinogenic to humans (Lead chromate)

Reproductive toxicity
Known human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GB2975000

Lead salts have been reported to cross the placenta and to induce embryo- and feto- mortality. They also have teratogenic effect in some animal species. No teratogenic effects have been reported with exposure to organometallic lead compounds. Adverse effects of lead on human reproduction, embryonic and fetal development, and postnatal (e.g., mental) development have been reported. Excessive exposure can affect blood, nervous, and digestive systems. The synthesis of hemoglobin is inhibited and results in

anemia. If left untreated, neuromuscular dysfunction, possible paralysis, and encephalopathy can result. Additional symptoms of overexposure include: joint and muscle pain, weakness of the extensor muscles (frequently the hand and wrist), headache, dizziness, abdominal pain, diarrhea, constipation, nausea, vomiting, blue line on the gums, insomnia, and metallic taste. High body levels produce increased cerebrospinal pressure, brain damage, and stupor leading to coma and often death., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077	IMDG: 3077	IATA: 3077

14.2 UN proper shipping name

ADR/RID:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead chromate)
IMDG:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead chromate)
IATA:	Environmentally hazardous substance, solid, n.o.s. (Lead chromate)

14.3 Transport hazard class(es)

ADR/RID: 9	IMDG: 9	IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Authorisations and/or restrictions on use

Lead chromate CAS-No.: 7758-97-6
REACH - List of substances subject to authorisation (Annex XIV)
Carcinogenic (category 1B)
Sunset Date: 21.05.2015

Lead chromate CAS-No.: 7758-97-6
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).
Carcinogenic (article 57a)
ED/68/2009

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H350	May cause cancer.
H360Df	May damage the unborn child. Suspected of damaging fertility.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
T	Toxic
R33	Danger of cumulative effects.
R45	May cause cancer.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R61	May cause harm to the unborn child.
R62	Possible risk of impaired fertility.
Repr.Cat.1	Toxic to Reproduction Category 1
Repr.Cat.3	Toxic to Reproduction Category 3

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Worldwide Helpline :+1.415.685.4395
For further enquiries :info@clearsynth.com
For an online quote : click here

- MATERIAL SAFETY DATA SHEET -

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS Name : Dimethicone

Company Identification : Clearsynth Labs Pvt. Ltd.
413 Laxmi Mall, New Link Road, Andheri (W),
Mumbai-400 053, INDIA

For information call : ++91-22-26355700
For emergencies call : ++91-22-26355699
For further enquiries : info@clearsynth.com

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS#	Chemical Name	%	EINECS#	Haz Symbols	RISK PHRASES
9006-65-9	Dimethicone	>95%	-	-	-

Hazard Symbols: XN
Risk Phrases: 22

SECTION 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Harmful if swallowed.

Potential Health Effects
The toxicological properties of this material have not been investigated. Use appropriate procedures to prevent opportunities for direct contact with the skin or eyes and to prevent inhalation. Compound is Non-hazardous,Non-Toxic/Non-Flammable.

SECTION 4 - FIRST AID MEASURES

Eyes:
Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids.
Skin:
Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion:
Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation:
Remove from exposure and move to fresh air immediately.
Notes to Physician:

SECTION 5 - FIRE FIGHTING MEASURES

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or

combustion.
Extinguishing Media:
In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:
Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal.

SECTION 7 - HANDLING and STORAGE

Handling:
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.
Storage:
Store in a well closed container.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

Engineering Controls:
Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Personal Protective Equipment
Eyes:
Wear safety glasses and chemical goggles if splashing is possible.
Skin:
Wear appropriate protective gloves and clothing to prevent skin exposure.
Clothing:
Wear appropriate protective clothing to minimize contact with skin.
Respirators:
Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State:
Clear Colorless Oil
Molecular Formula:
C3H9Si(C2H6OSi)nCH3
Molecular Weight:

SECTION 10 - STABILITY AND REACTIVITY

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Incompatible materials, strong oxidants.
Incompatibilities with Other Materials:
Strong oxidizing agents, strong bases.
Hazardous Decomposition Products:
Nitrogen oxides, carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, nitrogen.
Hazardous Polymerization: Has not been reported.

SECTION 11 - TOXICOLOGICAL INFORMATION

RTECS#:

CAS#: LD50/LC50:
CAS#:Draize test, rabbit, eye: 100 mg/24H Moderate; Oral, mouse: LD50 = 300 mg/kg; Oral, rabbit: LD50 = 3200 mg/kg; Oral, rat: LD50 = 980 mg/kg.
Carcinogenicity:
Salicylamide -
Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
See actual entry in RTECS for complete information.

SECTION 12 - ECOLOGICAL INFORMATION

SECTION 13 - DISPOSAL CONSIDERATIONS

Dispose of in a manner consistent with federal, state, and local regulations.

SECTION 14 - TRANSPORT INFORMATION

IATA No information available.
IMO No information available.
ID/ADR No information available.

SECTION 15 - REGULATORY INFORMATION

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: XN
Risk Phrases:
R 22 Harmful if swallowed.
Safety Phrases:
WGK (Water Danger/Protection)

CAS# United Kingdom Occupational Exposure Limits
United Kingdom Maximum Exposure Limits

Canada
CAS# is listed on Canada's DSL List.
CAS#is not listed on Canada's Ingredient Disclosure List.
Exposure Limits
US FEDERAL
TSCA
CAS# is listed on the TSCA inventory.

SECTION 16 - ADDITIONAL INFORMATION

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 6.0 Revision Date 29.12.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Morpholine
Product Number	:	394467
Brand	:	Aldrich
Index-No.	:	613-028-00-9
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	110-91-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Flammable liquids (Category 3), H226
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1A), H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word Danger

Hazard statement(s)

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H311 + H331	Toxic in contact with skin or if inhaled.
H314	Causes severe skin burns and eye damage.

Precautionary statement(s)

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.

Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Tetrahydro-1,4-oxazine
Formula	:	C_4H_9NO
Molecular weight	:	87,12 g/mol
CAS-No.	:	110-91-8
EC-No.	:	203-815-1
Index-No.	:	613-028-00-9

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Morpholine			
CAS-No. EC-No. Index-No.	110-91-8 203-815-1 613-028-00-9	Flam. Liq. 3; Acute Tox. 4; Acute Tox. 3; Skin Corr. 1A; H226, H302, H331, H311, H314	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Hygroscopic.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	unpleasant
c)	Odour Threshold	No data available
d)	pH	10,6 at 5 g/l at 20 °C
e)	Melting point/freezing point	Melting point/range: -7 - -5 °C - lit.
f)	Initial boiling point and boiling range	129 °C - lit.
g)	Flash point	31 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 10,8 %(V) Lower explosion limit: 1,8 %(V)
k)	Vapour pressure	41 hPa at 38 °C 9 hPa at 20 °C
l)	Vapour density	3,01 - (Air = 1.0)
m)	Relative density	0,996 g/cm3 at 25 °C
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -2,55 at 25 °C
p)	Auto-ignition temperature	255 °C at 1.013 hPa
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	3,01 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 1.900 mg/kg
(OECD Test Guideline 401)

LD50 Dermal - Rabbit - male - 500 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: Causes severe burns.
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Buehler Test - Guinea pig
Result: Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity
unscheduled DNA synthesis assay
rat hepatocytes
Result: negative

Hamster - female
Result: negative

Carcinogenicity

Carcinogenicity - Mouse - Oral
Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma. Liver:Tumors.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Morpholine)

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity: Rat - female - Oral - LOAEL : 500 mg/kg
RTECS: QD6475000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Cough, Shortness of breath, Headache, Nausea
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Oncorhynchus mykiss (rainbow trout) - 380 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 45 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata - 28 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability: aerobic - Exposure time 25 d
Result: 93 % - Readily biodegradable

12.3 Bioaccumulative potential

Bioaccumulation: Cyprinus carpio (Carp) - 0,5 mg/l

Bioconcentration factor (BCF): < 2,8
(OECD Test Guideline 305C)

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Harmful to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2054 IMDG: 2054 IATA: 2054

14.2 UN proper shipping name

ADR/RID: MORPHOLINE
IMDG: MORPHOLINE
IATA: Morpholine

14.3 Transport hazard class(es)

ADR/RID: 8 (3) IMDG: 8 (3) IATA: 8 (3)

14.4 Packaging group

ADR/RID: I IMDG: I IATA: I

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H311	Toxic in contact with skin.
H311 + H331	Toxic in contact with skin or if inhaled.
H314	Causes severe skin burns and eye damage.
H331	Toxic if inhaled.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 20.11.2014
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Copper(I) chloride
Product Number	:	651745
Brand	:	Aldrich
Index-No.	:	029-001-00-4
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7758-89-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

N	Dangerous for the environment	R50/53
Xi	Irritant	R38, R41
Xn	Harmful	R22

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram	
Signal word	Danger

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501	Dispose of contents/ container to an approved waste disposal plant.

Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Cuprous chloride
Formula	:	ClCu
Molecular weight	:	99,00 g/mol
CAS-No.	:	7758-89-6
EC-No.	:	231-842-9
Index-No.	:	029-001-00-4

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Cuprous chloride			
CAS-No. EC-No. Index-No.	7758-89-6 231-842-9 029-001-00-4	Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; Aquatic Acute 1; Aquatic Chronic 1; H302, H315, H318, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Cuprous chloride			
CAS-No. EC-No. Index-No.	7758-89-6 231-842-9 029-001-00-4	Xn, N, R22 - R50/53 - R38 - R41	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Hydrogen chloride gas, Copper oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Air, light, and moisture sensitive.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Beads Colour: beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	5 at 50 g/l at 20 °C
e)	Melting point/freezing point	Melting point/range: 430 °C - lit.
f)	Initial boiling point and boiling range	1.490 °C - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1,7 hPa at 546 °C
l)	Vapour density	No data available
m)	Relative density	4,140 g/cm3
n)	Water solubility	0,047 g/l at 20 °C - slightly soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	1,7 g/l at 20 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Air Avoid moisture. Light.

10.5 Incompatible materials
Oxidizing agents, Alkali metals

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 336 mg/kg

LC50 Inhalation - Mouse - 1.008 mg/m3

Skin corrosion/irritation
Skin - Rabbit
Result: Irritating to skin.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Risk of serious damage to eyes.

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
Rat
Ascites tumor
Cytogenetic analysis

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GL6990000

Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0,05 - 0,36 mg/l - 96,0 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2802	IMDG: 2802	IATA: 2802

14.2 UN proper shipping name

ADR/RID:	COPPER CHLORIDE
IMDG:	COPPER CHLORIDE
IATA:	Copper chloride

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage

H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xn	Harmful
R22	Harmful if swallowed.
R38	Irritating to skin.
R41	Risk of serious damage to eyes.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.4 Revision Date 17.02.2015
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Copper(II) sulfate pentahydrate
Product Number	:	209198
Brand	:	Sigma-Aldrich
Index-No.	:	029-004-00-0
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7758-99-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xn	Harmful	R22
Xi	Irritant	R36/38
N	Dangerous for the environment	R50/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram	
Signal word	Warning

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501	Dispose of contents/ container to an approved waste disposal plant.

Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Cupric sulfatepentahydrate
Formula	:	$CuO_4S \cdot 5H_2O$
Molecular weight	:	249,69 g/mol
CAS-No.	:	7758-99-8
EC-No.	:	231-847-6
Index-No.	:	029-004-00-0

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Copper sulphate pentahydrate			
CAS-No. EC-No. Index-No.	7758-99-8 231-847-6 029-004-00-0	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H315, H319, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Copper sulphate pentahydrate			
CAS-No. EC-No. Index-No.	7758-99-8 231-847-6 029-004-00-0	Xn, N, R22 - R36/38 - R50/53	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Sulphur oxides, Copper oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Air sensitive. hygroscopic Handle and store under inert gas.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: blue
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	3,7 - 4,5 at 50 g/l at 25 °C
e)	Melting point/freezing point	Melting point/range: 110 °C - dec.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	9,7 hPa at 25 °C
l)	Vapour density	No data available
m)	Relative density	2,284 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Exposure to moisture

10.5 Incompatible materials

Powdered metals, Anhydrous copper(II) sulfate, reacts violently with:, hydroxylamine, Magnesium

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 482 mg/kg
(OECD Test Guideline 401)
Remarks: anhydrous

LD50 Dermal - Rat - > 2.000 mg/kg
Remarks: anhydrous

Skin corrosion/irritation
Irritating to skin.

Serious eye damage/eye irritation
Irritating to eyes.

Respiratory or skin sensitisation
Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GL8900000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0,024 mg/l - 48 h

12.2 Persistence and degradability

The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077	IMDG: 3077	IATA: 3077

14.2 UN proper shipping name

ADR/RID:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper sulphate pentahydrate)
IMDG:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper sulphate pentahydrate)
IATA:	Environmentally hazardous substance, solid, n.o.s. (Copper sulphate pentahydrate)

14.3 Transport hazard class(es)

ADR/RID: 9	IMDG: 9	IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life.

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xn	Harmful
R22	Harmful if swallowed.
R36/38	Irritating to eyes and skin.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 5.6 Revision Date 29.09.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Methyl methacrylate
Product Number	:	M55909
Brand	:	Aldrich
Index-No.	:	607-035-00-6
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	80-62-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Skin sensitisation (Category 1), H317
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H335	May cause respiratory irritation.

Precautionary statement(s)

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear protective gloves.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.

Supplemental Hazard Statements: none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
Lachrymator.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_5H_8O_2$
Molecular weight	:	100,12 g/mol
CAS-No.	:	80-62-6
EC-No.	:	201-297-1
Index-No.	:	607-035-00-6

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Methyl methacrylate			
CAS-No. EC-No. Index-No.	80-62-6 201-297-1 607-035-00-6	Flam. Liq. 2; Skin Irrit. 2; Skin Sens. 1; STOT SE 3; H225, H315, H317, H335	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Flash back possible over considerable distance., Container explosion may occur under fire conditions.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 66 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	pungent
c)	Odour Threshold	No data available

d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -48 °C - lit.
f)	Initial boiling point and boiling range	100 °C - lit.
g)	Flash point	9 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 12,5 %(V) Lower explosion limit: 2,12 %(V)
k)	Vapour pressure	37 hPa at 20 °C
l)	Vapour density	3,46 - (Air = 1.0)
m)	Relative density	0,936 g/cm3 at 25 °C
n)	Water solubility	15,3 g/l at 20 °C
o)	Partition coefficient: n-octanol/water	log Pow: 1,38
p)	Auto-ignition temperature	400 °C at 1.013,25 hPa
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	28 mN/m at 20 °C
Relative vapour density	3,46 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Polymerizes with evolution of heat. Avoid contact with incompatible materials. Unless inhibited, product can polymerize, raising temperature and pressure, possibly rupturing container. Check inhibitor content often adding to bulk liquid if needed. Do not blanket or mix with oxygen-free gas as it renders inhibitor ineffective.
Stable under recommended storage conditions.
Contains the following stabiliser(s):
Mequinol (<=0,003 %)

10.3 Possibility of hazardous reactions
Polymerises readily unless inhibited.

10.4 Conditions to avoid
May polymerize on exposure to light.
Heat, flames and sparks. Heat Extremes of temperature and direct sunlight.
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Peroxides, Amines, Bases, acids, Reducing agents, Halogens

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 7.900 mg/kg

LC50 Inhalation - Rat - 4 h - 78.000 mg/m3

LD50 Dermal - Rabbit - male - > 5.000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: Irritating to skin. - 4 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

Respiratory or skin sensitisation
in vivo assay - Mouse
May cause allergic skin reaction.
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available

Ames test
S. typhimurium
Result: negative

OECD Test Guideline 478
Mouse - male
Result: negative

Carcinogenicity

Carcinogenicity - Rat - male and female - Inhalation
No significant adverse effects were reported

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Methyl methacrylate)

Reproductive toxicity
No data available

Developmental Toxicity - Rat - Inhalation
No significant adverse effects were reported

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose Rat - male - Oral - NOAEL : >= 124,1 mg/kg

toxicity
RTECS: OZ5075000

Central nervous system depression, Drowsiness, Irritability, Dizziness, Ataxia., narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Lepomis macrochirus (Bluegill) - 283 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	flow-through test EC50 - Daphnia magna (Water flea) - 69 mg/l - 48 h
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata - > 110 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 14 d Result: 94 % - Readily biodegradable (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

12.4 Mobility in soil

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Harmful to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1247	IMDG: 1247	IATA: 1247

14.2 UN proper shipping name

ADR/RID:	METHYL METHACRYLATE MONOMER, STABILIZED
IMDG:	METHYL METHACRYLATE MONOMER, STABILIZED
IATA:	Methyl methacrylate monomer, stabilized

14.3 Transport hazard class(es)

ADR/RID: 3	IMDG: 3	IATA: 3

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapour.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H335	May cause respiratory irritation.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.4 Revision Date 17.02.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : 1-Methyl-2-pyrrolidinone

Product Number : 328634
Brand : Sigma-Aldrich
Index-No. : 606-021-00-7
REACH No. : 01-2119472430-46-XXXX
CAS-No. : 872-50-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Reproductive toxicity (Category 1B), H360
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

		R61
Xi	Irritant	R36/37/38

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.

H335	May cause respiratory irritation.
H360	May damage fertility or the unborn child.

Precautionary statement(s)

P201	Obtain special instructions before use.
P280	Wear eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.

Supplemental Hazard Statements: none

Restricted to professional users.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	*N*-Methyl-2-pyrrolidone 1-Methyl-2-pyrrolidone NMP M-PYROL™
Formula	:	C_5H_9NO
Molecular weight	:	99,13 g/mol
CAS-No.	:	872-50-4
EC-No.	:	212-828-1
Index-No.	:	606-021-00-7
Registration number	:	01-2119472430-46-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
N-methyl-2-pyrrolidone Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No.	872-50-4	Skin Irrit. 2; Eye Irrit. 2; Repr. 1B; STOT SE 3; H315, H319, H335, H360	<= 100 %
EC-No.	212-828-1		
Index-No.	606-021-00-7		
Registration number	01-2119472430-46-XXXX		

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
N-methyl-2-pyrrolidone Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No.	872-50-4	T, Repr.Cat.2, R61 - R36/37/38	<= 100 %
EC-No.	212-828-1		
Index-No.	606-021-00-7		
Registration number	01-2119472430-46-XXXX		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid exposure - obtain special instructions before use.Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Store under inert gas. Moisture sensitive.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Skin contact	Acute systemic effects	208mg/kg BW/d
Workers	Inhalation	Acute systemic effects	80 mg/m3
Workers	Skin contact	Long-term systemic effects	19,8mg/kg BW/d
Workers	Inhalation	Long-term systemic effects	40 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Water	5 mg/l
Soil	0,138 mg/kg
Marine water	0,025 mg/kg
Fresh water	0,25 mg/l
Fresh water sediment	0,805 mg/kg
Onsite sewage treatment plant	10 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0,6 mm
Break through time: 35 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	7,7 - 8
e)	Melting point/freezing point	Melting point/range: -24 °C
f)	Initial boiling point and boiling range	202 °C 81 - 82 °C at 13 hPa
g)	Flash point	91 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 9,5 %(V) Lower explosion limit: 1,3 %(V)
k)	Vapour pressure	0,39 - 0,43 hPa at 20 °C 1,32 hPa at 40 °C
l)	Vapour density	3,42 - (Air = 1.0)
m)	Relative density	1,028 g/mL at 25 °C
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: -0,46
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information

Surface tension	40,7 mN/m
Relative vapour density	3,42 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong acids, Strong oxidizing agents, Strong reducing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 3.914 mg/kg

LDLO Inhalation - Rat - 4 h - > 5100 ppm

LD50 Dermal - Rabbit - 8.000 mg/kg

Skin corrosion/irritation
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
Damage to fetus possible

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: UY5790000

prolonged or repeated exposure can cause:, Vomiting, Diarrhoea, Abdominal pain, Rats exposed to 1-methyl-2-pyrrolidinone at a concentration of 1 mg/L as an aerosol for 10 days showed depletion of hematopoietic cells in the bone marrow and atrophy of the lymphoid tissues of the thymus, spleen, and lymph nodes.

Bone marrow - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 4.000 mg/l - 96 h
	LC50 - Leuciscus idus (Golden orfe) - > 500 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - > 1.000 mg/l - 24 h
Toxicity to bacteria	LC50 - Bacteria - > 9.000 mg/l

12.2 Persistence and degradability

Biodegradability Result: 90 % - Readily biodegradable

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Authorisations and/or restrictions on use

N-methyl-2-pyrrolidone CAS-No.: 872-50-4
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).
Toxic for reproduction (article 57c)
ED/31/2011

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H360	May damage fertility or the unborn child.
Repr.	Reproductive toxicity
Skin Irrit.	Skin irritation
STOT SE	Specific target organ toxicity - single exposure

Full text of R-phrases referred to under sections 2 and 3

T	Toxic
R36/37/38	Irritating to eyes, respiratory system and skin.
R61	May cause harm to the unborn child.
Repr.Cat.2	Toxic to Reproduction Category 2

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 22.01.2014
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Carbon
Product Number	:	484164
Brand	:	Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7440-44-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Charcoal activated
Formula	:	C
Molecular Weight	:	12,01 g/mol
CAS-No.	:	7440-44-0
EC-No.	:	231-153-3

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
no data available

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder, granules Colour: black
b)	Odour	odourless

c)	Odour Threshold	no data available
d)	pH	6,0 - 9 at 40 g/l at 25 °C
e)	Melting point/freezing point	Melting point/range: 3.550 °C - lit.
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	< 0,01 hPa at 20 °C
l)	Vapour density	no data available
m)	Relative density	0,250 - 0,600 g/cm3
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Bulk density	250 - 550 kg/m3 at 20 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
no data available

LD50 Intravenous - mouse - 440 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: FF5250100

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 28.02.2016
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Sodium hexafluorosilicate
Product Number	:	250171
Brand	:	Aldrich
Index-No.	:	009-012-00-0
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	16893-85-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled

Precautionary statement(s)	
P261	Avoid breathing dust.
P280	Wear protective gloves/ protective clothing.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P311	Call a POISON CENTER /doctor.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	F_6Na_2Si
Molecular weight	:	188,06 g/mol
CAS-No.	:	16893-85-9
EC-No.	:	240-934-8
Index-No.	:	009-012-00-0

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Disodium hexafluorosilicate			
CAS-No. EC-No. Index-No.	16893-85-9 240-934-8 009-012-00-0	Acute Tox. 3; H301, H331, H311	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.Hydrofluoric (HF) acid burns require immediate and specialized first aid and medical treatment. Symptoms may be delayed up to 24 hours depending on the concentration of HF. After decontamination with water, further damage can occur due to penetration/absorption of the fluoride ion. Treatment should be directed toward binding the fluoride ion as well as the effects of exposure. Skin exposures can be treated with a 2.5% calcium gluconate gel repeated until burning ceases. More serious skin exposures may require subcutaneous calcium gluconate except for digital areas unless the physician is experienced in this technique, due to the potential for tissue injury from increased pressure. Absorption can readily occur through the subungual areas and should be considered when undergoing decontamination. Prevention of absorption of the fluoride ion in cases of ingestion can be obtained by giving milk, chewable calcium carbonate tablets or Milk of Magnesia to conscious victims. Conditions such as hypocalcemia, hypomagnesemia and cardiac arrhythmias should be monitored for, since they can occur after exposure.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.First treatment with calcium gluconate paste.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	3,0 - 4,0 at 50 g/l at 20 °C
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	2,68 g/mL at 25 °C
n)	Water solubility	0,65 g/l at 17 °C - insoluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	1.000 g/l

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Hydrogen fluoride, Sodium oxides, silicon oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rabbit - 125 mg/kg

LD50 Oral - Rat - 125 mg/kg

LD50 Oral - Mouse - 70 mg/kg
Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Ataxia. Behavioral:Muscle contraction or spasticity.

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation
(OECD Test Guideline 437)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: VV8410000

Fluoride ion can reduce serum calcium levels possibly causing fatal hypocalcemia.

A dose of about 1 gram can cause:, Nausea, burning sensation, sores in the mouth, Lesions of the:, Throat., sores in the digestive tract, Tremors, Convulsions, Shock., Death may result from ingestion of two to five grams., Prolonged or repeated exposure may cause:, Increased:, bone density, calcium deposits in the ligaments, new bone growth, Vomiting, Diarrhoea, Abdominal pain, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus - 49 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Harmful to aquatic life with long lasting effects.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2674	IMDG: 2674	IATA: 2674

14.2 UN proper shipping name

ADR/RID:	SODIUM FLUOROSILICATE
IMDG:	SODIUM FLUOROSILICATE
IATA:	Sodium fluorosilicate

14.3 Transport hazard class(es)

ADR/RID: 6.1	IMDG: 6.1	IATA: 6.1

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H331	Toxic if inhaled.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SIGMA-ALDRICH

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 23.07.2014
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Sodium thiosulfate
Product Number	:	72049
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7772-98-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Sodium thiosulphate
Formula	:	$Na_2O_3S_2$
Molecular Weight	:	158,11 g/mol
CAS-No.	:	7772-98-7
EC-No.	:	231-867-5

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
no data available

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Do not store near acids.

Keep in a dry place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	no data available

c)	Odour Threshold	no data available
d)	pH	6,0 - 8,5 at 50 g/l at 20 °C
e)	Melting point/freezing point	52 °C - Decomposes on heating.
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	1,667 g/cm3 at 20 °C
n)	Water solubility	210 g/l at 20 °C
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong acids, Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - > 8.000 mg/kg

LD50 Intraperitoneal - mouse - 5.200 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: XN6476000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Gambusia affinis (Mosquito fish) - 24.000 mg/l - 96 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 07.11.2014
Print Date 23.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	*N*-Phenyl-1-naphthylamine
Product Number	:	104043
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	90-30-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin sensitisation (Category 1), H317
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xn, N	Harmful, Dangerous for the environment	R22, R43, R50/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)

H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P280	Wear protective gloves.
P501	Dispose of contents/ container to an approved waste disposal plant.

Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	*N*-(1-Naphthyl)aniline 1-(N-phenylamino)naphthalene NPN
Formula	:	$C_{16}H_{13}N$
Molecular weight	:	219,28 g/mol
CAS-No.	:	90-30-2
EC-No.	:	201-983-0

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
N-1-Naphthylaniline			
CAS-No. EC-No.	90-30-2 201-983-0	Acute Tox. 4; Skin Sens. 1; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H317, H373, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
N-1-Naphthylaniline			
CAS-No. EC-No.	90-30-2 201-983-0	Xn, R22 - R43 - R50/53	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: dark red
b)	Odour	pungent
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 60 - 62 °C - lit.
f)	Initial boiling point and boiling range	226 °C at 20 hPa - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available

k)	Vapour pressure	0,000011 hPa at 20 °C
l)	Vapour density	No data available
m)	Relative density	1,16 g/cm3 at 20 °C
n)	Water solubility	2,76 g/l at 17 °C
o)	Partition coefficient: n-octanol/water	log Pow: 4,28
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong acids

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1.625 mg/kg

LD50 Dermal - Rabbit - male - > 5.000 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Result: May cause sensitisation by skin contact.
(OECD Test Guideline 406)

Germ cell mutagenicity
Hamster
ovary
Result: negative

Mouse - male
Result: negative
Dominant lethal test

Carcinogenicity

Carcinogenicity - Mouse - Oral
Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Kidney, Ureter, Bladder:Kidney tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity - Rat - male and female - Oral - No observed adverse effect level - 80 mg/kg - Lowest observed adverse effect level - 20 mg/kg
RTECS: QM4500000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated., Nausea, Dizziness, Headache

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - 0,44 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	static test LC50 - Daphnia magna (Water flea) - 0,3 mg/l - 48 h
Toxicity to bacteria	Respiration inhibition EC50 - Sludge Treatment - > 10.000 mg/l - 3 h (OECD Test Guideline 209)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 0 % - Not readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 56 d Bioconcentration factor (BCF): 427 - 2.730 (OECD Test Guideline 305C)

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077	IMDG: 3077	IATA: 3077

14.2 UN proper shipping name

ADR/RID:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (N-1-Naphthylaniline)
IMDG:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (N-1-Naphthylaniline)
IATA:	Environmentally hazardous substance, solid, n.o.s. (N-1-Naphthylaniline)

14.3 Transport hazard class(es)

ADR/RID: 9	IMDG: 9	IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity

H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Skin Sens.	Skin sensitisation

Full text of R-phrases referred to under sections 2 and 3

Xn	Harmful
R22	Harmful if swallowed.
R43	May cause sensitisation by skin contact.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 09.04.2013
Print Date 13.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	*N*-Phenyl-2-naphthylamine
Product Number	:	178055
Brand	:	Aldrich
Index-No.	:	612-135-00-8
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	135-88-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Carcinogenicity (Category 2), H351
Eye irritation (Category 2), H319
Skin irritation (Category 2), H315
Skin sensitisation (Category 1), H317
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

N	Dangerous for the environment	R40 R51/53
Xi	Irritant	R43 R36/38

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram	
Signal word	Warning

Hazard statement(s)

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P280	Wear protective gloves.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	N-(2-Naphthyl)aniline
Formula	:	$C_{16}H_{13}N$
Molecular Weight	:	219,28 g/mol
CAS-No.	:	135-88-6
EC-No.	:	205-223-9
Index-No.	:	612-135-00-8

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
N-Phenyl-2-naphthylamine		
	Skin Irrit. 2; Eye Irrit. 2; Skin Sens. 1; Carc. 2; Aquatic Chronic 2; H319, H315, H317, H351, H411	-

Hazardous ingredients according to Directive 1999/45/EC

Component	Classification	Concentration
N-Phenyl-2-naphthylamine		
	Xn, N, Carc.Cat.3, R36/38 - R40 - R43 - R51/53	-

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
A part from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: flakes Colour: grey
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 105 - 108 °C - lit.
f)	Initial boiling point and boiling range	395 - 395,5 °C - lit.
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	log Pow: 5
p)	Auto-ignition temperature	no data available

q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Oxidizing agentsStrong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 8.730 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity).

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (N-Phenyl-2-naphthylamine)

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: QM4550000

Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.

SECTION 12: Ecological information

12.1 Toxicity
no data available

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Pimephales promelas (fathead minnow) - 32 d - 52,1 µg/l
	Bioconcentration factor (BCF): 147

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077	IMDG: 3077	IATA: 3077

14.2 UN proper shipping name

ADR/RID:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (N-Phenyl-2-naphthylamine)
IMDG:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (N-Phenyl-2-naphthylamine)
IATA:	Environmentally hazardous substance, solid, n.o.s. (N-Phenyl-2-naphthylamine)

14.3 Transport hazard class(es)

ADR/RID: 9	IMDG: 9	IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.
H411	Toxic to aquatic life with long lasting effects.
Skin Irrit.	Skin irritation
Skin Sens.	Skin sensitisation

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xn	Harmful
R36/38	Irritating to eyes and skin.
R40	Limited evidence of a carcinogenic effect.
R43	May cause sensitisation by skin contact.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.8 Revision Date 13.09.2017
Print Date 14.10.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Sodium nitrite
Product Number	:	237213
Brand	:	Sigma-Aldrich
Index-No.	:	007-010-00-4
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7632-00-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #	+1-703-527-3887 (CHEMTREC)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Oxidizing solids (Category 3), H272
Acute toxicity, Oral (Category 3), H301
Eye irritation (Category 2), H319
Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H272 May intensify fire; oxidizer.

H301	Toxic if swallowed.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life.

Precautionary statement(s)

P220	Keep/Store away from clothing/ combustible materials.
P273	Avoid release to the environment.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$NNaO_2$
Molecular weight	:	69,00 g/mol
CAS-No.	:	7632-00-0
EC-No.	:	231-555-9
Index-No.	:	007-010-00-4

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Sodium nitrite			
CAS-No. EC-No. Index-No.	7632-00-0 231-555-9 007-010-00-4	Ox. Sol. 3; Acute Tox. 3; Eye Irrit. 2; Aquatic Acute 1; H272, H301, H319, H400 M-Factor - Aquatic Acute: 1	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.Keep away from heat and sources of ignition.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	9
e)	Melting point/freezing point	Melting point/range: 271 °C - lit.
f)	Initial boiling point and boiling range	320 °C

g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	< 0,0001 hPa at 25 °C
l)	Vapour density	No data available
m)	Relative density	2,168 g/cm3
n)	Water solubility	820 g/l at 20 °C
o)	Partition coefficient: n-octanol/water	log Pow: -3,7 at 25 °C
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	The substance or mixture is classified as oxidizing with the category 3.

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
Acids, Powdered metals, Ammonia, Cyanides, Amines, Activated carbon, Combustible material, Reducing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Nitrogen oxides (NOx), Sodium oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 157,9 mg/kg

LD50 Oral - Mouse - 175 mg/kg
Remarks: Vascular:BP lowering not charactertized in autonomic section. Vascular:Regional or general arteriolar or venous dilation.

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 48 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 2A - Group 2A: Probably carcinogenic to humans (Sodium nitrite)

IARC: 2A - Group 2A: Probably carcinogenic to humans (Sodium nitrite)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: RA1225000

Headache, Nausea, Incoordination., Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Oncorhynchus mykiss (rainbow trout) - 0,94 - 1,92 mg/l - 96,0 h
	mortality NOEC - Oncorhynchus mykiss (rainbow trout) - 0,54 mg/l - 96,0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 12,5 mg/l - 48 h
Toxicity to algae	NOEC - Desmodesmus subspicatus (green algae) - 100 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1500	IMDG: 1500	IATA: 1500

14.2 UN proper shipping name

ADR/RID:	SODIUM NITRITE
IMDG:	SODIUM NITRITE
IATA:	Sodium nitrite

14.3 Transport hazard class(es)

ADR/RID: 5.1 (6.1)	IMDG: 5.1 (6.1)	IATA: 5.1 (6.1)

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H272	May intensify fire; oxidizer.
H301	Toxic if swallowed.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held

liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.0 Revision Date 31.10.2012
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : N-Nitrosodiphenylamine

Product Number : 73900
Brand : Aldrich
CAS-No. : 86-30-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
Acute toxicity, Oral (Category 4)
Eye irritation (Category 2)

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Harmful if swallowed.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 [CLP]
Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H319 Causes serious eye irritation.

Precautionary statement(s)
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard Statements none

According to European Directive 67/548/EEC as amended.

Hazard symbol(s)

R-phrase(s)

R22	Harmful if swallowed.

S-phrase(s) none

2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Diphenylnitrosamine
Diphenylnitrosoamine
N-Nitroso-N-phenylaniline

Formula : $C_{12}H_{10}N_2O$

Molecular Weight : 198,22 g/mol

Component	Concentration
N-Nitrosodiphenylamine	
CAS-No. 86-30-6 EC-No. 201-663-0	-

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, nitrogen oxides (NOx)

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Normal measures for preventive fire protection.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Store under inert gas. Air sensitive.

7.3 Specific end uses

no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 65 - 66 °C
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evaporation rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	log Pow: 3,13
p)	Autoignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Solubility in other solvents	Methanol 100 g/l - soluble

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
no data available

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 1.825 mg/kg
Remarks: Cyanosis

LD50 Dermal - rabbit - > 7.940 mg/kg
Remarks: Behavioral:Food intake (animal). Behavioral:Change in motor activity (specific assay).

Skin corrosion/irritation
Serious eye damage/eye irritation
Eyes - rabbit - Mild eye irritation - 24 h

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

Carcinogenicity - rat - Oral
Tumorigenic:Carcinogenic by RTECS criteria. Kidney, Ureter, Bladder:Tumors.

Carcinogenicity - mouse - Skin
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma. Tumorigenic:Increased incidence of tumors in susceptible strains.

Carcinogenicity - rat - Oral
Tumorigenic:Carcinogenic by RTECS criteria. Kidney, Ureter, Bladder:Tumors. Skin and Appendages: Other: Tumors.

Carcinogenicity - rat - Intraperitoneal
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Liver:Tumors. Endocrine:Tumors.

Carcinogenicity - mouse - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Kidney, Ureter, Bladder:Tumors.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification. Nitrosamines are suspected of causing cancers of the lung, nasal sinuses, brain, esophagus, stomach, liver, bladder, and kidney.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (N-Nitrosodiphenylamine)

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: JJ9800000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 5,8 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 7,8 mg/l - 48 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 14 d -0,00921 mg/l Bioconcentration factor (BCF): 217

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
no data available

12.6 Other adverse effects
Toxic to aquatic life.
no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number

ADR/RID: -	IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
no data available

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
no data available

15.2 Chemical Safety Assessment
no data available

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 5.4 Revision Date 13.07.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Hexamethylenetetramine
Product Number	:	398160
Brand	:	Sigma-Aldrich
Index-No.	:	612-101-00-2
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	100-97-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable solids (Category 2), H228
Skin sensitisation (Category 1), H317

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H228 Flammable solid.
H317 May cause an allergic skin reaction.

Precautionary statement(s)	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Urotropine 1,3,5,7-Tetraazatricyclo[3.3.1.13,7]decane Hexamine Methenamine
Formula	:	$C_6H_{12}N_4$
Molecular weight	:	140,19 g/mol
CAS-No.	:	100-97-0
EC-No.	:	202-905-8
Index-No.	:	612-101-00-2

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Hexamethylenetetramine			
CAS-No. EC-No. Index-No.	100-97-0 202-905-8 612-101-00-2	Flam. Sol. 2; Skin Sens. 1; H228, H317	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx), Hydrogen cyanide (hydrocyanic acid)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic
Storage class (TRGS 510): Flammable solid hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: colourless
b)	Odour	ammoniacal
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	280 °C
f)	Initial boiling point and boiling range	No data available
g)	Flash point	250 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 2.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	< 0,01 hPa at 20 °C
l)	Vapour density	No data available
m)	Relative density	1,331 g/cm3
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: -2,179 at 20 °C
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	70,4 mN/m at 20 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture
Heat, flames and sparks.

10.5 Incompatible materials
Strong acids, Acids, Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 20.000 mg/kg

LD50 Dermal - Rat - male and female - > 2.000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Result: May cause sensitisation by skin contact.
(OECD Test Guideline 406)

Germ cell mutagenicity
Salmonella typhimurium
Result: negative

Mouse - male
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity: Rat - male - Oral - NOAEL : >= 80 mg/kg

Rat - female - Oral - NOAEL : >= 100 mg/kg

RTECS: MN4725000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Cyprinodon variegatus (sheepshead minnow) - 49.000 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 36.000 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 35 % - According to the results of tests of biodegradability this product is not readily biodegradable. (OECD Test Guideline 301D)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1328 IMDG: 1328 IATA: 1328

14.2 UN proper shipping name

ADR/RID: HEXAMETHYLENETETRAMINE
IMDG: HEXAMETHYLENETETRAMINE
IATA: Hexamethylenetetramine
Special Provisions: “Keep away from heat” label required.

14.3 Transport hazard class(es)

ADR/RID: 4.1 IMDG: 4.1 IATA: 4.1

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

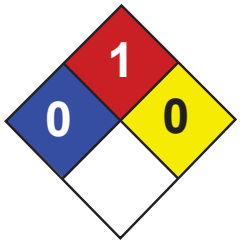
SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H228	Flammable solid.
H317	May cause an allergic skin reaction.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.



Health	1
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Paraffin MSDS

Section 1: Chemical Product and Company Identification

Product Name: Paraffin

Catalog Codes: SLP4450

CAS#: 8002-74-2 or 64742-43-4

RTECS: RV0350000

TSCA: TSCA 8(b) inventory: Wax (Paraffin)

CI#: Not available.

Synonym: Paraffin Wax

Chemical Name: Paraffin

Chemical Formula: Not available.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Wax (Paraffin) Beads	8002-74-2 or	100
	64742-43-4	

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 245°C (473°F) - 340 C

Flash Points: CLOSED CUP: 199°C (390.2°F). OPEN CUP: 235°C (455°F).

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Parrafin Wax (Fume) TWA: 2 STEL: 6 (mg/m3) [Canada] TWA: 2 (mg/m3) from OSHA (PEL) [United States] TWA: 2 (mg/m3) from ACGIH (TLV) [United States] TWA: 2 (mg/m3) from NIOSH [United States] TWA: 2 STEL: 6 [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: Not available.

Color: White.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: 47°C (116.6°F) - 65 C

Critical Temperature: Not available.

Specific Gravity:
0.9 @ 20 deg. C 0.92 @ 25 deg. C (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Solid material is not expected to be an irritant, but it may cause mild skin irritation. Eyes: Solid materials is not expected to be an irritant, but it may cause mild eye irritation. Vapors from molten wax may cause eye irritation. Inhalation: Low hazard. Paraffin wax fumes may be irritating to the eyes nose and throat. and may also produce nausea. 'However, vapors emitted from molten wax are expected to have a low degree of irritation by inhalation. Ingestion: Ingested paraffin wax is not absorbed, and is considered nontoxic. Ingestion of large amounts may have a mild laxative effect and cause diarrhea. Chronic Potential Health Effects: Skin: Poor personal hygiene can lead to wax plugging of skin follicles and producing so-called "Wax Boils".

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Illinois toxic substances disclosure to employee act: Wax (Paraffin) Fume Rhode Island RTK hazardous substances: Wax (Paraffin) Fume Pennsylvania RTK: Wax (Paraffin) Minnesota: Wax (Paraffin) Fume Massachusetts RTK: Wax (Paraffin) Fume TSCA 8(b) inventory: Wax (Paraffin)

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
This product is not classified according to the EU regulations. Not applicable.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 11:11 AM

Last Updated: 05/21/2013 12:00 PM

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SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 6.10 Revision Date 24.08.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Formaldehyde solution, 36.5-38%
Product Number	:	F8775
Brand	:	Sigma
Index-No.	:	605-001-00-5
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	50-00-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1B), H314
Skin sensitisation (Category 1), H317
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 1), H370
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word Danger

Hazard statement(s)

H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H370	Causes damage to organs.

Precautionary statement(s)

P201	Obtain special instructions before use.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P311	IF exposed or concerned: Call a POISON CENTER or doctor/ physician.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.

Supplemental Hazard Statements none

Restricted to professional users.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Synonyms : Formalin

Formula : CH_2O

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Formaldehyde			
CAS-No. EC-No. Index-No.	50-00-0 200-001-8 605-001-00-5	Acute Tox. 3; Skin Corr. 1B; Skin Sens. 1; Muta. 2; Carc. 1B; H301, H331, H311, H314, H317, H341, H350 Concentration limits: >= 25 %: Skin Corr. 1B, H314; 5 - < 25 %: Skin Irrit. 2, H315; 5 - < 25 %: Eye Irrit. 2, H319; >= 5 %: STOT SE 3, H335; >= 0,2 %: Skin Sens. 1, H317;	>= 30 - < 50 %

Methanol			
CAS-No. EC-No. Index-No. Registration number	67-56-1 200-659-6 603-001-00-X 01-2119433307-44-XXXX	Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301, H331, H311, H370 Concentration limits: >= 10 %: STOT SE 1, H370; 3 - < 10 %: STOT SE 2, H371;	>= 10 - < 20 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid exposure - obtain special instructions before use.Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 60 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: clear
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	64 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 73 %(V) Lower explosion limit: 7 %(V)
k)	Vapour pressure	69 hPa at 37 °C
l)	Vapour density	1,04 - (Air = 1.0)
m)	Relative density	1,016 g/cm3 at 20 °C
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information

Relative vapour density 1,04 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Skin corrosion/irritation
Skin - Rabbit
Result: Corrosive after 3 minutes to 1 hour of exposure - 20 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive - 7 d
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Result: Causes sensitisation.
May cause allergic skin reaction.
(OECD Test Guideline 406)

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (Formaldehyde)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: LP8925000

Liver - Irregularities - Based on Human Evidence (Formaldehyde)

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Harmful to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2209	IMDG: 2209	IATA: 2209

14.2 UN proper shipping name

ADR/RID:	FORMALDEHYDE SOLUTION
IMDG:	FORMALDEHYDE SOLUTION
IATA:	Formaldehyde solution

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapour.
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H370	Causes damage to organs.
H371	May cause damage to organs.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.5 Revision Date 09.09.2016
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Potassium persulfate
Product Number	:	216224
Brand	:	Sigma-Aldrich
Index-No.	:	016-061-00-1
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7727-21-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Oxidizing solids (Category 3), H272
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Respiratory sensitisation (Category 1), H334
Skin sensitisation (Category 1), H317
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word	Danger
Hazard statement(s)	
H272	May intensify fire; oxidizer.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
Precautionary statement(s)	
P220	Keep/Store away from clothing/ combustible materials.
P261	Avoid breathing dust.
P280	Wear protective gloves.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P342 + P311	If experiencing respiratory symptoms: Call a POISON CENTER/doctor.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Potassium peroxodisulfate
Formula	:	$K_2S_2O_8$
Molecular weight	:	270,32 g/mol
CAS-No.	:	7727-21-1
EC-No.	:	231-781-8
Index-No.	:	016-061-00-1

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Dipotassium peroxodisulphate			
CAS-No. EC-No. Index-No.	7727-21-1 231-781-8 016-061-00-1	Ox. Sol. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; Resp. Sens. 1; Skin Sens. 1; STOT SE 3; H272, H302, H315, H319, H334, H317, H335	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Container explosion may occur under fire conditions.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.Keep away from heat and sources of ignition.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Moisture sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	2,5 - 4,5 at 27 g/l at 25 °C
e)	Melting point/freezing point	100 °C
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	9,33 - (Air = 1.0)
m)	Relative density	2,477 g/cm3
n)	Water solubility	27 g/l at 20 °C - completely soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	170 °C -
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	The substance or mixture is classified as oxidizing with the category 3.

9.2 Other safety information

Relative vapour density	9,33 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture Heat

10.5 Incompatible materials
Organic materials, Strong reducing agents, Powdered metals, Strong bases, Alcohols, phosphorous, Anhydrides, Halogens, Acids

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Sulphur oxides, Potassium oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 825 mg/kg

LD50 Dermal - Rabbit - > 10.000 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: SE0400000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Fish - 76,3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia (water flea) - 120 mg/l - 48 h
Toxicity to bacteria	EC50 - Bacteria - 83,7 mg/l - 72 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Harmful to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1492 IMDG: 1492 IATA: 1492

14.2 UN proper shipping name

ADR/RID: POTASSIUM PERSULPHATE
IMDG: POTASSIUM PERSULPHATE
IATA: Potassium persulphate

14.3 Transport hazard class(es)

ADR/RID: 5.1 IMDG: 5.1 IATA: 5.1

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H272	May intensify fire; oxidizer.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 4.1 Revision Date 09.01.2012
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : Polyethylene

Product Number : 427799
Brand : Aldrich
CAS-No. : 9002-88-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

Caution - substance not yet tested completely.

2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : C2H4

4. FIRST AID MEASURES

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Acrolein, formaldehyde-like
Nature of decomposition products not known.
Carbon oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapors, mist or gas.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.Normal measures for preventive fire protection.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end uses
no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of

contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: light grey
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 90 °C
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evaporation rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	0,906 g/mL at 25 °C
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Autoignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
no data available

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

Carcinogenicity - rat - Implant
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Blood:Lymphomas including Hodgkin's disease. Tumorigenic:Tumors at site or application.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
no data available

12.6 Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
no data available

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
no data available

15.2 Chemical Safety Assessment
no data available

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any

guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

ADDOVATE EM 132D

RHEIN CHEMIE CORPORATION
145 Parker Court
Chardon, OH 44024

TRANSPORTATION EMERGENCY
CALL CHEMTREC..... : (800) 424-9300
INTERNATIONAL ..... : (703) 527-3887

NON-TRANSPORTATION
RCC EMERGENCY PHONE : (440) 285-3547
RCC INFORMATION PHONE: (800) 289-2436

Section 1: Product and Company Identification

Product Name:	ADDOVATE EM 132D
Article Number:	1594242
Product Code:	220190
Chemical Family:	Polyether Alcohol
Chemical Name:	Polyether Polyol
CAS Number:	69227-21-0

Section 2: Composition/Information on Ingredients

HAZARDOUS INGREDIENTS

Ingredient Name/ CAS Number	Exposure Limits	Concentration Min.	Max.
Polyether Alcohol 69227-21-0	**OSHA (PEL):** Not Established **ACGIH (TLV):** Not Established	0%	100%

Section 3: Hazards Identification

EMERGENCY OVERVIEW

CAUTION! Non-regulated. **Color:** Colorless to Yellow **Form:** Liquid **Odor:** Odorless to weak odor
May cause eye, skin, and respiratory tract irritation. Water may cause frothing. Use cold water spray to cool fire-exposed containers to minimize the risk of rupture. Irritating gases/fumes may be given off during burning or thermal decomposition.

POTENTIAL HEALTH EFFECTS

Route(s) of Entry: Inhalation, Skin Contact, Eye Contact

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE

General Effects of Exposure

Acute Effects of Exposure: This product at ambient temperatures, under normal working conditions, using good industrial hygiene practices is not expected to present a problem. However, if heated, processed, or sprayed/mi sted, this product may cause irritation of the mucous membranes of the upper respiratory tract. Liquid contact with the skin may cause irritation. This material can be absorbed through the skin. However, no information is available on the extent of systemic effects in humans. The lethal dose from dermal absorption in rabbits was 4.6 gm/kg. Liquid and vapor contact with the eyes may cause irritation, redness, swelling, discharge and/or corneal clouding. Ingestion is not a likely route of exposure. However, if ingested this product could cause nausea, diarrhea, pain and other gastrointestinal disturbances.

Chronic Effects of Exposure: Prolonged or repeated exposure with the concentrated solution may cause dermatitis, with drying and cracking of the skin due to the defatting action of the solution. Repeated and prolonged exposure to the mist from this product may cause conjunctivitis.

Carcinogenic Components:

NTP: None

IARC: None

OSHA: None

Medical Conditions Aggravated by Exposure: May aggravate existing skin disorders.

Section 4: First Aid Measures

First Aid for Eye: In case of contact, flush eyes with large quantities of water for at least 15 minutes. Get medical attention if irritation develops or persists.

First Aid for Skin: Immediately remove contaminated clothing and shoes. In case of skin contact, wash affected areas with soap and water. Wash clothing and clean shoes before reuse. Get medical attention if irritation develops or persists.

First Aid for Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

First Aid for Ingestion: Give victim one or two glasses of water or milk. If material is ingested, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention. Should vomiting occur, keep patients head

below hip level to prevent aspiration of fluid into the lungs.

Note to Physician: Treat symptomatically.

Section 5: Fire Fighting Measures

Flash Point: 365 °F Pensky-Martens Closed Cup (ASTM D-93)

Flammable Limits:

Upper Explosion Limit (UEL %): Not Established

Lower Explosion Limit (LEL %): Not Established

Auto-ignition Temperature: 698 °F (370 °C) DIN 51794

Extinguishing Media:

Suitable: Water, Carbon Dioxide, Dry Chemical, Foam

Special Fire Fighting Procedures: A solid stream of water directed into the burning material could spread the fire. Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by firefighters. Use cold water spray to cool fire exposed containers. Material supports combustion. During a fire, irritating and toxic gases may be generated by thermal decomposition or combustion.

Unusual Fire/Explosion Hazards: None known.

Section 6: Accidental Release Measures

Spill or Leak Procedures: Extinguish all ignition sources. Emergency clean-up personnel should wear appropiate protection when entering the spill area for clean-up. Do not allow spilled or released material to enter ground water, waste water or soil. Cover spill with absorbent material, such as sand, sweeping compound or diatomaceous earth; collect material for disposal. Spill area can be washed with water. Ventilate area to remove vapors.

Section 7: Handling and Storage

Storage Temperature:

Maximum: 122 °F (50 °C)

Shelf Life: 6 Months

Special Sensitivity: Moisture.

Handling/Storage Precautions: Handle in accordance with good industrial hygiene and safety practices. Keep container tightly closed when not in use. Avoid

contact with skin or clothing. Avoid breathing dusts, vapors or mists. Do not reseal container if contamination is suspected.

Section 8: Exposure Controls/Personal Protection

Personal Protection Equipment

Eye Protection Requirements:	Chemical safety goggles., In a splash hazard environment chemical goggles should be used in combination with a full face-shield.
Skin Protection Requirements:	Permeation resistant gloves (neoprene, nitrile, or PVC) and impervious clothing (long sleeve shirts) are recommended., Cover as much of the exposed skin area as possible with appropriate clothing, coveralls, apron and boots., If skin creams are used, keep the area covered by the cream to a minimum.
Ventilation Requirements:	None required during handling but necessary during processing.
Respirator Requirements:	The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA). Air purifying respirator equipped with a full-face organic vapor and dust/mist cartridge if vapors are near or exceeding the exposure limits listed in Section 2. In areas of high concentrations, confined space or other poorly ventilated areas and for large spill clean-up sites, fresh air-line respirators or self-contained breathing apparatus should be used. Observe OSHA regulations for respirator use (29 CFR 1910.134.)
Additional Protective Measures:	Safety showers and eyewash stations should be accessible to the work area.

Section 9: Physical and Chemical Properties

Physical Form:	Liquid
Color:	Colorless to Yellow
Odor:	Odorless to weak odor
pH:	Approximately 4.5
Boiling Point:	Not Established
Melting/Freezing Point:	Not Established
Viscosity:	115 mPa.s @ 75 °F (25 °C)
Solubility in Water:	Soluble
Specific Gravity:	1 @ 68 °F (20 °C)
Bulk Density:	Not Established
Vapor Pressure:	9 mmHg @ 68 °F (20 °C)
Vapor Density:	Not Established
VOC by Weight:	Not Established

Section 10: Stability and Reactivity

Stability: Stable

Hazardous Polymerization: Will not occur

Substances to Avoid: Oxidizing materials and isocyanates.

Conditions to Avoid: None known.

Decomposition Products: By fire - CO, CO2, oxides of nitrogen, and other undetermined aliphatic fragments.

Section 11: Toxicological Information

Toxicity Data for ADDOVATE EM 132D

Acute oral toxicity: LD50 = > 5,000 mg/kg (Rat)

Eye Irritation: Non-irritating

Skin Irritation: Non-irritating

Toxicity Data for Polyether Alcohol

Toxicity Note: No data available for this component.

Section 12: Ecological Information

Ecological Data for ADDOVATE EM 132D

Ecological Note: Water Pollution Class WGK 1 - slightly hazardous to water (German Water Resources Act)

Ecological Data for Polyether Alcohol

Ecological Note: No data available for this component.

Section 13: Disposal Considerations

Waste Disposal Method: Disposal must be in compliance with federal, state and local environmental control regulations. If incinerated, toxic and corrosive combustion gases must be properly handled.

Empty Container Precautions: Empty container retains product residue and can be hazardous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat, flame, sparks, static electricity, or other sources of ignition. Recondition or dispose of empty container in accordance with government regulations.

Section 14: Transportation Information

Technical shipping name: Polyether Alcohol

Freight Class
Bulk: Chemicals, N.O.I. (NMFC 60000)
Package: Chemicals, N.O.I. (NMFC 60000)

Product Label: Product Label Established

Domestic Surface Transportation (DOT)
Hazard Class or Division: Non-Regulated

Marine Transportation (IMO / IMDG)
Hazard Class Division Number: Non-Regulated

Air Transportation (ICAO / IATA)
Hazard Class Division Number: Non-Regulated

Section 15: Regulatory Information

United States Federal Regulations

OSHA Hazcom Standard Rating: Hazardous

TSCA Inventory List: **On TSCA Inventory**

CERCLA Hazardous Substance:

Component(s)	Reportable Quantity
None	

SARA Title III
SARA Section 302 Extremely Hazardous Substances:

Component(s)/ CAS Number	Concentration Min.	Concentration Max.
None		

SARA Section 311/312 Hazard Categories: Immediate Health Hazard

SARA Section 313 Toxic Chemicals:

Component(s)/ CAS Number	Reporting Threshold	Concentration Min.	Concentration Max.
None			

RCRA Status: If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

State Right-to-Know Information

Component(s)/ CAS Number	State Code	Concentration Min.	Max.
Polyether Alcohol 69227-21-0	PA-N, NJ-N	0%	100%

State Code Translation Table
PA-N = Pennsylvania Non-hazardous
NJ-N = New Jersey Other - includes predominant ingredients

Section 16: Other Information

HMIS Rating

Health		1
Flammability		1
Reactivity		0

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe
*=Chronic Health Hazard

RHEIN CHEMIE CORPORATION's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. HMIS and NFPA ratings are provided by RHEIN CHEMIE CORPORATION as a customer service.

Contact: HES Dept.
Phone: (440) 285-3547
MSDS Number: R36590
Version Date: 12/14/2007
MSDS Version: 2.4

Indicates Relevant Change Made.

SAFETY DATA SHEET

Revision Date 15-Dec-2011 **Revision Number** 3

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Description: **Sodium polyphosphate**
Cat No. **390930000; 390930010; 390930050; 390932500**
Synonyms Sodium metaphosphate; Calgon; Graham`s salt

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals
Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium
E-mail address begel.sdsdesk@thermofisher.com

Emergency Telephone Number

For information in the US, call: 001-800-ACROS-01
For information in Europe, call: +32 14 57 52 11

Emergency Number, Europe: +32 14 57 52 99
Emergency Number, US: 001-201-796-7100

CHEMTREC Phone Number, US: 001-800-424-9300
CHEMTREC Phone Number, Europe: 001-703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ systemic toxicity (single exposure)	Category 3

Classification according to EU Directives 67/548/EEC or 1999/45/EC

For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16

Symbol(s) Xi - Irritant
R-phrase(s) none
Risk Combination Phrases R36/37/38 - Irritating to eyes, respiratory system and skin

SECTION 2. HAZARDS IDENTIFICATION

Label Elements

Signal Word **Warning**

Hazard Statements
H335 - May cause respiratory irritation
H319 - Causes serious eye irritation
H315 - Causes skin irritation

Precautionary Statements - EU (§28, 1272/2008)
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

Other Hazards
No information available.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	EC-No.	Weight %	CAS-No	67/548/EEC Classification	CLP Classification - Regulation (EC) No 1272/2008	REACH No.
Metaphosphoric acid, sodium salt 50813-16-6	EEC No. 256-779-4	65-70	50813-16-6	Xi; R36/37/38	STOT SE 3 (H335) Skin Irrit. 2 (H315) Eye Irrit. 2 (H319)	-

For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16

SECTION 4. FIRST AID MEASURES

SECTION 4. FIRST AID MEASURES

Description of first aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Ingestion Clean mouth with water. Get medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.

Notes to Physician Treat symptomatically

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable Extinguishing Media
Water spray. Carbon dioxide (CO_2). Dry chemical. chemical foam.

Extinguishing media which must not be used for safety reasons
No information available.

Special hazards arising from the substance or mixture

Thermal decomposition can lead to release of irritating gases and vapors

Advice for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation

Environmental precautions

Prevent further leakage or spillage if safe to do so

Methods and material for containment and cleaning up

Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Do not ingest.

Conditions for safe storage, including any incompatibilities

Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

Specific End Uses

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure limits	This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
Biological limit values	This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.
Derived No Effect Level (DNEL)	No information available.
Predicted No Effect Concentration (PNEC)	No information available.

Exposure controls

Engineering Measures	Ensure adequate ventilation, especially in confined areas Ensure that eyewash stations and safety showers are close to the workstation location
Personal protective equipment	
Eye Protection	Goggles
Hand Protection	Protective gloves
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice
Environmental exposure controls	No information available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Powder, Solid
Appearance	White
pH	No information available.
Boiling Point/Range	No information available.
Melting Point/Range	600°C / 1112°F
Flash Point	No information available.
Autoignition Temperature	No information available.
Water Solubility	1000g/L (20°C)
Molecular Formula	(NaPO3)n

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Chemical Stability

Hygroscopic.

Possibility of Hazardous Reactions

Hazardous Polymerization	No information available.
Hazardous Reactions .	No information available.

Conditions to Avoid

Incompatible products, Exposure to moist air or water.

Incompatible Materials

Strong oxidizing agents.

Hazardous Decomposition Products

Highly toxic fumes. Oxides of phosphorus. Sodium oxides.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on Toxicological Effects

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Chronic Toxicity

Carcinogenicity	There are no known carcinogenic chemicals in this product
Sensitization	No information available.
Mutagenic Effects	No information available
Reproductive Effects	No information available.
Developmental Effects	No information available.
Target Organs	No information available.
Other Adverse Effects	The toxicological properties have not been fully investigated.
Endocrine Disruptor Information	None known

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Ecotoxicity effects Do not empty into drains

Persistence and degradability

No information available

Bioaccumulative potential

No information available.

Mobility in soil

No information available.

Results of PBT and vPvB assessment

Other adverse effects

No information available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from Residues / Unused Products Dispose of in accordance with local regulations

Contaminated Packaging Empty containers should be taken to local recyclers for disposal

SECTION 14. TRANSPORT INFORMATION

IMDG/IMO Not regulated

ADR Not regulated

IATA Not regulated

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	CHINA	AICS	KECL
Metaphosphoric acid, sodium salt	256-779-4	-		-	-	-	X	X	X	X	X

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
PICCS - Philippines Inventory of Chemicals and Chemical Substances
ENCS - Japan Existing and New Chemical Substances
CHINA - China Inventory of Existing Chemical Substances
AICS - Inventory of Chemical Substances
KECL - Existing and Evaluated Chemical Substances

Chemical Safety Assessment

SECTION 16. OTHER INFORMATION

Full text of R-phrases referred to under sections 2 and 3
R36/37/38 - Irritating to eyes, respiratory system and skin

Revision Date 15-Dec-2011
Revision Summary Not applicable
This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006
Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 23.04.2015
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Silicon dioxide

Product Number : S5631
Brand : Sigma-Aldrich
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 14808-60-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), Lungs, H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Xn Harmful R48/20

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H372 Causes damage to organs (Lungs) through prolonged or repeated exposure if inhaled.

Precautionary statement(s) P314	Get medical advice/ attention if you feel unwell.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Silica Quartz Sand Cristobalite
Formula	:	O_2Si
Molecular weight	:	60,08 g/mol
CAS-No.	:	14808-60-7
EC-No.	:	238-878-4

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Quartz			
CAS-No. EC-No.	14808-60-7 238-878-4	STOT RE 1; H372	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Quartz			
CAS-No. EC-No.	14808-60-7 238-878-4	Xn, R48/20	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
silicon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 1.610 °C - lit.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or	No data available

	explosive limits	
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	2,6 g/cm3 at 25 °C
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Hydrogen fluoride

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (Quartz)

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Inhalation - Causes damage to organs through prolonged or repeated exposure. - Lungs

Aspiration hazard
No data available

Additional Information
RTECS: VV7330000

The chronic health risks are associated with respirable particles of 3-4 um over protracted periods of time. Currently, there is a limited understanding of the mechanisms of quartz toxicity, including its mechanisms for lung carcinogenicity. Additional studies are needed to determine whether the cell transforming activity of quartz is related to its carcinogenic potential.

Lungs - Prolonged inhalation of crystalline silica may result in silicosis, a disabling pulmonary fibrosis characterized by fibrotic changes and miliary nodules in the lungs, a dry cough, shortness of breath, emphysema, decreased chest expansion, and increased susceptibility to tuberculosis. In advanced stages, loss of appetite, pleuritic pain, and total incapacity to work. Advanced silicosis may result in death due to cardiac failure or destruction of lung tissue. Crystalline silica is classified as group 1 "known to be carcinogenic to humans" by IARC and "sufficient evidence" of carcinogenicity by the NTP. - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods

IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H372	Causes damage to organs through prolonged or repeated exposure if inhaled.
STOT RE	Specific target organ toxicity - repeated exposure

Full text of R-phrases referred to under sections 2 and 3

Xn	Harmful
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.5 Revision Date 04.08.2016
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Sodium anthraquinone-2-sulfonate
Product Number	:	743038
Brand	:	Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	131-08-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.2 Label elements

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	9,10-Dihydro-9,10-dioxo-2-anthracenesulfonic acid sodium salt Anthraquinone-2-sulfonic acid sodium salt
Formula	:	$C_{14}H_7NaO_5S$

Molecular weight	:	310,26 g/mol
CAS-No.	:	131-08-8
EC-No.	:	205-009-5

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder, crystalline Colour: beige, light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides, Sodium oxides

Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Guinea pig - 21.000 mg/kg

Remarks: Liver:Liver function tests impaired. Kidney, Ureter, Bladder:Renal function tests depressed.

Inhalation: No data available

LD50 Intraperitoneal - Rat - 730 mg/kg

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CB1095550

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and

toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -	IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.5 Revision Date 15.07.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Silica gel
Product Number	:	236772
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	112926-00-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

This substance is not classified as dangerous according to Directive 67/548/EEC.

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	SiO_2
CAS-No.	:	112926-00-8
EC-No.	:	231-545-4

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
no data available

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Hygroscopic.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	no data available

c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: > 1.600 °C
f)	Initial boiling point and boiling range	2.230 °C
g)	Flash point	not applicable
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Silica-Amorphous, precipitated)

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: VV7315000

Amorphous silica is not classifiable as to its carcinogenicity to humans (Group 3); however, crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1, IARC). Therefore, amorphous silica should be handled as if possessing the same hazards as the crystalline form., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

CTD

CTD-101K

CTD-101K is a modified anhydride cured epoxy system with excellent performance at cryogenic temperatures, and excellectn radiation resistance. It is formulated with a very long pot life to enhance vacuum impregnation and RTM processing. Quoted performance properties are obtained by using the following procedure for mixing and curing the system.

MATERIALS	DESIGNATION	PARTS BY WEIGHT
RESIN:	PART A	100.0
HARDENER:	PART B	90.0
ACCELERATOR:	PART C	1.5

MIXING TEMPERATURE: 40 - 60°C

MIXING PROCEDURE: Combine the weighed components into a container equipped with heating and mechanical stirring. Heat and stir the mixture until a clear solution at 40-60C is obtained. Degass the mix at 27 in Hg for approximately 20 to 40 minutes until bubbles evolve infrequently from the mixture. The system is now ready for application.

POT LIFE:

Temperature (°C)	Pot Life (Hr)	Viscosity (Cp)
25	145	1300
40	60	400
60	20	100

	Standard	Accelerated
CURE:	5 Hrs. @ 110°C	1.5 Hrs. @ 135°C
POST CURE:	16 Hrs. @ 125°C	None

Composite Technology Development, Inc.
1505 COAL CREEK DRIVE, LAFAYETTE, COLORADO 80026
Ph: (303)664-0394 / Fax: (303)664-0392

CTD

MATERIAL SAFETY DATA SHEET

COMPOSITE TECHNOLOGY DEVELOPMENT, INC.
1505 COAL CREEK DRIVE
LAFAYETTE, COLORADO 80026

EMERGENCY TELEPHONE NUMBER: (303) 664 0394

1. PRODUCT IDENTIFICATION

Trade Name and Synonyms
CTD-101K PART A

Chemical Name and/or Family or Description
Formulated liquid epoxide resin

CHEMICAL IDENTITY TRADE SECRET. COMPOSITION WILL BE REVEALED TO A HEALTH PROFESSIONAL IN THE CASE OF A MEDICAL EMERGENCY.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Special Health Effects - Carcinogenicity
Not a carcinogen as considered by NTP, IARC, or OSHA.
This product contains less than 50 ppm Epichlorohydrin, a substance known to be a carcinogen in the State of California

CHEMICAL NAME	CAS #	RANGE %	EXPOSURE LIMITS
Epoxide Resin mixture	Trade secret	100%	OSHA PEL - Not established OSHA STEL - Not established ACGIH TWA - Not established ACGIH STEL - Not established

3. HAZARDS IDENTIFICATION

Emergency Overview: Warning! Causes irritation. May cause allergic skin reactions.
Primary Route(s) of Entry: Dermal

4. FIRST AID MEASURES

EYE — Flush eyes with water for at least 15 min. Get medical attention if irritation occurs.

SKIN CONTACT — Wipe away excess material with dry towel. Wash with mild soap and plenty of water. Get medical attention if irritation occurs.

INHALATION — Remove to fresh air. If breathing is difficult, or irritation occurs, get medical attention.

INGESTION — Give 3-4 glasses of water. Do not induce vomiting. Get medical attention.

OVEREXPOSURE EFFECTS — May cause moderate skin and mild eye irritation. May cause allergic skin reations.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Allergy, eczema or skin conditions

5. FIRE-FIGHTING MEASURES

FLASH POINT	> 200°F (> 93°C)
EXTINGUISHING MEDIA	CO_2; dry chemical; water spray; foam
SPECIAL FIREFIGHTING PROCEDURES	Use self-contained breathing apparatus
FIRE AND EXPLOSION HAZARDS	Combustion products may be toxic

CTD

6. ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE, BREAKAGE OR LEAK	Avoid all personal contact. Clean with absorbent material. Put into closeable containers. Flush area with water.

7. HANDLING AND STORAGE

STORAGE TEMPERATURE	Minimum handling temperature for storage.
HANDLING/STORAGE	Store in cool, dry area in closed containers. Avoid breathing vapor, mist or spray. Use only with adequate ventilation. Eye wash and safety shower should be available nearby when product is handled. For industrial use only.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EYES	Chemical goggles
SKIN	Lab coats or coveralls, and impervious rubber gloves. Use of barrier cream recommended.
INHALATION	Use NIOSH approved respirator suitable for organic vapors.
VENTILATION	General mechanical ventilation and local exhaust.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM	Liquid
APPEARANCE AND ODOR	Clear, slight odor
BOILING POINT	> 200°C (> 392°F)
SOLUBILITY IN WATER	Insoluble
SPECIFIC GRAVITY	~1.2g/cc
DECOMPOSITION TEMPERATURE	> 200°C (> 392°F)

10. STABILITY AND REACTIVITY

STABILITY	Stable
INCOMPATIBILITIES	Strong oxidizing agents
HAZARDOUS DECOMPOSITION PRODUCTS	Carbon monoxide, carbon dioxide and aldehydes.
HAZARDOUS POLYMERIZATION	Will not occur
CONDITIONS TO AVOID	Strong acids or bases in bulk and elevated temperatures

11. TOXICOLOGICAL INFORMATION

ORAL LD_{50}	> 5000 mg/kg - rat
DERMAL LD_{50}	> 6000 mg/kg - rabbit
SKIN IRRITATION	Moderate irritation - rabbit
EYE IRRITATION	Slight irritation - rabbit
SENSITIZATION	Moderate sensitizer

12. ECOLOGICAL INFORMATION

Data not yet available

13. DISPOSAL CONSIDERATIONS

According to Federal, State, and Local regulations. This product is not considered to be a hazardous waste by RCRA.

14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION	Not regulated

CTD

15. REGULATORY INFORMATION

OSHA STATUS	This MSDS has been prepared in compliance with Federal OSHA Hazard Communication
Standard 29 CFR 1910.1200. This product is considered to be a hazardous chemical under that standard.	
RCRA	Not a hazardous waste under RCRA (40 CFR 261)
TSCA INVENTORY STATUS	Chemical components listed on TSCA Inventory
SARA/TITLE III:	This product does not contain a toxic chemical under SEC. 313 (40 CFR 372)
CERLA	Not listed
CALIFORNIA PROPOSITION 65	This product contains less than 50 ppm

Epichlorohydrin, a substance known to the State of California to cause cancer.

16. OTHER INFORMATION

FOR TECHNICAL INFORMATION CONTACT:	DR. NASEEM A. MUNSHI COORDINATOR OF PRODUCT SAFETY
COMPOSITE TECHNOLOGY DEVELOPMENT,INC 1505 COAL CREEK DRIVE LAFAYETTE, CO 80026 (303) 664-0394	ISSUE DATE: 01/05/99 REVISION DATE & NO.:

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CTD

MATERIAL SAFETY DATA SHEET

COMPOSITE TECHNOLOGY DEVELOPMENT, INC.
1505 COAL CREEK DRIVE
LAFAYETTE, COLORADO 80026

EMERGENCY TELEPHONE NUMBER: (303) 664 0394

1. PRODUCT IDENTIFICATION

Trade Name and Synonyms
CTD-101K PART B
Chemical Name and/or Family or Description
Formulated liquid hardener

CHEMICAL IDENTITY TRADE SECRET. COMPOSITION WILL BE REVEALED TO A HEALTH PROFESSIONAL IN THE CASE OF A MEDICAL EMERGENCY.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Special Health Effects - Carcinogenicity
Not reviewed by NTP, IARC, or OSHA.

CHEMICAL NAME	CAS #	RANGE %	EXPOSURE LIMITS
Methyl Nadic Anhydride	25134-21-8	Trade secret	OSHA PEL - Not established OSHA STEL - Not established ACGIH TWA - Not established ACGIH STEL - Not established

3. HAZARDS IDENTIFICATION

Emergency Overview: Warning! Corrosive. Causes skin and eye burns. May cause allergic skin reactions.
Primary Route(s) of Entry: Dermal

4. FIRST AID MEASURES

EYE	Flush eyes with water for at least 15 min. Get medical attention if irritation occurs.
SKIN CONTACT	Wipe away excess material with dry towel. Wash with mild soap and plenty of water. Get immediate medical attention.
INHALATION	Remove to fresh air. If breathing is difficult, or irritation occurs, get immediate medical attention.
INGESTION	Give 3-4 glasses of water. Do not induce vomiting. Get immediate medical attention.
OVEREXPOSURE EFFECTS	Warning! Corrosive. Causes skin and eye burns. May cause allergic skin reactions.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE	Allergy, eczema or skin conditions

5. FIRE-FIGHTING MEASURES

FLASH POINT	275°F (135°C)
EXTINGUISHING MEDIA	CO_2; water in copious amounts
SPECIAL FIREFIGHTING PROCEDURES	Use self-contained breathing apparatus
FIRE AND EXPLOSION HAZARDS	Combustion products may be toxic

6. ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE, BREAKAGE OR LEAK	Remove sources of heat. Wear protective equipment. Take up with absorbent material. Put into closeable containers. Neutralize area with soda ash and water. Flush area with water.

7. HANDLING AND STORAGE

HANDLING/STORAGE	Store away from heat, oxidizing agents and alkaline materials. Corrosive. Causes skin and eye burns. Avoid breathing vapor, mist or spray. Store in cool, dry area in closed containers. Use only with adequate ventilation. Eye wash and safety shower should be available nearby when product is handled. For industrial use only.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EYES	Chemical goggles
SKIN	Wear impervious rubber gloves.
INHALATION	Use NIOSH approved respirator suitable for organic vapors.
VENTILATION	General mechanical ventilation and local exhaust.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM	Viscous liquid
APPEARANCE AND ODOR	Clear, light yellow
SOLUBILITY IN WATER	Reacts with water
SPECIFIC GRAVITY	~1.2g/cc
BOILING POINT	> 250°C (> 482°F)
DECOMPOSITION TEMPERATURE	> 200°C (> 392°F)

10. STABILITY AND REACTIVITY

STABILITY	Stable
INCOMPATIBILITIES	Strong oxidizing agents, water, alkali metal ions, alkaline materials
HAZARDOUS DECOMPOSITION PRODUCTS	Carbon monoxide, carbon dioxide and aldehydes.
HAZARDOUS POLYMERIZATION	May occur above 200°C
CONDITIONS TO AVOID	High temperatures in the presence of alkali metal ions.

11. TOXICOLOGICAL INFORMATION

ORAL LD_{50}	~ 640 mg/kg - rat
DERMAL LD_{50}	~ 4900 mg/kg - rat
INHALATION LC_{50}	~ 750 mg/cu.m/4h - rat
SKIN IRRITATION	Corrosive
EYE IRRITATION	Corrosive
SENSITIZATION	Sensitizer

12. ECOLOGICAL INFORMATION

Data not yet available

13. DISPOSAL CONSIDERATIONS

According to Federal, State, and Local regulations. This product is not considered to be a hazardous waste by RCRA.

14. TRANSPORT INFORMATION

CTD

PROPER SHIPPING NAME	Corrosive liquid, n.o.s. (Contains Methyl nadic anhydride)
ID NUMBER	UN 1760
LABEL REQUIRED	Corrosive
HAZARD CLASS	8
PACKING GROUP	II

15. REGULATORY INFORMATION

OSHA STATUS Standard 29 CFR 1910.1200. This product is considered to be a hazardous chemical under that standard.	This MSDS has been prepared in compliance with Federal OSHA Hazard Communication
RCRA corrosive effect on skin and eyes.	Not a hazardous waste under RCRA (40 CFR 261), but handle with care due to
TSCA INVENTORY STATUS	Chemical components listed on TSCA Inventory
SARA/TITLE III: CERLA	This product does not contain a toxic chemical under SEC. 313 (40 CFR 372) Not listed
CALIFORNIA PROPOSITION 65	This product does not contain any substance known to the State of California to cause cancer.

16. OTHER INFORMATION

FOR TECHNICAL INFORMATION CONTACT:	DR. NASEEM A. MUNSHI COORDINATOR OF PRODUCT SAFETY
COMPOSITE TECHNOLOGY DEVELOPMENT,INC 1505 COAL CREEK DRIVE LAFAYETTE, CO 80026 (303) 664-0394	ISSUE DATE: 01/05/99 REVISION DATE & NO.:

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CTD

MATERIAL SAFETY DATA SHEET

COMPOSITE TECHNOLOGY DEVELOPMENT, INC.
1505 COAL CREEK DRIVE
LAFAYETTE, COLORADO 80026

EMERGENCY TELEPHONE NUMBER: (303) 664 0394

1. PRODUCT IDENTIFICATION

Trade Name and Synonyms
CTD-101K PART C
Chemical Name and/or Family or Description
Accelerator for curing epoxy resins

CHEMICAL IDENTITY TRADE SECRET. COMPOSITION WILL BE REVEALED TO A HEALTH PROFESSIONAL IN THE CASE OF A MEDICAL EMERGENCY.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Carcinogenicity: Not reviewed by OSHA, IARC or NTP

CHEMICAL NAME	CAS #	RANGE %	EXPOSURE LIMITS
Dibutyl Phthalate	84-74-2	Trade secret	OSHA PEL - 5 mg/m3 ACGIH TWA - 5 mg/m3
Phenol	108-95-2	Trade secret	OSHA PEL - 5 ppm ACGIH TWA - 5 ppm

3. HAZARDS IDENTIFICATION

Emergency Overview: Severely irritating to eyes, nose and throat. Prolonged overexposure may cause collapse and liver or kidney damage. May cause allergic skin reactions.
Primary Route(s) of Entry: Dermal

4. FIRST AID MEASURES

EYE — Flush eyes with water for at least 15 min. Get medical attention if irritation occurs.

SKIN CONTACT — Wipe away excess material with dry towel. Wash with mild soap and plenty of water. Get immediate medical attention.

INHALATION — Remove to fresh air. If breathing is difficult, or irritation occurs, get immediate medical attention.

INGESTION — Give 3-4 glasses of water. Do not induce vomiting. Get immediate medical attention.

OVEREXPOSURE EFFECTS — Overexposure may produce weakness, .headache, dizzinesss. Prolonged overexposure may cause collapse and liver or kidney damage

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Allergy, eczema or skin conditions

5. FIRE-FIGHTING MEASURES

FLASH POINT	180°F (82°C)
EXTINGUISHING MEDIA	CO_2; water spray, dry chemical, foam
SPECIAL FIREFIGHTING PROCEDURES	Use self-contained breathing apparatus
FIRE AND EXPLOSION HAZARDS	Combustion products may be toxic

6. ACCIDENTAL RELEASE MEASURES

CTD

ACCIDENTAL RELEASE, BREAKAGE OR LEAK	Avoid all personal contact. Wear protective equipment. Take up with absorbent material. Put into closeable containers. Flush area with water.

7. HANDLING AND STORAGE

HANDLING/STORAGE	Store away from heat, oxidizing agents and alkaline materials. Causes severe skin and eye irritation. Avoid breathing vapor, mist or spray. Store in cool, dry area in closed containers. Use only with adequate ventilation. Eye wash and safety shower should be available nearby when product is handled. For industrial use only.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EYES	Chemical goggles
SKIN	Wear impervious rubber gloves.
INHALATION	Use NIOSH approved respirator suitable for organic vapors.
VENTILATION	General mechanical ventilation and local exhaust.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM	Liquid
APPEARANCE AND ODOR	Clear, amine odor
SOLUBILITY IN WATER	Soluble
SPECIFIC GRAVITY	~1.0g/cc
BOILING POINT	> 150°C (> 302°F)
DECOMPOSITION TEMPERATURE	> 200°C (> 392°F)

10. STABILITY AND REACTIVITY

STABILITY	Stable
INCOMPATIBILITIES	Strong oxidizing agents, strong acids, and strong alkaline materials
HAZARDOUS DECOMPOSITION PRODUCTS	Carbon monoxide, carbon dioxide, aldehydes, and nitrogen oxides
HAZARDOUS POLYMERIZATION	Will not occur
CONDITIONS TO AVOID	High temperatures.

11. TOXICOLOGICAL INFORMATION

ORAL LD_{50}	780 mg/kg - rat
DERMAL LD_{50}	250 mg/kg - rabbit
INHALATION LC_{50}	> 1.06 mg/l air, 4h exposure - rat
SKIN IRRITATION	Mild - rabbit
EYE IRRITATION	Severe
SENSITIZATION	Sensitizer

12. ECOLOGICAL INFORMATION

Data not yet available.
This product contains a marine pollutant, dibutyl phthalate

13. DISPOSAL CONSIDERATIONS

According to Federal, State, and Local regulations.

14. TRANSPORT INFORMATION

PROPER SHIPPING NAME (Contains Dibutyl Phthalate)	Environmentally hazardous substance, liquid, n.o.s.

CTD

ID NUMBER	UN 3082
LABEL REQUIRED	Corrosive
HAZARD CLASS	9
PACKING GROUP	III

15. REGULATORY INFORMATION

OSHA STATUS	This MSDS has been prepared in compliance with Federal OSHA Hazard Communication
Standard 29 CFR 1910.1200. This product is considered to be a hazardous chemical under that standard.	
RCRA	Not a hazardous waste under RCRA (40 CFR 261)
TSCA INVENTORY STATUS	Chemical components listed on TSCA Inventory
TSCA 12(b) EXPORT NOTIFICATION	This product contains chemical(s) which are

regulated by TSCA 12(b) Regulation and it is required that proper export notification shall be sent to EPA prior to shipping out of the US.

SARA/TITLE III:	This product contains a toxic chemical under SEC. 313 (40 CFR 372): 50%; 84-74-2;
Dibutyl Phthalate, & 16.8%; 108-95-2, Phenol	
CERLA	RQ 20lb (Dibutyl Phthalate) (U069)
CALIFORNIA PROPOSITION 65	This product does not contain any substance known to the State of California to cause cancer.

16. OTHER INFORMATION

FOR TECHNICAL INFORMATION CONTACT:	DR. NASEEM A. MUNSHI COORDINATOR OF PRODUCT SAFETY
COMPOSITE TECHNOLOGY DEVELOPMENT,INC 1505 COAL CREEK DRIVE LAFAYETTE, CO 80026 (303) 664-0394	ISSUE DATE: 01/05/99 REVISION DATE & NO.:

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.5 Revision Date 28.07.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Sodium hydrosulfite
Product Number	:	157953
Brand	:	Sigma-Aldrich
Index-No.	:	016-028-00-1
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7775-14-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Self-heating substances and mixtures (Category 1), H251
Acute toxicity, Oral (Category 4), H302

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

		R 7
Xn	Harmful	R22
		R31

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)

H251	Self-heating: may catch fire.
H302	Harmful if swallowed.

Precautionary statement(s)

P235 + P410	Keep cool. Protect from sunlight.

Supplemental Hazard information (EU)

EUH031	Contact with acids liberates toxic gas.

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Sodium dithionite Sodium hypodisulfite
Formula	:	$Na_2O_4S_2$
Molecular Weight	:	174,11 g/mol
CAS-No.	:	7775-14-6
EC-No.	:	231-890-0
Index-No.	:	016-028-00-1

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Sodium dithionite			
CAS-No. EC-No. Index-No.	7775-14-6 231-890-0 016-028-00-1	Self-heat. 1; Acute Tox. 4; H251, H302, EUH031	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Sodium dithionite			
CAS-No. EC-No. Index-No.	7775-14-6 231-890-0 016-028-00-1	Xn, R 7 - R22 - R31	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
no data available

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
Addition of small amounts of water may cause self ignition.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage. Do not store near acids.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: > 480 min
Material tested:

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: > 480 min
Material tested:

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	7,0 - 9 at 50 g/l at 20 °C
e)	Melting point/freezing point	300 °C
f)	Initial boiling point and boiling range	no data available

g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	2,500 g/cm3 at 20 °C
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	log Pow: < -4,7
p)	Auto-ignition temperature	The substance or mixture is classified as self heating with the category 1.
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Bulk density	1.250 kg/m3

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
May decompose on exposure to air and moisture.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
Do not allow water to enter container because of violent reaction. Avoid moisture. Heat.

10.5 Incompatible materials
Strong oxidizing agents, acids, Water

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Sulphur oxides, Sodium oxides
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Leuciscus idus (Golden orfe) - 10 - 100 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 10 - 100 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Toxic to aquatic life.

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1384 IMDG: 1384 IATA: 1384

14.2 UN proper shipping name

ADR/RID: SODIUM DITHIONITE
IMDG: SODIUM DITHIONITE
IATA: Sodium dithionite

14.3 Transport hazard class(es)

ADR/RID: 4.2 IMDG: 4.2 IATA: 4.2

14.4 Packaging group

ADR/RID: II IMDG: II IATA: II

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
EUH031	Contact with acids liberates toxic gas.
H251	Self-heating: may catch fire.
H302	Harmful if swallowed.
Self-heat.	Self-heating substances

Full text of R-phrases referred to under sections 2 and 3

Xn	Harmful
R 7	May cause fire.
R22	Harmful if swallowed.
R31	Contact with acids liberates toxic gas.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 5.2 Revision Date 30.11.2015
Print Date 13.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	SODIUM DIBUTYLDITHIOCARBAMATE
Product Number	:	CDS010552
Brand	:	Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	136-30-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1B), H314
Skin sensitisation (Category 1), H317
Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.

H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.
Precautionary statement(s)	
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Molecular weight	:	227,37 g/mol
CAS-No.	:	136-30-1
EC-No.	:	205-238-0

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
sodium dibutyldithiocarbamate		
CAS-No. 136-30-1 EC-No. 205-238-0	Acute Tox. 4; Acute Tox. 3; Skin Corr. 1B; Skin Sens. 1; STOT RE 2; Aquatic Acute 1; H302, H311, H314, H317, H373, H400 M-Factor - Aquatic Acute: 1	>= 50 - <= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx), Sulphur oxides, Sodium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: EZ3880000

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Very toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2922	IMDG: 2922	IATA: 2922

14.2 UN proper shipping name

ADR/RID:	CORROSIVE LIQUID, TOXIC, N.O.S. (sodium dibutyldithiocarbamate)
IMDG:	CORROSIVE LIQUID, TOXIC, N.O.S. (sodium dibutyldithiocarbamate)
IATA:	Corrosive liquid, toxic, n.o.s. (sodium dibutyldithiocarbamate)

14.3 Transport hazard class(es)

ADR/RID: 8 (6.1)	IMDG: 8 (6.1)	IATA: 8 (6.1)

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure.

H400 Very toxic to aquatic life.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.16 Revision Date 22.03.2016
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sodium dodecyl sulfate

Product Number : L3771
Brand : Sigma
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 151-21-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable solids (Category 2), H228
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)	
H228	Flammable solid.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.
Precautionary statement(s)	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
Possible sensitizer.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Lauryl sulfate sodium salt Sodium dodecyl sulphate Sodium dodecyl sulfate Sodium lauryl sulfate Dodecyl sodium sulfate Dodecyl sulfate sodium salt SDS
Formula	:	$C_{12}H_{25}NaO_4S$
Molecular weight	:	288,38 g/mol
CAS-No.	:	151-21-3
EC-No.	:	205-788-1

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Sodium dodecyl sulphate			
CAS-No. EC-No.	151-21-3 205-788-1	Flam. Sol. 2; Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; STOT SE 3; Aquatic Chronic 3; H228, H302, H332, H315, H318, H335, H412 Concentration limits: 10 - < 20 %: Eye Irrit. 2, H319; >= 20 %: Eye Dam. 1, H318;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic
Storage class (TRGS 510): Flammable solid hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Rods Colour: white
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	9,1 at 10 g/l
e)	Melting point/freezing point	Melting point/range: 204 - 207 °C - lit.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	170 °C
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 2.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	0,0018 hPa at 20 °C
l)	Vapour density	No data available
m)	Relative density	0,370 g/cm3
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	log Pow: 0,83 at 22 °C
p)	Auto-ignition temperature	310,5 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Solubility in other solvents	Ethanol - partly soluble

Surface tension	25,2 mN/m at 23 °C
Dissociation constant	1,31 at 20 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides, Sodium oxides
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 1.200 mg/kg

LC50 Inhalation - Rat - 1 h - > 3.900 mg/m3

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 24 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Risk of serious damage to eyes.
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Information given is based on data obtained from similar substances.

Germ cell mutagenicity
No data available

Ames test
S. typhimurium
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: WT1050000

sneezing, The sodium salt of dodecyl sulfate has been reported to cause pulmonary sensitization resulting in hyperactive airway dysfunction and pulmonary allergy accompanied by fatigue, malaise, and aching. Significant symptoms of exposure can persist for more than two years and can be activated by a variety of nonspecific environmental stimuli such as automobile exhaust, perfumes, and passive smoking.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 29 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia dubia (water flea) - 5,55 mg/l - 48 h
	NOEC - Daphnia dubia (water flea) - 0,684 mg/l - 7 d
Toxicity to algae	Growth inhibition LOEC - Pseudokirchneriella subcapitata - 2,68 mg/l - 6 d
	static test EC50 - Desmodesmus subspicatus (Scenedesmus subspicatus) - > 120 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 95 % - Readily biodegradable (OECD Test Guideline 301B)
Ratio BOD/ThBOD	95,9 %

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 72 h
	Bioconcentration factor (BCF): 3,9 - 5,3

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1325	IMDG: 1325	IATA: 1325

14.2 UN proper shipping name

ADR/RID: FLAMMABLE SOLID, ORGANIC, N.O.S. (Sodium dodecyl sulphate)
IMDG: FLAMMABLE SOLID, ORGANIC, N.O.S. (Sodium dodecyl sulphate)
IATA: Flammable solid, organic, n.o.s. (Sodium dodecyl sulphate)

14.3 Transport hazard class(es)

ADR/RID: 4.1	IMDG: 4.1	IATA: 4.1

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H228	Flammable solid.
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

ScienceLab.com
Chemicals & Laboratory Equipment

Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Diphenylamine MSDS

Section 1: Chemical Product and Company Identification

Product Name: Diphenylamine

Catalog Codes: SLD2347

CAS#: 122-39-4

RTECS: JJ7800000

TSCA: TSCA 8(b) inventory: Diphenylamine

CI#: Not available.

Synonym: DFA, Deccoscald 282, Naugalube 428 L, Scaldip, Shield DPA; Aniline, N-Phenyl-; Anilinobenzene; Benzenamine, N-phenyl-; Benzene, anilino-; N,N-Diphenylamine; N-Phenylaniline; N-Phenylbenzenamine

Chemical Name: Diphenylamine

Chemical Formula: C12-H11-N

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Diphenylamine	122-39-4	100

Toxicological Data on Ingredients: Diphenylamine: ORAL (LD50): Acute: 1120 mg/kg [Rat]. 1230 mg/kg [Mouse]. 300 mg/kg [Guinea pig].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, bladder. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation: Not available.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 634°C (1173.2°F)

Flash Points: CLOSED CUP: 153°C (307.4°F).

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Slightly explosive in presence of open flames and sparks. Non-explosive in presence of shocks.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
When heated to decomposition it emits highly toxic fumes of Nitrogen oxides As with most organic solids, fire is possible at elevated temperatures

Special Remarks on Explosion Hazards:
Fine dust dispersed in air in sufficient concentrations, and in the presences of an ignition source is a potential dust explosion hazard.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Poisonous solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for

assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 (mg/m3) from ACGIH (TLV) [United States] TWA: 10 (mg/m3) from OSHA (PEL) [United States] TWA: 10 (mg/m3) from NIOSH [United States] TWA: 10 STEL: 20 (mg/m3) [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystals solid.)

Odor: Floral.

Taste: Not available.

Molecular Weight: 169.23 g/mole

Color:
Colorless. White. Off-white. Tan. Amber. Brown. White to yellowish.

pH (1% soln/water): Not applicable.

Boiling Point: 302°C (575.6°F)

Melting Point: 53°C (127.4°F) - 54 C

Critical Temperature: Not available.

Specific Gravity: Density: 1.16 (Water = 1)

Vapor Pressure: 1 mmHg at 108 C

Vapor Density: 5.82 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Easily soluble in diethyl ether, acetone. Insoluble in cold water, hot water. Freely soluble in benzene, glacial acetic acid, carbon disulfide. I g dissolves in 2.2 ml alcohol. 1 g dissolves in 4.5 ml of propyl alcohol. Very soluble in ethyl acetate, carbon tetrachloride, pyridine. Soluble in petroleum ether

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, incompatible materials, light, air.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with hexachloromelamine, and trichloromelamine. Air and light sensitive. Discolors in light. Crystals turn blue in air. Protect from light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 300 mg/kg [Guinea pig].

Chronic Effects on Humans: May cause damage to the following organs: blood, kidneys, liver, bladder.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause birth defects (teratogenic) based on animal test data

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. It is absorbed through intact skin. Eyes: Causes eye irritation. Inhalation: May cause respiratory tract irritation with coughing and sneezing. It is absorbed through the respiratory tract and may cause effects similar to those of acute ingestion. Ingestion: May cause digestive tract irritation. It is readily abosorbed orally. It may affect behavior/central nervous system (somnolence), respiration (respiratory depression, dyspnea, cyanosis), blood (methemoglobinemia, anemia). Chronic Potential Health Effects: Ingestion: Prolonged or repeated ingestion may affect urinary system (bladder, kidneys - renal failure, acute tubular necrosis, Hematuria, Proteinuria), metabolism (weight loss, anorexia), liver, cardiovascular system (tachycardia, hypertension), spleen. Skin: Prolonged or repeated skin contact may cause dermatitis, an allergic skin reaction

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Illinois toxic substances disclosure to employee act: Diphenylamine Rhode Island RTK hazardous substances: Diphenylamine Pennsylvania RTK: Diphenylamine Minnesota: Diphenylamine Massachusetts RTK: Diphenylamine Massachusetts spill list: Diphenylamine New Jersey: Diphenylamine New Jersey spill list: Diphenylamine California Director's list of Hazardous Substances: Diphenylamine TSCA 8(b) inventory: Diphenylamine TSCA 4(a) proposed test rules: Diphenylamine TSCA 8(a) PAIR: Diphenylamine TSCA 8(d) H and S data reporting: Diphenylamine: Effective date: 3/11/94; Sunset date: 6/30/98 SARA 313 toxic chemical notification and release reporting: Diphenylamine CERCLA: Hazardous substances.: Diphenylamine

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R23/24/25- Toxic by inhalation, in contact with skin and if swallowed. R33- Danger of cumulative effects. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S28- After contact with skin, wash immediately with plenty of [***] S36/37- Wear suitable protective clothing and gloves. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 09.02.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Sodium sulfite
Product Number	:	S0505
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7757-83-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

R31

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram	none
Signal word	none
Hazard statement(s)	none
Precautionary statement(s)	none

Supplemental Hazard information (EU)

EUH031	Contact with acids liberates toxic gas.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Na_2O_3S
Molecular weight	:	126,04 g/mol
CAS-No.	:	7757-83-7
EC-No.	:	231-821-4

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture

Sulphur oxides, Sodium oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage. Do not store near acids.

Air and moisture sensitive.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	9,0 - 10,5 at 126 g/l at 25 °C
e)	Melting point/freezing point	Decomposes before melting.
f)	Initial boiling point and boiling range	Not applicable
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	2,630 g/cm3
n)	Water solubility	126 g/l at 20 °C - completely soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	does not ignite
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not explosive
t)	Oxidizing properties	The substance or mixture is not classified as oxidizing.

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to air may affect product quality. Exposure to moisture may affect product quality.

10.5 Incompatible materials
Acids, Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 3.560 mg/kg

LC50 Inhalation - Rat - 4 h - > 5.500 mg/m3

LD50 Dermal - Rat - > 2.000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

in vivo assay - Mouse
Result: Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Sodium sulphite)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: WE2150000

May cause irritation of the:, Gastrointestinal tract, violent colic, Diarrhoea, Disturbance of:, circulatory system, Central nervous system depression, death, Persons with allergies and/or asthma may exhibit hypersensitivity to sulfites., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Gambusia affinis (Mosquito fish) - 660 mg/l - 96 h

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -	IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of R-phrases referred to under sections 2 and 3

R31	Contact with acids liberates toxic gas.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet
Sodium polyphosphate

MSDS# 15464

Section 1 - Chemical Product and Company Identification

MSDS Name:	Sodium polyphosphate
Catalog Numbers:	AC390930000
Synonyms:	Graham's salt; Sodium metaphosphate; Calgon.
Company Identification:	Acros Organics BVBA Janssen Pharmaceuticalaan 3a 2440 Geel, Belgium
Company Identification: (USA)	Acros Organics One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:	800-ACROS-01
For information in Europe, call:	+32 14 57 52 11
Emergency Number, Europe:	+32 14 57 52 99
Emergency Number US:	201-796-7100
CHEMTREC Phone Number, US:	800-424-9300
CHEMTREC Phone Number, Europe:	703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#:	50813-16-6
Chemical Name:	Sodium polyphosphate
%:	97-100
EINECS#:	256-779-4

Hazard Symbols: XI

Risk Phrases: 36/37/38

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! Hygroscopic (absorbs moisture from the air). Causes eye, skin, and respiratory tract irritation. Target Organs: Respiratory system, eyes, skin.

Potential Health Effects

Eye:	Causes eye irritation.
Skin:	Causes skin irritation. May be harmful if absorbed through the skin.
Ingestion:	May cause irritation of the digestive tract. May be harmful if swallowed.
Inhalation:	Causes respiratory tract irritation. May be harmful if inhaled.
Chronic:	No information found.

Section 4 - First Aid Measures

Eyes:	Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin:	Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion:	Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation:	Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician:	Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information:	As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media:	Use water spray, dry chemical, carbon dioxide, or chemical foam.
Autoignition Temperature:	Not available
Flash Point:	Not available
Explosion Limits: Lower:	Not available
Explosion Limits: Upper:	Not available
NFPA Rating:	health: 2; flammability: 1; instability: 1;

Section 6 - Accidental Release Measures

General Information:	Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:	Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling:	Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.
Storage:	Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sodium polyphosphate	none listed	none listed	none listed

OSHA Vacated PELs: Sodium polyphosphate: None listed

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Personal Protective Equipment

Eyes:	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin:	Wear appropriate protective gloves to prevent skin exposure.
Clothing:	Wear appropriate protective clothing to prevent skin exposure.
Respirators:	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid

Color: white

Odor: Not available
pH: Not available
Vapor Pressure: Not available
Vapor Density: Not available
Evaporation Rate: Not available
Viscosity: Not available
Boiling Point: Not available
Freezing/Melting Point: 600 deg C (1,112.00°F)
Decomposition Temperature: Not available
Solubility in water: 1000g/l (20°C)
Specific Gravity/Density:
Molecular Formula: (NaPO3)n
Molecular Weight:

Section 10 - Stability and Reactivity

Chemical Stability:	Hygroscopic: absorbs moisture or water from the air.
Conditions to Avoid:	Incompatible materials, dust generation, exposure to moist air or water.
Incompatibilities with Other Materials	Not available
Hazardous Decomposition Products	Oxides of phosphorus, toxic fumes of sodium oxide.
Hazardous Polymerization	Has not been reported.

Section 11 - Toxicological Information

RTECS#:	CAS# 50813-16-6: None listed
LD50/LC50:	RTECS: Not available.
Carcinogenicity:	Sodium polyphosphate - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.
Other:	The toxicological properties have not been fully investigated.

Section 12 - Ecological Information

Other: No information available.

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: Not Regulated.
Hazard Class:
UN Number:
Packing Group:
Canada TDG
Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XI

Risk Phrases:

R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)

CAS# 50813-16-6: 1

Canada

Canadian WHMIS Classifications: D2B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 50813-16-6 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 50813-16-6 is not listed on the TSCA Inventory. It is for research and development use only.

Section 16 - Other Information

MSDS Creation Date: 12/15/2006

Revision #2 Date 7/20/2009

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 6.0 Revision Date 09.07.2015
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Ethanol
Product Number	:	32205
Brand	:	Sigma-Aldrich
Index-No.	:	603-002-00-5
REACH No.	:	01-2119457610-43-XXXX
CAS-No.	:	64-17-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Flammable liquids (Category 2), H225
Eye irritation (Category 2), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.

Precautionary statement(s)

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280	Wear eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P403 + P235	Store in a well-ventilated place. Keep cool.

Supplemental Hazard Statements: none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Ethyl alcohol
Formula	:	C_2H_6O
Molecular weight	:	46,07 g/mol
CAS-No.	:	64-17-5
EC-No.	:	200-578-6
Index-No.	:	603-002-00-5
Registration number	:	01-2119457610-43-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Ethanol			
CAS-No. EC-No. Index-No.	64-17-5 200-578-6 603-002-00-5	Flam. Liq. 2; Eye Irrit. 2; H225, H319 Concentration limits: >= 50 %: Eye Irrit. 2A, H319;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Hygroscopic.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Long-term systemic effects	950 mg/m3
Workers	Skin contact	Long-term systemic effects	343mg/kg BW/d
Workers	Ingestion	Long-term systemic effects	343mg/kg BW/d
Workers	Inhalation	Acute local effects	1900 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	0,63 mg/kg
Marine water	0,79 mg/l
Fresh water	0,96 mg/l
Fresh water sediment	3,6 mg/l
Sewage treatment plant	580 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 38 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -114 °C
f)	Initial boiling point and boiling range	78 °C
g)	Flash point	14,0 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 19 %(V) Lower explosion limit: 3,3 %(V)
k)	Vapour pressure	59,5 hPa at 20,0 °C
l)	Vapour density	No data available
m)	Relative density	0,789 g/mL at 25 °C
n)	Water solubility	completely soluble
o)	Partition coefficient: n-octanol/water	log Pow: -0,349 at 24 °C
p)	Auto-ignition temperature	363,0 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Alkali metals, Oxidizing agents, Peroxides

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 10.470 mg/kg

LC50 Inhalation - Rat - 4 h - 30.000 mg/l

LD50 Dermal - Rabbit - 15.800 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Moderate eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Carcinogenicity - Mouse - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Liver:Tumors. Blood:Lymphomas including Hodgkin's disease.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

Reproductive toxicity - Human - female - Oral
Effects on Newborn: Apgar score (human only). Effects on Newborn: Other neonatal measures or effects. Effects on Newborn: Drug dependence.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KQ6300000

Central nervous system depression, narcosis, Damage to the heart., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 14.200 mg/l - 96 h
Toxicity to daphnia and other aquatic	LC50 - Ceriodaphnia dubia (water flea) - 5.012 mg/l - 48 h

invertebrates

NOEC - Daphnia magna (Water flea) - 9,6 mg/l - 9 d

Toxicity to algae EC50 - Chlorella vulgaris (Fresh water algae) - 275 mg/l - 72 h
(OECD Test Guideline 201)

12.2 Persistence and degradability
Biodegradability Result: 95 % - Readily biodegradable

12.3 Bioaccumulative potential
Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 1170 IMDG: 1170 IATA: 1170

14.2 UN proper shipping name
ADR/RID: ETHANOL
IMDG: ETHANOL
IATA: Ethanol

14.3 Transport hazard class(es)
ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packaging group
ADR/RID: II IMDG: II IATA: II

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.8 Revision Date 10.07.2017
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Styrene
Product Number	:	S4972
Brand	:	Sigma-Aldrich
Index-No.	:	601-026-00-0
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	100-42-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Reproductive toxicity (Category 2), H361d
Specific target organ toxicity - repeated exposure (Category 1), H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word	Danger
Hazard statement(s)	
H226	Flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H361d	Suspected of damaging the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
Precautionary statement(s)	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
Lachrymator.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C8H8
Molecular weight	:	104,15 g/mol
CAS-No.	:	100-42-5
EC-No.	:	202-851-5
Index-No.	:	601-026-00-0

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Styrene			
CAS-No. EC-No. Index-No.	100-42-5 202-851-5 601-026-00-0	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; Repr. 2; STOT RE 1; H226, H332, H315, H319, H361d, H372	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Dry powder Dry sand

Unsuitable extinguishing media
Do NOT use water jet.

5.2 Special hazards arising from the substance or mixture
Container explosion may occur under fire conditions., Vapours may form explosive mixture with air.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

Recommended storage temperature 2 - 8 °C

Light sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: > 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: 32 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	sweet
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -31 °C - lit.
f)	Initial boiling point and boiling range	145 - 146 °C - lit.
g)	Flash point	32,0 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 8,9 %(V) Lower explosion limit: 1,1 %(V)
k)	Vapour pressure	6 hPa at 20 °C
l)	Vapour density	3,6
m)	Relative density	0,906 g/cm3 at 25 °C
n)	Water solubility	0,05 g/l at 25 °C - slightly soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	490,0 °C 480,0 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	3,6

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.
Contains the following stabiliser(s):
4-tert-Butylpyrocatechol (>=30 - <=50 ppm)

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

May polymerize on exposure to light.
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Copper

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 6.000 mg/kg

LC50 Inhalation - Rat - 4 h - 12.000 mg/m3

LD50 Dermal - Rat - male and female - > 2.000 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
Maximisation Test - Guinea pig
Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Styrene)

Reproductive toxicity
Suspected of damaging the unborn child. Suspected human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: WL3675000

Dermatitis, Central nervous system depression, Nausea, Dizziness, Headache, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Endocrine system. -

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	NOEC - Pimephales promelas (fathead minnow) - 4 mg/l - 96 h
	LC50 - Pimephales promelas (fathead minnow) - 32 mg/l - 96 h

	LOEC - Pimephales promelas (fathead minnow) - 7,6 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 4,7 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	IC50 - Pseudokirchneriella subcapitata (green algae) - 1,4 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability: aerobic - Exposure time 28 d
Result: > 60 % - Readily biodegradable.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Toxic to aquatic life.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Waste material must be disposed of in accordance with the Directive on waste 2008/98/EC as well as other national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2055 IMDG: 2055 IATA: 2055

14.2 UN proper shipping name

ADR/RID: STYRENE MONOMER, STABILIZED
IMDG: STYRENE MONOMER, STABILIZED
IATA: Styrene monomer, stabilized

14.3 Transport hazard class(es)

ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H361d	Suspected of damaging the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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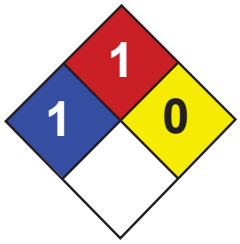
Chemicals & Laboratory Equipment



Health	1
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Tristearin MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tristearin

Catalog Codes: SLT1306

CAS#: 555-43-1

RTECS: Not available.

TSCA: TSCA 8(b) inventory: Tristearin

CI#: Not available.

Synonym: Pationic 919; Glycowax S 932; Stearin; Stearin, tri; Dynasan 118; Hardened Oil; Glyceryl tristearate; Glycerol Tristearate; Stearic Acid Triglyceride; Glycerol, Trioctadecanoate; Steroyl Triglyceride; Trioctadecanoin; Octadecanoic Acid, 1,2,3-Propanetriyl Ester; Triglyceryl Stearate; Tristeaerin

Chemical Name: Stearic Acid Triglycerin Ester

Chemical Formula: C57-H110-O6

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tristearin	555-43-1	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: OPEN CUP: 298°C (568.4°F).

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Slightly explosive in presence of open flames and sparks. Non-explosive in presence of shocks.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: As with most organic solids, fire is possible at elevated temperatures

Special Remarks on Explosion Hazards:
Fine dust dispersed in air in sufficient concentrations, and in the presences of an ignition source is a potential dust explosion hazard.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Do not breathe dust. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid powder.)

Odor: Odorless.

Taste: Tasteless.

Molecular Weight: 891.45g/mole

Color: White. Off-white.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: 68°C (154.4°F)

Critical Temperature: Not available.

Specific Gravity: 0.8559 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Soluble in benzene, chloroform, hot alcohol, hot carbon tetrachloride, carbon disulfide. Almost insoluble in cold alcohol, ether, petroleum ether. Insoluble in Ethyl acetate.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat., incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: May cause skin, eye, respiratory tract, and gastrointestinal tract irritaiton. The toxicological properties of this substance have not been fully investigated.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Tristearin

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
This product is not classified according to the EU regulations. Not applicable.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:55 PM

Last Updated: 05/21/2013 12:00 PM

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 7.0 Revision Date 11.10.2016
Print Date 12.07.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Toluene

Product Number : 244511
Brand : Sigma-Aldrich
Index-No. : 601-021-00-3
REACH No. : 01-2119471310-51-XXXX
CAS-No. : 108-88-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Reproductive toxicity (Category 2), H361d
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - repeated exposure (Category 2), H373
Aspiration hazard (Category 1), H304

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.

H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

Precautionary statement(s)

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.

Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C_7H_8
Molecular weight	:	92,14 g/mol
CAS-No.	:	108-88-3
EC-No.	:	203-625-9
Index-No.	:	601-021-00-3
Registration number	:	01-2119471310-51-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Toluene			
CAS-No. EC-No. Index-No. Registration number	108-88-3 203-625-9 601-021-00-3 01-2119471310-51-XXXX	Flam. Liq. 2; Skin Irrit. 2; Repr. 2; STOT SE 3; STOT RE 2; Asp. Tox. 1; H225, H315, H361d, H336, H373, H304	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Handle and store under inert gas.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Acute systemic effects	384 mg/m3
Workers	Inhalation	Acute local effects	384 mg/m3
Workers	Skin contact	Long-term systemic effects	384mg/kg BW/d
Workers	Inhalation	Long-term systemic effects	192 mg/m3
Workers	Inhalation	Long-term local effects	192 mg/m3
Consumers	Inhalation	Acute systemic effects	226 mg/m3
Consumers	Inhalation	Acute local effects	226 mg/m3
Consumers	Skin contact	Long-term systemic effects	226mg/kg BW/d
Consumers	Inhalation	Long-term systemic effects	56,5 mg/m3
Consumers	Ingestion	Long-term systemic effects	8,13mg/kg BW/d

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	2,89 mg/kg
Marine water	0,68 mg/l
Fresh water	0,68 mg/l
Marine sediment	16,39 mg/kg
Fresh water sediment	16,39 mg/kg
Sewage treatment plant	13,61 mg/l
Aquatic intermittent release	0,68 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	aromatic
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -93 °C
f)	Initial boiling point and boiling range	110 - 111 °C
g)	Flash point	4,0 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 7 %(V) Lower explosion limit: 1,2 %(V)
k)	Vapour pressure	29,1 hPa at 20,0 °C
l)	Vapour density	No data available
m)	Relative density	0,865 g/mL at 25 °C
n)	Water solubility	0,5 g/l at 15 °C
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	535,0 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 5.580 mg/kg

LC50 Inhalation - Rat - 4 h - 12.500 - 28.800 mg/m3

LD50 Dermal - Rabbit - 12.196 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Rat
Liver
DNA damage

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
Damage to fetus possible
Suspected human reproductive toxicant

Reproductive toxicity - Rat - Inhalation
Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

Experiments have shown reproductive toxicity effects in male and female laboratory animals.

Developmental Toxicity - Rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: XS5250000

Lung irritation, chest pain, pulmonary edema, Inhalation studies on toluene have demonstrated the development of inflammatory and ulcerous lesions of the penis, prepuce, and scrotum in animals., Central nervous system

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 7,63 mg/l - 96 h
	NOEC - Pimephales promelas (fathead minnow) - 5,44 mg/l - 7 d
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 8,00 mg/l - 24 h
	Immobilization EC50 - Daphnia magna (Water flea) - 6 mg/l - 48 h
Toxicity to algae	EC50 - Chlorella vulgaris (Fresh water algae) - 245,00 mg/l - 24 h
	EC50 - Pseudokirchneriella subcapitata (green algae) - 10,00 mg/l - 24 h

12.2 Persistence and degradability

Biodegradability	Result: - Readily biodegradable

12.3 Bioaccumulative potential

Bioaccumulation	Leuciscus idus (Golden orfe) - 3 d - 0,05 mg/l
	Bioconcentration factor (BCF): 90

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1294	IMDG: 1294	IATA: 1294

14.2 UN proper shipping name

ADR/RID: TOLUENE
IMDG: TOLUENE
IATA: Toluene

14.3 Transport hazard class(es)

ADR/RID: 3	IMDG: 3	IATA: 3

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

Authorisations and/or restrictions on use

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII) : Toluene

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

ThermoFisher SCIENTIFIC

SAFETY DATA SHEET

Creation Date 23-Feb-2012 **Revision Date** 30-May-2017 **Revision Number** 2

1. Identification

Product Name **Vinyltoluene, stabilized with 10 to 15 ppm p-tert-Butylcatechol**

Cat No. : **AC422611000; AC422615000**

Synonyms Ethenylmethylbenzene; Methylstyrene; Styrene, methyl-

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 3
Acute Inhalation Toxicity - Vapors	Category 3
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2

Label Elements

Signal Word
Danger

Hazard Statements
Flammable liquid and vapor
Causes skin irritation
Causes serious eye irritation
Toxic if inhaled

Precautionary Statements
Prevention
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician
Skin
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition / information on ingredients

Component	CAS-No	Weight %
Vinyl toluene	25013-15-4	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket

	mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.
Ingestion	Do not induce vomiting. Call a physician or Poison Control Center immediately.
Most important symptoms/effects	Breathing difficulties. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.
Unsuitable Extinguishing Media	No information available
Flash Point	52 °C / 125 °F
Method -	No information available
Autoignition Temperature	575 °C
Explosion Limits	
Upper	5.2%
Lower	1.1%
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	2	2	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional ecological information.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling	Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use explosion-proof equipment. Do not breathe vapors/dust. Do not ingest. Take precautionary measures against static discharges.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Refrigerator/flammables.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Vinyl toluene	TWA: 50 ppm STEL: 100 ppm	(Vacated) TWA: 100 ppm (Vacated) TWA: 480 mg/m³ TWA: 100 ppm TWA: 480 mg/m³	IDLH: 400 ppm TWA: 100 ppm TWA: 480 mg/m³	TWA: 50 ppm TWA: 240 mg/m³ STEL: 100 ppm STEL: 485 mg/m³

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear
Odor	Strong
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-77 °C / -107 °F
Boiling Point/Range	168 °C / 334 °F @ 760 mmHg
Flash Point	52 °C / 125 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	5.2%
Lower	1.1%
Vapor Pressure	1.1 mmHg @ 20 °C
Vapor Density	4.08
Specific Gravity	0.8930
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	575 °C
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C9H10
Molecular Weight	118.18

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Vinyl toluene	LD50 = 2255 mg/kg (Rat) LD50 = 4000 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Vinyl toluene	25013-15-4	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Vinyl toluene	Not listed	LC50: = 23.4 mg/L, 96h (Pimephales rafinesque)	Not listed	Not listed

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

Component	log Pow
Vinyl toluene	3.36

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN2618
Proper Shipping Name VINYLTOLUENES, STABILIZED
Hazard Class 3
Packing Group III

TDG

UN-No UN2618
Proper Shipping Name VINYLTOLUENES, STABILIZED
Hazard Class 3
Packing Group III

IATA

UN-No UN2618
Proper Shipping Name VINYLTOLUENES, STABILIZED
Hazard Class 3
Packing Group III

IMDG/IMO

UN-No UN2618
Proper Shipping Name VINYLTOLUENES, STABILIZED
Hazard Class 3
Packing Group III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Vinyl toluene	X	X	-	246-562-2	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Vinyl toluene	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 23-Feb-2012
Revision Date 30-May-2017
Print Date 30-May-2017
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally

Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 5.2 Revision Date 10.11.2015
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Talc
Product Number	:	243604
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	14807-96-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.2 Label elements

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Hydrous magnesium silicate
Formula	:	$H_2Mg_3O_{12}Si_4$
Molecular weight	:	379,27 g/mol

CAS-No.	:	14807-96-6
EC-No.	:	238-877-9

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Magnesium oxide, silicon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: light grey
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Skin corrosion/irritation
Skin - Human
Result: Mild skin irritation - 3 h

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Carcinogenicity - Rat - Inhalation
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Hydrous magnesium silicate)

3 - Group 3: Not classifiable as to its carcinogenicity to humans (Hydrous magnesium silicate)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: WW2710000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 29.04.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Phenothiazine
Product Number	:	88580
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	92-84-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin sensitisation (Category 1), H317
Specific target organ toxicity - repeated exposure, Oral (Category 2), Blood, H373
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Xn Harmful R22, R43, R48/22, R52/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.

H317	May cause an allergic skin reaction.
H373	May cause damage to organs (Blood) through prolonged or repeated exposure if swallowed.
H412	Harmful to aquatic life with long lasting effects.
Precautionary statement(s)	
P273	Avoid release to the environment.
P280	Wear protective gloves.
Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_{12}H_9NS$
Molecular Weight	:	199,27 g/mol
CAS-No.	:	92-84-2
EC-No.	:	202-196-5

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Phenothiazine			
CAS-No. EC-No.	92-84-2 202-196-5	Acute Tox. 4; Skin Sens. 1; STOT RE 2; Aquatic Chronic 3; H302, H317, H373, H412	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Phenothiazine			
CAS-No. EC-No.	92-84-2 202-196-5	Xn, R22 - R43 - R48/22 - R52/53	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, nitrogen oxides (NOx), Sulphur oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: pellets Colour: light yellow
b)	Odour	odourless
c)	Odour Threshold	no data available
d)	pH	7 at 10 g/l at 20 °C
e)	Melting point/freezing point	Melting point/range: 182 - 187 °C - lit. Melting point/range: 183 - 187 °C
f)	Initial boiling point and boiling range	371 °C - lit.
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	The product is not flammable. - Flammability (solids)
j)	Upper/lower	no data available

	flammability or explosive limits	
k)	Vapour pressure	53 hPa at 290 °C
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	0,127 g/l at 23 °C - OECD Test Guideline 105 - slightly soluble
o)	Partition coefficient: n-octanol/water	log Pow: ca.3,78 at 25 °C
p)	Auto-ignition temperature	397 °C at 1.013 hPa
q)	Decomposition temperature	> 250 °C -
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Bulk density	0,65 g/l

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - male and female - 1.370 mg/kg

LD50 Dermal - rat - male and female - > 2.000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Maximisation Test - guinea pig
May cause sensitisation by skin contact.
(OECD Test Guideline 406)

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

rat - male
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

Reproductive toxicity - rat - Oral
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
Oral - May cause damage to organs through prolonged or repeated exposure. - Blood

Aspiration hazard
no data available

Additional Information
RTECS: SN5075000

anemia, Discoloration of the skin.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Oncorhynchus mykiss (rainbow trout) - 70,7 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 11,92 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test EC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	Respiration inhibition IC50 - Sludge Treatment - > 100 mg/l - 3 h (OECD Test Guideline 209)

12.2 Persistence and degradability

Biodegradability	aerobic Result: 0 % - Not readily biodegradable. (OECD Test Guideline 301D)
Chemical Oxygen Demand (COD)	2.337 mg/g

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 56 d

at 25 °C - 0,02 mg/l

Bioconcentration factor (BCF): 127 - 660

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Harmful to aquatic life with long lasting effects.

Additional ecological information	no data available
Dissolved organic carbon (DOC)	8 mg/g

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure if swallowed.
H412	Harmful to aquatic life with long lasting effects.
Skin Sens.	Skin sensitisation
STOT RE	Specific target organ toxicity - repeated exposure

Full text of R-phrases referred to under sections 2 and 3

Xn	Harmful
R22	Harmful if swallowed.
R43	May cause sensitisation by skin contact.
R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed.
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 18.04.2013
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Tetraethylthiuram disulfide
Product Number	:	86720
Brand	:	Aldrich
Index-No.	:	006-079-00-8
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	97-77-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin sensitisation (Category 1), H317
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xn	Harmful	R22, R48/22 R43
N	Dangerous for the environment	R50/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word	Warning
Hazard statement(s)	
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P273	Avoid release to the environment.
P280	Wear protective gloves.
P501	Dispose of contents/ container to an approved waste disposal plant.
Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Bis(diethylthiocarbamyl) disulfide Disulfiram Bis(diethylthiocarbamoyl) disulfide
Formula	:	$C_{10}H_{20}N_2S_4$
Molecular Weight	:	296,54 g/mol
CAS-No.	:	97-77-8
EC-No.	:	202-607-8
Index-No.	:	006-079-00-8

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Tetraethylthiuramdisulfide		
	Acute Tox. 4; Skin Sens. 1; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H317, H373, H410	-

Hazardous ingredients according to Directive 1999/45/EC

Component	Classification	Concentration
Tetraethylthiuramdisulfide		
	Xn, N, R22 - R43 - R48/22 - R50/53	-

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, nitrogen oxides (NOx), Sulphur oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
A part from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: beige
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 69 - 71 °C
f)	Initial boiling point and boiling range	117 °C at 23 hPa
g)	Flash point	no data available

h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	1,3 g/cm3
n)	Water solubility	0,004 g/l at 25 °C
o)	Partition coefficient: n-octanol/water	log Pow: 5
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Bulk density	340 - 380 kg/m3 at 20 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rabbit - 1.800 mg/kg
Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Ataxia. Nutritional and Gross Metabolic:Changes in:Body temperature decrease.

LD50 Oral - mouse - 1.980 mg/kg

LD50 Intraperitoneal - rat - 248 mg/kg
Remarks: Behavioral:Change in motor activity (specific assay). Nutritional and Gross Metabolic:Changes in:Body temperature decrease.

LD50 Intraperitoneal - mouse - 75 mg/kg

LD50 Subcutaneous - mouse - 2.600 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
Eyes - rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
Hamster
ovary
Sister chromatid exchange

Hamster
Embryo
Morphological transformation.

Chicken
Embryo
Other mutation test systems

mouse
Embryo
DNA inhibition

mouse
lymphocyte

Chicken
Embryo
DNA inhibition

mouse
Sister chromatid exchange

rat
Morphological transformation.

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Tetraethylthiuramdisulfide)

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard
no data available

Additional Information
RTECS: JO1225000

A serious toxic interaction has been observed in rats fed tetraethylthiuram (antabuse, ro-sulfiram) and then exposed to vapors of 1,2-dibromoethane., May cause nervous system disturbances., Lethargy., Ataxia., Seizures., Coma., thyroid enlargement

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Poecilia reticulata (guppy) - 0,187 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 0,12 mg/l - 48 h
Toxicity to algae	Growth inhibition EC50 - Chlorella pyrenoidosa - 1,8 mg/l - 96 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 3077 IMDG: 3077 IATA: 3077

14.2 UN proper shipping name
ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Tetraethylthiuramdisulfide)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Tetraethylthiuramdisulfide)
IATA: Environmentally hazardous substance, solid, n.o.s. (Tetraethylthiuramdisulfide)

14.3 Transport hazard class(es)
ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packaging group
ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards
ADR/RID: yes IMDG Marine pollutant: yes IATA: yes

14.6 Special precautions for user

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Skin Sens.	Skin sensitisation

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xn	Harmful
R22	Harmful if swallowed.
R43	May cause sensitisation by skin contact.
R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 18.04.2013
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Tetraethylthiuram disulfide
Product Number	:	86720
Brand	:	Aldrich
Index-No.	:	006-079-00-8
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	97-77-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin sensitisation (Category 1), H317
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xn	Harmful	R22, R48/22 R43
N	Dangerous for the environment	R50/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word	Warning
Hazard statement(s)	
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P273	Avoid release to the environment.
P280	Wear protective gloves.
P501	Dispose of contents/ container to an approved waste disposal plant.
Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Bis(diethylthiocarbamyl) disulfide Disulfiram Bis(diethylthiocarbamoyl) disulfide
Formula	:	$C_{10}H_{20}N_2S_4$
Molecular Weight	:	296,54 g/mol
CAS-No.	:	97-77-8
EC-No.	:	202-607-8
Index-No.	:	006-079-00-8

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Tetraethylthiuramdisulfide		
	Acute Tox. 4; Skin Sens. 1; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H317, H373, H410	-

Hazardous ingredients according to Directive 1999/45/EC

Component	Classification	Concentration
Tetraethylthiuramdisulfide		
	Xn, N, R22 - R43 - R48/22 - R50/53	-

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, nitrogen oxides (NOx), Sulphur oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
A part from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: beige
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 69 - 71 °C
f)	Initial boiling point and boiling range	117 °C at 23 hPa
g)	Flash point	no data available

h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	1,3 g/cm3
n)	Water solubility	0,004 g/l at 25 °C
o)	Partition coefficient: n-octanol/water	log Pow: 5
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Bulk density	340 - 380 kg/m3 at 20 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rabbit - 1.800 mg/kg
Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Ataxia. Nutritional and Gross Metabolic:Changes in:Body temperature decrease.

LD50 Oral - mouse - 1.980 mg/kg

LD50 Intraperitoneal - rat - 248 mg/kg
Remarks: Behavioral:Change in motor activity (specific assay). Nutritional and Gross Metabolic:Changes in:Body temperature decrease.

LD50 Intraperitoneal - mouse - 75 mg/kg

LD50 Subcutaneous - mouse - 2.600 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
Eyes - rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
Hamster
ovary
Sister chromatid exchange

Hamster
Embryo
Morphological transformation.

Chicken
Embryo
Other mutation test systems

mouse
Embryo
DNA inhibition

mouse
lymphocyte

Chicken
Embryo
DNA inhibition

mouse
Sister chromatid exchange

rat
Morphological transformation.

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Tetraethylthiuramdisulfide)

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard
no data available

Additional Information
RTECS: JO1225000

A serious toxic interaction has been observed in rats fed tetraethylthiuram (antabuse, ro-sulfiram) and then exposed to vapors of 1,2-dibromoethane., May cause nervous system disturbances., Lethargy., Ataxia., Seizures., Coma., thyroid enlargement

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Poecilia reticulata (guppy) - 0,187 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 0,12 mg/l - 48 h
Toxicity to algae	Growth inhibition EC50 - Chlorella pyrenoidosa - 1,8 mg/l - 96 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 3077 IMDG: 3077 IATA: 3077

14.2 UN proper shipping name
ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Tetraethylthiuramdisulfide)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Tetraethylthiuramdisulfide)
IATA: Environmentally hazardous substance, solid, n.o.s. (Tetraethylthiuramdisulfide)

14.3 Transport hazard class(es)
ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packaging group
ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards
ADR/RID: yes IMDG Marine pollutant: yes IATA: yes

14.6 Special precautions for user

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Skin Sens.	Skin sensitisation

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xn	Harmful
R22	Harmful if swallowed.
R43	May cause sensitisation by skin contact.
R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 23.07.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Antimony(III) oxide

Product Number : 202649
Brand : Aldrich
Index-No. : 051-005-00-X
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 1309-64-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
R40

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H351 Suspected of causing cancer.

Precautionary statement(s) P281	Use personal protective equipment as required.
Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	O_3Sb_2
Molecular Weight	:	291,52 g/mol
CAS-No.	:	1309-64-4
EC-No.	:	215-175-0
Index-No.	:	051-005-00-X

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Antimony trioxide			
CAS-No. EC-No. Index-No.	1309-64-4 215-175-0 051-005-00-X	Carc. 2; H351	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Antimony trioxide			
CAS-No. EC-No. Index-No.	1309-64-4 215-175-0 051-005-00-X	Xn, Carc.Cat.3, R40	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Antimony oxide

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 655 °C - lit.
f)	Initial boiling point and boiling range	1.550 °C - lit.
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower	no data available

	flammability or explosive limits	
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	ca.5,2 g/cm3 at 20 °C
n)	Water solubility	0,0287 g/l at 20 °C
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong reducing agents, Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - > 34.600 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
Eyes - rabbit
Result: Mild eye irritation
(Draize Test)

Respiratory or skin sensitisation
Maximisation Test - guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
no data available

Carcinogenicity

Carcinogenicity - rat - Inhalation
Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Liver:Tumors.

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Antimony trioxide)

Reproductive toxicity

Reproductive toxicity - rat - Inhalation
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetal death.

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: CC5650000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	mortality LC50 - Danio rerio (zebra fish) - > 1.000 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 1.000 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Growth inhibition EC50 - Selenastrum capricornutum (green algae) - 67 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Harmful to aquatic life with long lasting effects.

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -		IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
H351	Suspected of causing cancer.

Full text of R-phrases referred to under sections 2 and 3

Xn	Harmful
R40	Limited evidence of a carcinogenic effect.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.1 Revision Date 30.06.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	4-*tert*-Butylcatechol
Product Number	:	19670
Brand	:	Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	98-29-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Dermal (Category 4), H312
Skin corrosion (Category 1B), H314
Skin sensitisation (Category 1), H317
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

C, N	Corrosive, Dangerous for the environment	R21/22, R34, R43, R50/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word	Danger
Hazard statement(s)	
H302 + H312	Harmful if swallowed or in contact with skin
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
P501	Dispose of contents/ container to an approved waste disposal plant.
Supplemental Hazard Statements	none

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_{10}H_{14}O_2$
Molecular Weight	:	166,22 g/mol
CAS-No.	:	98-29-3
EC-No.	:	202-653-9

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
4-tert-Butylpyrocatechol			
CAS-No. EC-No.	98-29-3 202-653-9	Acute Tox. 4; Skin Corr. 1B; Skin Sens. 1; Aquatic Acute 1; Aquatic Chronic 1; H302 + H312, H314, H317, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
4-tert-Butylpyrocatechol			
CAS-No. EC-No.	98-29-3 202-653-9	C, N, R21/22 - R34 - R43 - R50/53	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: flakes Colour: white
b)	Odour	phenol-like
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 53 - 56 °C Melting point/range: 52 - 55 °C - lit.
f)	Initial boiling point and boiling range	285 °C - lit.
g)	Flash point	113 °C - closed cup
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	The product is not flammable. - Flammability (solids)
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	0,001 - 0,011 hPa at 30,35 - 50,15 °C
l)	Vapour density	no data available
m)	Relative density	1,08 kg/m3 at 20 °C
n)	Water solubility	4,2 g/l at 20 °C - OECD Test Guideline 105 - soluble
o)	Partition coefficient: n-octanol/water	log Pow: 1,98 at 25 °C
p)	Auto-ignition temperature	435 °C at 996 - 1.000 hPa
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	Not explosive
t)	Oxidizing properties	no data available

9.2 Other safety information

no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

Avoid moisture.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - male and female - 815 mg/kg
(OECD Test Guideline 401)

LD50 Dermal - rat - male and female - 1.331 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - rabbit
Result: Corrosive - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - rabbit
Result: Corrosive
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test - guinea pig
Result: May cause sensitisation by skin contact.
(OECD Test Guideline 406)

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

Mutagenicity (micronucleus test)
mouse - male and female
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information

Repeated dose toxicity - rat - male and female - Oral - No observed adverse effect level - < 70 mg/kg
RTECS: UX1400000

Cough, Shortness of breath, Headache, Nausea, Vomiting

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Danio rerio (zebra fish) - 0,12 mg/l - 96 h

	(OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	semi-static test EC50 - Daphnia magna (Water flea) - 0,48 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata - 10,17 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	Respiration inhibition EC50 - Sludge Treatment - 16 mg/l - 3 h (OECD Test Guideline 209)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 24,7 % - Not readily biodegradable. (OECD Test Guideline 310)

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3261	IMDG: 3261	IATA: 3261

14.2 UN proper shipping name

ADR/RID:	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (4-tert-Butylpyrocatechol)
IMDG:	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (4-tert-Butylpyrocatechol)
IATA:	Corrosive solid, acidic, organic, n.o.s. (4-tert-Butylpyrocatechol)

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user
no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H302 + H312	Harmful if swallowed or in contact with skin
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.

Full text of R-phrases referred to under sections 2 and 3

C	Corrosive
N	Dangerous for the environment
R21/22	Harmful in contact with skin and if swallowed.
R34	Causes burns.
R43	May cause sensitisation by skin contact.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.3 Revision Date 14.06.2017
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Triethanolamine
Product Number	:	90279
Brand	:	Sigma
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	102-71-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.2 Label elements

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	2,2′,2″-NitrilotriethanolTris(2-hydroxyethyl)amine
Formula	:	$C_6H_{15}NO_3$
Molecular weight	:	149,19 g/mol

CAS-No.	:	102-71-6
EC-No.	:	203-049-8

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Store in cool place.

hygroscopic

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0,6 mm
Break through time: 480 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection not required. For nuisance exposures use type OV/AG (US) or type ABEK (EU EN 14387) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: viscous

		Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	10,5 - 11,5 at 149 g/l at 25 °C
e)	Melting point/freezing point	Melting point/range: 17,9 - 21 °C
f)	Initial boiling point and boiling range	190 - 193 °C at 7 hPa
g)	Flash point	179 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 8,5 %(V) Lower explosion limit: 1,3 %(V)
k)	Vapour pressure	No data available
l)	Vapour density	5,15 - (Air = 1.0)
m)	Relative density	1,124 g/mL at 25 °C
n)	Water solubility	149 g/l at 20 °C - completely soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	5,15 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Air Exposure to moisture Light.

10.5 Incompatible materials
Acids, Oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Dermal - Rabbit - > 22,5 g/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KL9275000

Kidney injury may occur., Dermatitis

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia (water flea) - 609,98 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability	Result: 96 % - Readily biodegradable.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 07.05.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Sodium tripolyphosphate
Product Number	:	238503
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7758-29-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Sodium triphosphate pentabasic Sodium tripolyphosphate pentabasic Pentasodium tripolyphosphate Anhydrous STPP Sodium triphosphate
Formula	:	$Na_5O_{10}P_3$
Molecular Weight	:	367,86 g/mol
CAS-No.	:	7758-29-4

EC-No. : 231-838-7

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Oxides of phosphorus, Sodium oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: granules Colour: white
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	9,5 - 10,3 at 1 g/l
e)	Melting point/freezing point	Melting point/range: 622 °C
f)	Initial boiling point and boiling range	no data available
g)	Flash point	not applicable
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	148 g/l at 20 °C - completely soluble
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information

Dissociation constant	9,52 at 25 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
Avoid moisture.

10.5 Incompatible materials
Strong acids, Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - no data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - male and female - > 2.000 mg/kg
(OECD Test Guideline 401)

LC50 Inhalation - rat - male and female - 4 h - > 0,39 mg/l

LD50 Dermal - rabbit - 4.640 mg/kg

Skin corrosion/irritation
Skin - rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
in vivo assay - mouse
Result: Did not cause sensitisation on laboratory animals.
(OECD Test Guideline 429)

Germ cell mutagenicity
in vitro assay
S. typhimurium
Result: negative

rat - male
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: YK4570000

Gastrointestinal disturbance, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and EC50 - Daphnia magna (Water flea) - > 100 mg/l - 48 h

other aquatic
invertebrates

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -	IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
no data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.0 Revision Date 16.06.2016
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Zeolite
Product Number	:	96096
Brand	:	Sigma
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	1318-02-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.2 Label elements

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

CAS-No.	:	1318-02-1
EC-No.	:	215-283-8

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Avoid moisture.

10.5 Incompatible materials
Strong acids, Strong bases, Hydrogen fluoride, Chlorine trifluoride, Ethylene oxide, Halogenated hydrocarbon, Oxygen difluoride, Sodium nitrate, Vinyl compoundsStrong acids, Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 10.000 mg/kg

LC50 Inhalation - Rat - 4 h - > 5.300 mg/m3

LD50 Dermal - Rabbit - > 2.000 mg/kg

Skin corrosion/irritation
Skin - Human
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Human
lymphocyte
Cytogenetic analysis

Mouse
Cytogenetic analysis

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: ZG6800000

prolonged or repeated exposure can cause:, Damage to the lungs.
Cough, Difficulty in breathing, Gastrointestinal disturbance, prolonged or repeated exposure can cause:, Damage to the lungs., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 27.11.2014
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Manganese(IV) oxide
Product Number	:	529664
Brand	:	Aldrich
Index-No.	:	025-001-00-3
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	1313-13-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Xn Harmful R20/22

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H302 + H332 Harmful if swallowed or if inhaled

Precautionary statement(s)	none
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Manganese dioxide
Formula	:	MnO_2
Molecular weight	:	86,94 g/mol
CAS-No.	:	1313-13-9
EC-No.	:	215-202-6
Index-No.	:	025-001-00-3

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Manganese dioxide			
CAS-No. EC-No. Index-No.	1313-13-9 215-202-6 025-001-00-3	Acute Tox. 4; H302 + H332	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Manganese dioxide			
CAS-No. EC-No. Index-No.	1313-13-9 215-202-6 025-001-00-3	Xn, R20/22	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Manganese/manganese oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 535 °C - dec.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available

k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	5,026 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong acids, Strong reducing agents, Organic materials

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: OP0350000

Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H332	Harmful if inhaled.

Full text of R-phrases referred to under sections 2 and 3

Xn	Harmful
R20/22	Harmful by inhalation and if swallowed.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.0 Revision Date 19.09.2012
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : Zinc oxide

Product Number : 251607
Brand : Sigma-Aldrich
Index-No. : 030-013-00-7
CAS-No. : 1314-13-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 [CLP]
Pictogram

Signal word Warning

Hazard statement(s)
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P273 Avoid release to the environment.
P501 Dispose of contents/ container to an approved waste disposal plant.

Supplemental Hazard Statements none

According to European Directive 67/548/EEC as amended.
Hazard symbol(s)

R-phrase(s)

R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-phrase(s)

S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release to the environment. Refer to special instructions/ Safety data sheets.

2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : OZn
Molecular Weight : 81,39 g/mol

Component		Concentration
Zinc oxide		
CAS-No.	1314-13-2	-
EC-No.	215-222-5	
Index-No.	030-013-00-7	

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
Zinc oxide dust or fume can irritate the respiratory tract. Prolonged skin contact can produce a severe dermatitis called oxide pox. Exposure to high levels of dust or fume can cause metallic taste, marked thirst, coughing, fatigue, weakness, muscular pain, and nausea followed by fever and chills. Severe overexposure may result in bronchitis or pneumonia with a bluish tint to the skin., prolonged or repeated exposure can cause:, Reversible liver enzyme abnormalities., Diarrhoea

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Zinc/zinc oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end uses

no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Immersion protection
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: > 480 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

Splash protection
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: > 30 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	no data available
g)	Flash point	not applicable
h)	Evaporation rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	5,610 g/cm3
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Autoignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
no data available

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - mouse - 7.950 mg/kg

LC50 Inhalation - mouse - 2.500 mg/m3

Skin corrosion/irritation
Skin - rabbit - Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit - Mild eye irritation - 24 h

Eyes - rabbit - Mild eye irritation - 24 h

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

Genotoxicity in vitro - Hamster - Embryo
Unscheduled DNA synthesis

Genotoxicity in vitro - Hamster - Embryo
Morphological transformation.

Genotoxicity in vitro - Hamster - Embryo
Sister chromatid exchange

Genotoxicity in vivo - guinea pig - Inhalation
Unscheduled DNA synthesis

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

Developmental Toxicity - rat - Oral
Specific Developmental Abnormalities: Homeostasis Effects on Newborn: Stillbirth. Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
Zinc oxide dust or fume can irritate the respiratory tract. Prolonged skin contact can produce a severe dermatitis called oxide pox. Exposure to high levels of dust or fume can cause metallic taste, marked thirst, coughing, fatigue, weakness, muscular pain, and nausea followed by fever and chills. Severe overexposure may result in bronchitis or pneumonia with a bluish tint to the skin., prolonged or repeated exposure can cause:, Reversible liver enzyme abnormalities., Diarrhoea

Additional Information
RTECS: ZH4810000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 1,1 mg/l - 96,0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0,098 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
no data available

12.6 Other adverse effects
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number
ADR/RID: 3077 IMDG: 3077 IATA: 3077

14.2 UN proper shipping name
ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide)
IATA: Environmentally hazardous substance, solid, n.o.s. (Zinc oxide)

14.3 Transport hazard class(es)
ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: yes

14.6 Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
no data available

15.2 Chemical Safety Assessment
no data available

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.3 Revision Date 02.12.2016
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sodium hydroxymethanesulfinate hydrate

Product Number : 71530
Brand : Aldrich
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 149-44-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Germ cell mutagenicity (Category 2), H341

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H341 Suspected of causing genetic defects.

Precautionary statement(s)
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Supplemental Hazard information (EU)
EUH031 Contact with acids liberates toxic gas.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Rongalit™
Sodium formaldehyde sulfoxylatehydrate

Formula : $CH_3NaO_3S \cdot xH_2O$
Molecular weight : 118,09 g/mol
CAS-No. : 149-44-0
EC-No. : 205-739-4

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Sodium hydroxymethanesulphinate hydrate		
CAS-No. 149-44-0 EC-No. 205-739-4	Muta. 2; H341	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage. Do not store near acids.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min

Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	sulphurous
c)	Odour Threshold	No data available
d)	pH	9,5 - 10,5
e)	Melting point/freezing point	Melting point/range: 120 °C - dec.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	> 100 °C
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1,74 g/cm3 at ca.21 °C
n)	Water solubility	1.000 g/l at 25 °C - OECD Test Guideline 105 - soluble
o)	Partition coefficient: n-octanol/water	log Pow: < 0,3 at 22 °C
p)	Auto-ignition	No data available

	temperature	
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	850 - 900 kg/m3

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Acids

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides, Sodium oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - female - >= 5.000 mg/kg

LD50 Dermal - Rat - male and female - >= 2.000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rat
Result: No skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test - Guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
In vitro tests showed mutagenic effects

Mouse
lymphocyte
Result: positive

Mutagenicity (micronucleus test)
Mouse - male and female
Result: positive

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Suspected of damaging the unborn child. Suspected human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity	Rat - male and female - Oral - NOAEL : 300 mg/kg

RTECS: PB0380000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Leuciscus idus (Golden orfe) - > 10.000 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 100 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Growth inhibition ErC50 - Desmodesmus subspicatus (green algae) - 370 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 77 % - Readily biodegradable. (OECD Test Guideline 301B)
Biochemical Oxygen Demand (BOD)	14 mg/g
Chemical Oxygen Demand (COD)	490 mg/g

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Additional ecological	No data available

information

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -		IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

EUH031	Contact with acids liberates toxic gas.
H341	Suspected of causing genetic defects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.0 Revision Date 23.11.2012
Print Date 16.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : Sodium chloride solution

Product Number : S6546
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : ClNa
Molecular Weight : 58,44 g/mol

No components need to be disclosed according to the applicable regulations.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Hydrogen chloride gas, Sodium oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
no data available

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end uses
no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: colourless
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	6,0 - 8,0
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evaporation rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	1,190 g/cm3
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Autoignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available

s) Explosive properties no data available

t) Oxidizing properties no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
no data available

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity
no data available

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
no data available

12.6 Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
no data available

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
no data available

15.2 Chemical Safety Assessment
no data available

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.7 Revision Date 29.04.2015
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sodium hydroxide

Product Number : S8045
Brand : Sigma-Aldrich
Index-No. : 011-002-00-6
REACH No. : 01-2119457892-27-XXXX
CAS-No. : 1310-73-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Corrosive to metals (Category 1), H290
Skin corrosion (Category 1A), H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC
C Corrosive R35

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary statement(s)
P280 Wear protective gloves/ protective clothing/ eye protection/ face

	protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Caustic soda
Formula	:	NaOH
Molecular weight	:	40,00 g/mol
CAS-No.	:	1310-73-2
EC-No.	:	215-185-5
Index-No.	:	011-002-00-6
Registration number	:	01-2119457892-27-XXXX

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Sodium hydroxide			
CAS-No.	1310-73-2	Met. Corr. 1; Skin Corr. 1A; H290, H314	<= 100 %
EC-No.	215-185-5		
Index-No.	011-002-00-6		
Registration number	01-2119457892-27-XXXX		

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Sodium hydroxide			
CAS-No.	1310-73-2	C, R35	<= 100 %
EC-No.	215-185-5		
Index-No.	011-002-00-6		
Registration number	01-2119457892-27-XXXX		

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Sodium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Long-term local effects	1 mg/m3
Consumers	Inhalation	Long-term local effects	1 mg/m3

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: pellets Colour: white
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	14 at 50 g/l at 20 °C
e)	Melting point/freezing point	Melting point/range: 318 °C
f)	Initial boiling point and boiling range	1.390 °C
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	< 24,00 hPa at 20 °C 4,00 hPa at 37 °C
l)	Vapour density	1,38 - (Air = 1.0)
m)	Relative density	2,1300 g/cm3
n)	Water solubility	ca.1.260 g/l at 20 °C
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	ca.1.150 kg/m3
Relative vapour density	1,38 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong acids, Organic materials

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Causes severe burns. - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive - 24 h

Respiratory or skin sensitisation
Will not occur

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: WB4900000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Gambusia affinis (Mosquito fish) - 125 mg/l - 96 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 45,4 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia (water flea) - 40,38 mg/l - 48 h

12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Harmful to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1823	IMDG: 1823	IATA: 1823

14.2 UN proper shipping name

ADR/RID:	SODIUM HYDROXIDE, SOLID
IMDG:	SODIUM HYDROXIDE, SOLID
IATA:	Sodium hydroxide, solid

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
Met. Corr.	Corrosive to metals

Skin Corr.	Skin corrosion

Full text of R-phrases referred to under sections 2 and 3

C	Corrosive
R35	Causes severe burns.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.4 Revision Date 15.09.2017
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Ammonium chloride
Product Number	:	254134
Brand	:	Aldrich
Index-No.	:	017-014-00-8
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	12125-02-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Eye irritation (Category 2), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H319 Causes serious eye irritation.

Precautionary statement(s)	
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Salmiac
Formula	:	H_4ClN
Molecular weight	:	53,49 g/mol
CAS-No.	:	12125-02-9
EC-No.	:	235-186-4
Index-No.	:	017-014-00-8

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Ammonium chloride			
CAS-No. EC-No. Index-No.	12125-02-9 235-186-4 017-014-00-8	Acute Tox. 4; Eye Irrit. 2; H302, H319	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Store in cool place.

Hygroscopic.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	4,5 - 5,5 at 50,00000 g/l at 20,0 °C
e)	Melting point/freezing point	340,0 °C
f)	Initial boiling point and boiling range	No data available
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or	No data available

	explosive limits	
k)	Vapour pressure	1,3 hPa at 160,4 °C
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	500 kg/m3

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Exposure to moisture may affect product quality.

10.5 Incompatible materials
Strong acids, Strong bases, Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Nitrogen oxides (NOx), Hydrogen chloride gas
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1.650 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation

Respiratory or skin sensitisation
Will not occur

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: BP4550000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 3,98 mg/l - 96 h
	NOEC - Oncorhynchus mykiss (rainbow trout) - 57 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 161 mg/l - 48 h
	Growth inhibition NOEC - Daphnia magna (Water flea) - 0,1 mg/l - 216 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Toxic to aquatic life.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Waste material must be disposed of in accordance with the Directive on waste 2008/98/EC as well as other national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: -	IMDG: -	IATA: -

14.2 UN proper shipping name

ADR/RID:	Not dangerous goods
IMDG:	Not dangerous goods
IATA:	Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: -	IMDG: -	IATA: -

14.4 Packaging group

ADR/RID: -	IMDG: -	IATA: -

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H319	Causes serious eye irritation.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 20.11.2014
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Copper(I) chloride
Product Number	:	256528
Brand	:	Sigma-Aldrich
Index-No.	:	029-001-00-4
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7758-89-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	:	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

N	Dangerous for the environment	R50/53
Xi	Irritant	R38, R41
Xn	Harmful	R22

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram	
Signal word	Danger

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501	Dispose of contents/ container to an approved waste disposal plant.

Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Cuprous chloride
Formula	:	ClCu
Molecular weight	:	99,00 g/mol
CAS-No.	:	7758-89-6
EC-No.	:	231-842-9
Index-No.	:	029-001-00-4

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Cuprous chloride			
CAS-No. EC-No. Index-No.	7758-89-6 231-842-9 029-001-00-4	Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; Aquatic Acute 1; Aquatic Chronic 1; H302, H315, H318, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component		Classification	Concentration
Cuprous chloride			
CAS-No. EC-No. Index-No.	7758-89-6 231-842-9 029-001-00-4	Xn, N, R22 - R50/53 - R38 - R41	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Hydrogen chloride gas, Copper oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Air, light, and moisture sensitive.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: granules Colour: beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	5 at 50 g/l at 20 °C
e)	Melting point/freezing point	Melting point/range: 430 °C - lit.
f)	Initial boiling point and boiling range	1.490 °C - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1,7 hPa at 546 °C
l)	Vapour density	No data available
m)	Relative density	4,140 g/cm3
n)	Water solubility	0,047 g/l at 20 °C - slightly soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	1,7 g/l at 20 °C

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Air Avoid moisture. Light.

10.5 Incompatible materials
Oxidizing agents, Alkali metals

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 336 mg/kg

LC50 Inhalation - Mouse - 1.008 mg/m3

Skin corrosion/irritation
Skin - Rabbit
Result: Irritating to skin.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Risk of serious damage to eyes.

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
Rat
Ascites tumor
Cytogenetic analysis

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GL6990000

Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0,05 - 0,36 mg/l - 96,0 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2802	IMDG: 2802	IATA: 2802

14.2 UN proper shipping name

ADR/RID:	COPPER CHLORIDE
IMDG:	COPPER CHLORIDE
IATA:	Copper chloride

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage

H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xn	Harmful
R22	Harmful if swallowed.
R38	Irritating to skin.
R41	Risk of serious damage to eyes.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.0 Revision Date 28.11.2012
Print Date 17.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : 3,4-Dichloro-1-butene

Product Number : 159301
Brand : Aldrich
CAS-No. : 760-23-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Chemie GmbH
Riedstrasse 2
D-89555 STEINHEIM

Telephone : +49 89-6513-1444
Fax : +49 7329-97-2319
E-mail address : eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone # : 0800 181 7059 (CHEMTREC Deutschland)
+49 (0)696 43508409 (CHEMTREC weltweit)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
Flammable liquids (Category 3)
Acute toxicity, Oral (Category 4)
Acute toxicity, Inhalation (Category 4)
Skin corrosion (Category 1B)

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Flammable. Harmful by inhalation and if swallowed. Causes burns.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 [CLP]
Pictogram

Signal word Danger

Hazard statement(s)
H226 Flammable liquid and vapour.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H332 Harmful if inhaled.

Precautionary statement(s)
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove

	contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
Supplemental Hazard Statements	none

According to European Directive 67/548/EEC as amended.

Hazard symbol(s)

R-phrase(s)	
R10	Flammable.
R20/22	Harmful by inhalation and if swallowed.
R34	Causes burns.
S-phrase(s)	
S16	Keep away from sources of ignition - No smoking.
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

2.3 Other hazards

Lachrymator.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : $C_4H_6Cl_2$

Molecular Weight : 125,00 g/mol

Component		Concentration
3,4-Dichloro-1-butene		
CAS-No.	760-23-6	-
EC-No.	212-079-0	

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature: 2 - 8 °C

7.3 Specific end use(s)
no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: light yellow
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: -61 °C - lit.
f)	Initial boiling point and boiling range	123 °C - lit.
g)	Flash point	28 °C - closed cup
h)	Evaporation rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	23 hPa at 25 °C
l)	Vapour density	4,31 - (Air = 1.0)
m)	Relative density	1,15 g/cm3 at 25 °C
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available

r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
no data available

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agentsStrong oxidizing agents, Strong bases

10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - mouse - 724 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Excitement. Lungs, Thorax, or Respiration:Dyspnea.

LC50 Inhalation - rat - 4 h - 2100 ppm
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Ataxia. Lungs, Thorax, or Respiration:Dyspnea.

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	Harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion	Harmful if swallowed. Causes burns.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Eyes	Causes eye burns.

Signs and Symptoms of Exposure
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea

Additional Information
RTECS: EM4740000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - Pimephales promelas (fathead minnow) - 7,17 mg/l - 96 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
no data available

12.6 Other adverse effects
Toxic to aquatic life.
no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number
ADR/RID: 2920 IMDG: 2920 IATA: 2920

14.2 UN proper shipping name
ADR/RID: CORROSIVE LIQUID, FLAMMABLE, N.O.S. (3,4-Dichloro-1-butene)
IMDG: CORROSIVE LIQUID, FLAMMABLE, N.O.S. (3,4-Dichloro-1-butene)
IATA: Corrosive liquid, flammable, n.o.s. (3,4-Dichloro-1-butene)

14.3 Transport hazard class(es)
ADR/RID: 8 (3) IMDG: 8 (3) IATA: 8 (3)

14.4 Packaging group
ADR/RID: II IMDG: II IATA: II

14.5 Environmental hazards
ADR/RID: no IMDG Marine Pollutant: no IATA: no

14.6 Special precautions for user
no data available

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
no data available

15.2 Chemical Safety Assessment
no data available

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

DOW CHEMICAL COMPANY LIMITED

Safety Data Sheet according to Reg. (EU) No 2015/830

Product name: Propionic Acid

Revision Date: 22.06.2017
Version: 7.1
Print Date: 23.06.2017

DOW CHEMICAL COMPANY LIMITED encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier
Product name: Propionic Acid

Chemical name of the substance: propionic acid
CASRN: 79-09-4
EC-No.: 201-176-3
REACH Registration Number: 01-2119486971-24-0001

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Manufacture of substance, industrial. Distribution of substance, industrial. Formulation & (re)packing of substances and mixtures, industrial. Use in laboratories, industrial. Industrial use as intermediate. Polymer processing, industrial. Industrial uses: in animal feeds Use in laboratories, professional. Polymer processing, professional. professional use in animal feeds Consumer use in animal feeds

1.3 Details of the supplier of the safety data sheet
COMPANY IDENTIFICATION
DOW CHEMICAL COMPANY LIMITED
DIAMOND HOUSE, LOTUS PARK,
KINGSBURY CRESCENT,
STAINES
England
TW18 3AG
UNITED KINGDOM

Customer Information Number: +44 (0) 203 139 4000
SDSQuestion@dow.com

1.4 EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 0031 115 694 982
Local Emergency Contact: 00 31 115 69 4982

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008:
Flammable liquids - Category 3 - H226
Skin corrosion - Category 1B - H314
Serious eye damage - Category 1 - H318
Specific target organ toxicity - single exposure - Category 3 - H335
For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008:

Hazard pictograms

Signal word: DANGER

Hazard statements

H226	Flammable liquid and vapour.
H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.

Precautionary statements

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

2.3 Other hazards
No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

This product is a substance.

CASRN / EC-No. / Index-No.	REACH Registration Number	Concentration	Component	Classification: REGULATION (EC) No 1272/2008
CASRN 79-09-4 **EC-No.** 201-176-3 **Index-No.** 607-089-00-0	01-2119486971-24	100.0%	propionic acid	Flam. Liq. - 3 - H226 Skin Corr. - 1B - H314 STOT SE - 3 - H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures
General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice.

Skin contact: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Suitable emergency safety shower facility should be immediately available.

Eye contact: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

4.3 Indication of any immediate medical attention and special treatment needed
Notes to physician: Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. Probable mucosal damage may contraindicate the use of gastric lavage. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data

Sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Unsuitable extinguishing media: No data available

5.2 Special hazards arising from the substance or mixture
Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur.

5.3 Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Eliminate ignition sources. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

Special protective equipment for firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures: Evacuate area. Refer to section 7, Handling, for additional precautionary measures. Only trained and properly protected personnel must be involved in clean-up operations. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Vapor explosion hazard. Keep out of sewers. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

6.2 Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

6.3 Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Attempt to neutralize by adding materials such as Gastrointestinal irritation. Large spills: Pump with explosion-proof equipment. If available, use foam to smother or suppress. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

6.4 Reference to other sections: References to other sections, if applicable, have been provided in the previous sub-sections.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling: Keep away from heat, sparks and flame. Do not get in eyes, on skin, on clothing. Do not swallow. Avoid breathing vapor. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. No smoking, open flames or sources of ignition in handling and storage area. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Electrically ground and bond all equipment. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

7.2 Conditions for safe storage, including any incompatibilities: Minimize sources of ignition, such as static build-up, heat, spark or flame. Store in tightly closed, properly vented containers.

7.3 Specific end use(s): See the technical data sheet on this product for further information.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
propionic acid	ACGIH	TWA	10 ppm
	Dow IHG	TWA	10 ppm
	Dow IHG	STEL	15 ppm
	2000/39/EC	TWA	31 mg/m3 10 ppm
	2000/39/EC	STEL	62 mg/m3 20 ppm
	GB EH40	TWA	31 mg/m3 10 ppm
	GB EH40	STEL	46 mg/m3 15 ppm

Derived No Effect Level
Workers

Acute - systemic effects		*Acute – local effects*		*Long-term – systemic effects*		*Long-term – local effects*	
Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
n.a.	n.a.	n.a.	62 mg/m3	20.9 mg/kg bw/day	73 mg/m3	n.a.	31 mg/m3

Consumers

Acute - systemic effects	*Acute – local effects*	*Long-term – systemic effects*	*Long-term – local effects*

Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
n.a.	n.a.	n.a.	n.a.	30.8 mg/m3	10.5 mg/kg bw/day	18.3 mg/m3	10.5 mg/kg bw/day	n.a.	3.7 mg/m3

Predicted No Effect Concentration

Compartment	PNEC	Remarks
Fresh water	0.5 mg/l	
Marine water	0.05 mg/l	
Intermittent releases	5 mg/l	
STP	5 mg/l	
Fresh water sediment	1.86 mg/kg d.w.	
Marine sediment	0.186 mg/kg d.w.	
Soil	0.1258 mg/kg d.w.	

8.2 Exposure controls

Engineering controls: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

Individual protection measures

Eye/face protection: Use chemical goggles. Chemical goggles should be consistent with EN 166 or equivalent. If exposure causes eye discomfort, use a full-face respirator.

Skin protection

Hand protection: Use chemical resistant gloves classified under Standard EN374: Protective gloves against chemicals and micro-organisms. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Neoprene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl alcohol ("PVA"). When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended. When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions no respiratory protection should be needed; however, if discomfort is experienced, use an approved air-purifying respirator.
Use the following CE approved air-purifying respirator: Organic vapor cartridge, type A (boiling point >65 ºC)

Environmental exposure controls
See SECTION 7: Handling and storage and SECTION 13: Disposal considerations for measures to prevent excessive environmental exposure during use and waste disposal.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	
Physical state	Liquid.
Color	Colorless
Odor	pungent
Odor Threshold	No test data available
pH	2.5 *Literature*
Melting point/range	Not applicable to liquids
Freezing point	< -20 °C *Literature*
Boiling point (760 mmHg)	104.9 °C at 760 mmHg *Literature* at 1.013 hPa
Flash point	**closed cup** 50.5 °C *Pensky-Martens Closed Cup ASTM D 93*
Evaporation Rate (Butyl Acetate = 1)	0.24 *Estimated.*
Flammability (solid, gas)	Not Applicable
Lower explosion limit	2.9 % vol *Literature*
Upper explosion limit	12.1 % vol *Literature*
Vapor Pressure	0.399 kPa at 23 °C *Literature*
Relative Vapor Density (air = 1)	2.6 *Literature* (relative to air at 25°C)
Relative Density (water = 1)	0.9950 at 20 °C / 20 °C *Literature*
Water solubility	100 % *Literature*
Partition coefficient: n-octanol/water	log Pow: 0.33 *Measured*
Auto-ignition temperature	440 °C *Literature*
Decomposition temperature	No test data available
Dynamic Viscosity	1.02 mPa.s at 20 °C *Literature*
Kinematic Viscosity	1.04 mm2/s at 25 °C *Estimated.*
Explosive properties	Not explosive
Oxidizing properties	The substance or mixture is not classified as oxidizing.

9.2 Other information

Molecular weight	74.08 g/mol *Estimated.*
Molecular formula	C2 H5 COOH

NOTE: The physical data presented above are typical values and should not be construed as a specification.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity: No data available

10.2 Chemical stability: Stable.

10.3 Possibility of hazardous reactions: Polymerization will not occur.

10.4 Conditions to avoid: Exposure to elevated temperatures can cause product to decompose.

10.5 Incompatible materials: None known.

10.6 Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Carbon monoxide. Carbon dioxide. Ammonia. Amines.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

11.1 Information on toxicological effects
Acute toxicity

Acute oral toxicity
Low toxicity if swallowed. Swallowing may result in irritation or burns of the mouth, throat, and gastrointestinal tract.

LD50, Rat, male and female, 3,455 mg/kg OECD 401 or equivalent

Acute dermal toxicity
Prolonged skin contact is unlikely to result in absorption of harmful amounts.

LD50, Rat, female, 3,235 mg/kg

Acute inhalation toxicity
Brief exposure (minutes) is not likely to cause adverse effects. Excessive exposure may cause irritation to upper respiratory tract (nose and throat).

LC50, Rat, male and female, 4 Hour, vapour, > 20 mg/l OECD Test Guideline 403

Skin corrosion/irritation
Brief contact may cause skin burns. Symptoms may include pain, severe local redness and tissue damage.

Serious eye damage/eye irritation
May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.
Vapor may cause eye irritation experienced as mild discomfort and redness.

Sensitization

Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)
The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
In animals, effects have been reported on the following organs after ingestion:
Gastrointestinal tract.
Positive findings are believed to be secondary to chronic irritation/tissue injury.

Carcinogenicity
Propionic acid caused pre-cancerous changes in the stomachs of rats when ingested in large amounts. Positive findings are believed to be secondary to chronic irritation/tissue injury. Available data are inadequate to evaluate carcinogenicity.

Teratogenicity
Did not cause birth defects or any other fetal effects in laboratory animals.

Reproductive toxicity
In animal studies, did not interfere with reproduction.

Mutagenicity
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

12.1 Toxicity

Acute toxicity to fish
Material is harmful to aquatic organisms (LC50/EC50/IC50 between 10 and 100 mg/L in the most sensitive species).
May decrease pH of aquatic systems to < pH 5 which may be toxic to aquatic organisms.

Based on analogy.
LC50, Leuciscus idus (Golden orfe), static test, 96 Hour, > 1,000 mg/l, DIN 38412

Acute toxicity to aquatic invertebrates
Based on analogy.
EC50, Daphnia magna (Water flea), static test, 48 Hour, > 500 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
Based on analogy.

EbC50, Desmodesmus subspicatus (green algae), static test, 72 Hour, Biomass, > 500 mg/l, OECD Test Guideline 201

ErC50, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 48.7 mg/l

Toxicity to bacteria
Based on analogy.
Other, activated sludge, static test, 0.5 Hour, Respiration rates., 500 - 1,040 mg/l

EC50, Pseudomonas putida, static test, 17 Hour, Growth inhibition, 59.6 mg/l, DIN 38412

12.2 Persistence and degradability
Biodegradability: Material is expected to be readily biodegradable.

Biodegradation: 93 %
Exposure time: 20 d

12.3 Bioaccumulative potential
Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 0.33 Measured

12.4 Mobility in soil
Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 1.2 Estimated.

12.5 Results of PBT and vPvB assessment
This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

12.6 Other adverse effects
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
This product, when being disposed of in its unused and uncontaminated state should be treated as a hazardous waste according to EC Directive 2008/98/EC. Any disposal practices must be in compliance with all national and provincial laws and any municipal or local by-laws governing hazardous waste. For used, contaminated and residual materials additional evaluations may be required. Do not dump into any sewers, on the ground, or into any body of water.

The definitive assignment of this material to the appropriate EWC group and thus its proper EWC code will depend on the use that is made of this material. Contact the authorized waste disposal services.

SECTION 14: TRANSPORT INFORMATION

Classification for ROAD and Rail transport (ADR/RID):

14.1	**UN number**	UN 3463
14.2	**UN proper shipping name**	PROPIONIC ACID
14.3	**Transport hazard class(es)**	8 (3)
14.4	**Packing group**	II
14.5	**Environmental hazards**	Not considered environmentally hazardous based on available data.
14.6	**Special precautions for user**	Hazard Identification Number: 83

Classification for SEA transport (IMO-IMDG):

14.1	**UN number**	UN 3463
14.2	**UN proper shipping name**	PROPIONIC ACID
14.3	**Transport hazard class(es)**	8 (3)
14.4	**Packing group**	II
14.5	**Environmental hazards**	Not considered as marine pollutant based on available data.
14.6	**Special precautions for user**	EmS: F-E, S-C
14.7	**Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code**	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

14.1	**UN number**	UN 3463
14.2	**UN proper shipping name**	Propionic acid
14.3	**Transport hazard class(es)**	8 (3)
14.4	**Packing group**	II
14.5	**Environmental hazards**	Not applicable
14.6	**Special precautions for user**	No data available.

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

REACh Regulation (EC) No 1907/2006
This substance has been registered according to Regulation (EC) No. 1907/2006 (REACH)., The aforementioned indications of the REACH registration status are provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. It is the buyer´s/user´s responsibility to ensure that his/her understanding of the regulatory status of this product is correct.

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.
Listed in Regulation: FLAMMABLE LIQUIDS
Number in Regulation: P5c
5,000 t
50,000 t

15.2 Chemical safety assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapour.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.

Product Literature
Additional information on this product may be obtained by calling your sales or customer service contact. Additional information on this and other products may be obtained by visiting our web page.

Revision
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Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

2000/39/EC	Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
ACGIH	USA. American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV)
Dow IHG	Dow Industrial Hygiene Guideline
GB EH40	UK. EH40 WEL - Workplace Exposure Limits
STEL	Short term exposure limit
TWA	Time weighted average

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

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1. Short title of Exposure Scenario: Manufacture of substance, industrial.

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU8, SU9:** Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
Process categories	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC1:** Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1: Manufacture of substances

Frequency and duration of use

Continuous exposure	:	350 Emission days/year, Continuous release.

Environment factors not influenced by risk management

Dilution Factor (River)	:	10

Other given operational conditions affecting environmental exposure

Emission or Release Factor: Air	:	0.1 %
Emission or Release Factor: Water	:	0.01 %
Emission or Release Factor: Soil	:	0.1 %
Remarks	:	Indoor use

Technical conditions and measures / Organizational measures

Water	:	Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Sludge Treatment	:	Sludge should be incinerated, contained or reclaimed., Do not apply industrial sludge to natural soils.

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Activity	:	Use in closed process, no likelihood of exposure

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.3 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Activity : Use in closed batch process (synthesis or formulation)

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure

Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.4 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity : Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Technical conditions and measures
Ensure operation is undertaken outdoors.

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.5 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity	:	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Technical conditions and measures
Provide extract ventilation to points where emissions occur (Effectiveness (of a measure): 30 %)

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.6 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Activity	:	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.7 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Activity	:	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.8 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Activity	:	Use as laboratory reagent

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC1	Used ECETOC TRA model.	Not applicable	Sediment		1.36 mg/l	
			Fresh water		0.14 mg/l	
			Fresh water sediment		0.52 mg/kg dry weight (d.w.)	
			Soil		0.02 mg/kg dry weight (d.w.)	
			Sediment			0.3
			Fresh water			0.3
			Fresh water sediment			0.3
			Soil			0.15

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC1	ECETOC TRA v2.0 Worker	Use in closed process, no likelihood of exposure	Chronic inhalation systemic exposure	0.031 mg/m³	0.001
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	0.347 mg/kg bw/day	0.026
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	0.0615 mg/m³	0.001
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.003
			Combined routes	0.343 mg/kg bw/day	0.004
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC3	ECETOC TRA v2.0 Worker	Use in closed batch process (synthesis or formulation)	Chronic inhalation systemic exposure	9.260 mg/m³	0.297
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.025

			Combined routes	1.666 mg/kg bw/day	0.322
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	18.443 mg/m³	0.297
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	0.425 mg/kg bw/day	0.0197
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC8a	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	Chronic inhalation systemic exposure	21.607 mg/m³	0.697
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.010
			Combined routes	4.458 mg/kg bw/day	0.707
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	43.034 mg/m³	0.4694
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.563 mg/kg bw/day	0.792
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC8a	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	Chronic inhalation systemic exposure	21.607 mg/m³	0.697
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.010
			Combined routes	4.458 mg/kg bw/day	0.707
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	43.034 mg/m³	0.4694
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.563 mg/kg bw/day	0.792

			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC8b	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.005
			Combined routes	2.890 mg/kg bw/day	0.503
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	30.738 mg/m³	0.496
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.049
			Combined routes	0.823 mg/kg bw/day	0.545
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC9	ECETOC TRA v2.0 Worker	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.005
			Combined routes	2.890 mg/kg bw/day	0.503
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.049
			Combined routes	0.823 mg/kg bw/day	0.545
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC15	ECETOC TRA v2.0 Worker	Use as laboratory reagent	Chronic inhalation systemic exposure	1.543 mg/m³	0.498
			Chronic dermal systemic exposure	0.034 mg/kg bw/day	0.000
			Combined routes	2.548 mg/kg bw/day	0.498
			Chronic dermal local exposure	0.010 mg/cm2	0.385
			Acute inhalation systemic exposure	43.034 mg/m³	0.496

			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.002
			Combined routes	0.878 mg/kg bw/day	0.498
			Acute dermal local exposure	0.010 mg/cm2	0.385

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Environment - Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet http://cefic.org/en/reach-for-industries-libraries.html.
Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Formulation & (re)packing of substances and mixtures, industrial.

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU 10:** Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) **PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC2:** Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC2: Formulation of preparations

Frequency and duration of use

Continuous exposure	:	350 Emission days/year, Continuous release.

Environment factors not influenced by risk management

Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Emission or Release Factor: Air	:	0.1 %
Emission or Release Factor: Water	:	0.05 %
Emission or Release Factor: Soil	:	0.1 %
Remarks	:	Indoor use

Technical conditions and measures / Organizational measures

Water	:	Sludge should be incinerated, contained or reclaimed.

Conditions and measures related to municipal sewage treatment plant

Sludge Treatment	:	Sludge should be incinerated, contained or reclaimed., Do not apply industrial sludge to natural soils.

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Activity	:	Use in closed process, no likelihood of exposure

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.3 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Activity	:	Use in closed batch process (synthesis or formulation)

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.4 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Activity	:	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure

Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 90 %)

2.5 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity : Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Technical conditions and measures

Ensure operation is undertaken outdoors.

Organisational measures to prevent /limit releases, dispersion and exposure

Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.6 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity : Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Product characteristics

Concentration of the Substance in : Covers the percentage of the substance in the product up to

Mixture/Article 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Technical conditions and measures

Provide extract ventilation to points where emissions occur (Effectiveness (of a measure): 30 %)

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.7 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Activity : Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure

Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.8 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Activity : Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.9 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.10 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC2	Used ECETOC TRA model.	Not applicable	Sediment		2.53 mg/l	0.5
			Fresh water		0.26 mg/l	0.52
			Fresh water sediment		0.96 mg/kg dry weight (d.w.)	0.52
			Soil		0.009 mg/kg dry weight	0.08

					(d.w.)	

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC1	ECETOC TRA v2.0 Worker	Use in closed process, no likelihood of exposure	Chronic inhalation systemic exposure	0.031 mg/m³	0.001
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	0.347 mg/kg bw/day	0.026
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	0.061 mg/m³	0.001
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.003
			Combined routes	0.343 mg/kg bw/day	0.004
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC3	ECETOC TRA v2.0 Worker	Use in closed batch process (synthesis or formulation)	Chronic inhalation systemic exposure	9.260 mg/m³	0.001
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	1.666 mg/kg bw/day	0.026
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	18.443 mg/m³	0.001
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.003
			Combined routes	0.425 mg/kg bw/day	0.004
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC5	ECETOC TRA v2.0 Worker	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	Chronic inhalation systemic exposure	15.433 mg/m³	0.001
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.025
			Combined routes	3.576 mg/kg bw/day	0.026
			Chronic dermal	0.200 mg/cm2	0.385

			local exposure		
			Acute inhalation systemic exposure	30.739 mg/m³	0.001
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.003
			Combined routes	0.159 mg/kg bw/day	0.004
			Acute dermal local exposure	0.200 mg/cm2	0.385
PROC8a	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	Chronic inhalation systemic exposure	21.607 mg/m³	0.697
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.010
			Combined routes	4.458 mg/kg bw/day	0.707
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	43.034 mg/m³	0.4694
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.564 mg/kg bw/day	0.792
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC8a	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	Chronic inhalation systemic exposure	21.607 mg/m³	0.697
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.010
			Combined routes	4.458 mg/kg bw/day	0.707
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	43.034 mg/m³	0.4694
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.563 mg/kg bw/day	0.792
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC8b	ECETOC TRA	Transfer of substance	Chronic inhalation	15.433 mg/m³	0.498

	v2.0 Worker	or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	systemic exposure		
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.005
			Combined routes	2.890 mg/kg bw/day	0.503
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.049
			Combined routes	0.823 mg/kg bw/day	0.545
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC9	ECETOC TRA v2.0 Worker	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.005
			Combined routes	2.890 mg/kg bw/day	0.503
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.049
			Combined routes	0.823 mg/kg bw/day	0.545
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC15	ECETOC TRA v2.0 Worker	Use as laboratory reagent	Chronic inhalation systemic exposure	1.543 mg/m³	0.498
			Chronic dermal systemic exposure	0.034 mg/kg bw/day	0.000
			Combined routes	2.548 mg/kg bw/day	0.498
			Chronic dermal local exposure	0.010 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.002
			Combined routes	0.172 mg/kg	0.498

				bw/day	
			Acute dermal local exposure	0.010 mg/cm2	0.385

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Environment - Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination. Further details on scaling and control technologies are provided in SpERC factsheet http://cefic.org/en/reach-for-industries-libraries.html.
Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Use in laboratories, industrial.

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	:	**PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC4:** Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling environmental exposure for: ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Amount used

Daily amount per site	:	13.70 kg

Frequency and duration of use

Continuous exposure	:	350 Emission days/year, Continuous release.

Environment factors not influenced by risk management

Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Emission or Release Factor: Air	:	5 %
Emission or Release Factor: Water	:	10 %
Emission or Release Factor: Soil	:	0.01 %
Remarks	:	Indoor use

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Activity	:	Use as laboratory reagent

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Technical conditions and measures

Provide extract ventilation to points where emissions occur

Organisational measures to prevent /limit releases, dispersion and exposure

Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC4	Used ECETOC TRA model.	Not applicable	Fresh water		0.05 mg/l	0.015
			Fresh water sediment		0.96 mg/kg dry weight (d.w.)	0.015
			Soil		0.01 mg/kg dry weight (d.w.)	0.05
			Marine water		0.2 mg/l	0.03
			Marine sediment		0.75 mg/kg dry weight (d.w.)	0.03

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC15	ECETOC TRA v2.0 Worker	Use as laboratory reagent	Chronic inhalation systemic exposure	1.543 mg/m³	0.498
			Chronic dermal systemic exposure	0.034 mg/kg bw/day	0
			Combined routes	0.255 mg/kg bw/day	0.498
			Chronic dermal local exposure	0.010 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.002
			Combined routes	0.172 mg/kg bw/day	0.498
			Acute dermal local exposure	0.010 mg/cm2	0.385

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Environment - Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Further details on scaling and control technologies are provided in SpERC factsheet http://cefic.org/en/reach-for-industries-libraries.html. No additional risk management measures required.

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Use in laboratories, professional.

Main User Groups	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	:	**PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC8a:** Wide dispersive indoor use of processing aids in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a: Wide dispersive indoor use of processing aids in open systems

Frequency and duration of use

Continuous exposure	:	Continuous release.

Environment factors not influenced by risk management

Remarks	:	Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Activity	:	Use as laboratory reagent

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Technical conditions and measures

Provide extract ventilation to points where emissions occur

Organisational measures to prevent /limit releases, dispersion and exposure

Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC8a	Used ECETOC	Not	Fresh water		0.008 mg/l	0.015

	TRA model.	applicable				
			Fresh water sediment		0.03 mg/kg dry weight (d.w.)	0.015
			Soil		0.003 mg/kg dry weight (d.w.)	0.05
			Marine water		0.0008 mg/l	0.03
			Marine sediment		0.003 mg/kg dry weight (d.w.)	0.03

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC15	ECETOC TRA v2.0 Worker	Use as laboratory reagent	Chronic inhalation systemic exposure	3.087 mg/m³	0.498
			Chronic dermal systemic exposure	0.034 mg/kg bw/day	0
			Combined routes	0.475 mg/kg bw/day	0.498
			Chronic dermal local exposure	0.010 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.002
			Combined routes	0.172 mg/kg bw/day	0.498
			Acute dermal local exposure	0.010 mg/cm2	0.385

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Environment - Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Further details on scaling and control technologies are provided in SpERC factsheet http://cefic.org/en/reach-for-industries-libraries.html. No additional risk management measures required.
Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Use as an intermediate, industrial.

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU8:** Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) **PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC6a:** Industrial use resulting in manufacture of another substance (use of intermediates)

2.1 Contributing scenario controlling environmental exposure for: ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Amount used

Daily amount per site	:	13.70 kg

Frequency and duration of use

Continuous exposure	:	350 Emission days/year, Continuous release.

Environment factors not influenced by risk management

Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

Other given operational conditions affecting environmental exposure

Emission or Release Factor: Air	:	5 %
Emission or Release Factor: Water	:	10 %
Emission or Release Factor: Soil	:	0.1 %

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Activity	:	Use in closed process, no likelihood of exposure

Product characteristics

Concentration of the Substance in	:	Covers the percentage of the substance in the product up to

Mixture/Article		100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.3 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Activity	:	Use in closed, continuous process with occasional controlled exposure

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.4 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Activity	:	Use in closed batch process (synthesis or formulation)

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated

differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.5 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Activity : Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP
Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.6 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Activity : Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP
Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.7 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity : Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Technical conditions and measures
Ensure operation is undertaken outdoors.

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.8 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Activity : Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.9 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent

Activity : Use as laboratory reagent

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.10 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Technical conditions and measures
Provide extract ventilation to points where emissions occur (Effectiveness (of a measure): 30 %)

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC6a	Used ECETOC TRA model.	Not applicable	Fresh water		0.4 mg/l	0.77
			Fresh water sediment		1.43 mg/l	0.77
			Soil		0.013 mg/kg dry weight (d.w.)	0.1
			Marine water			
			Marine sediment			

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC1	ECETOC TRA v2.0 Worker	Use in closed process, no likelihood of exposure	Chronic inhalation systemic exposure	0.031 mg/m³	0.001
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	0.347 mg/kg bw/day	0.026
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	0.0615 mg/m³	0.001
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.003
			Combined routes	0.343 mg/kg bw/day	0.004
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC2	ECETOC TRA v2.0 Worker	Use in closed, continuous process with occasional controlled exposure	Chronic inhalation systemic exposure	3.087 mg/m³	0.099
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.010
			Combined routes	1.812 mg/kg bw/day	0.109
			Chronic dermal local exposure	0.200 mg/cm2	0.769

			Acute inhalation systemic exposure	6.148 mg/m³	0.099
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.398 mg/kg bw/day	0.0197
			Acute dermal local exposure	0.200 mg/cm2	0.769
PROC3	ECETOC TRA v2.0 Worker	Use in closed batch process (synthesis or formulation)	Chronic inhalation systemic exposure	9.260 mg/m³	0.297
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	1.666 mg/kg bw/day	0.322
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	18.443 mg/m³	0.297
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	0.425 mg/kg bw/day	0.0197
			Acute dermal local exposure	0.100 mg/cm2	0.0297
PROC4	ECETOC TRA v2.0 Worker	Use in batch and other process (synthesis) where opportunity for exposure arises	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.005
			Combined routes	2.890 mg/kg bw/day	0.503
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	30.738 mg/m³	0.498
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.049
			Combined routes	0.823 mg/kg bw/day	0.0197
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC5	ECETOC TRA v2.0 Worker	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal	1.371 mg/kg	0.010

			systemic exposure	bw/day	
			Combined routes	3.576 mg/kg bw/day	0.508
			Chronic dermal local exposure	0.200 mg/cm2	0.769
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.509 mg/kg bw/day	0.594
			Acute dermal local exposure	0.200 mg/cm2	0.769
PROC8a	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	Chronic inhalation systemic exposure	21.607 mg/m³	
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	
			Combined routes	4.458 mg/kg bw/day	
			Chronic dermal local exposure	0.100 mg/cm2	
			Acute inhalation systemic exposure	43.034 mg/m³	
			Acute dermal systemic exposure	1.371 mg/kg bw/day	
			Combined routes	1.564 mg/kg bw/day	
			Acute dermal local exposure	0.100 mg/cm2	
PROC8b	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.0005
			Combined routes	2.890 mg/kg bw/day	0.503
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.049
			Combined routes	0.823 mg/kg	0.545

				bw/day	
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC15	ECETOC TRA v2.0 Worker	Use as laboratory reagent	Chronic inhalation systemic exposure	1.543	0.498
			Chronic dermal systemic exposure	0.034	0
			Combined routes	2.548	0.498
			Chronic dermal local exposure	0.010	0.385
			Acute inhalation systemic exposure	43.034	0.496
			Acute dermal systemic exposure	0.343	0.002
			Combined routes	0.878	0.498
			Acute dermal local exposure	0.010	0.385
PROC8a	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	Chronic inhalation systemic exposure	21.607 mg/m³	
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	
			Combined routes	4.458 mg/kg bw/day	
			Chronic dermal local exposure	0.100 mg/cm2	
			Acute inhalation systemic exposure	43.034 mg/m³	
			Acute dermal systemic exposure	1.371 mg/kg bw/day	
			Combined routes	1.564 mg/kg bw/day	
			Acute dermal local exposure	0.100 mg/cm2	

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Environment - Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Further details on scaling and control technologies are provided in SpERC factsheet http://cefic.org/en/reach-for-industries-libraries.html. No additional risk management measures required.
Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Polymer processing, industrial.

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU 10:** Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) **PROC6:** Calendering operations **PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Environmental Release Categories	:	**ERC6d:** Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

2.1 Contributing scenario controlling environmental exposure for: ERC6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers

Frequency and duration of use

Continuous exposure	:	Continuous release.

Environment factors not influenced by risk management

Remarks	:	Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Activity	:	Use in closed process, no likelihood of exposure

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.3 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Activity : Use in closed, continuous process with occasional controlled exposure

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.4 Contributing scenario controlling worker exposure for: PROC3: Use in closed batch process (synthesis or formulation)

Activity : Use in closed batch process (synthesis or formulation)

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.5 Contributing scenario controlling worker exposure for: PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Activity : Use in batch and other process (synthesis) where opportunity for exposure arises

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP
Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.6 Contributing scenario controlling worker exposure for: PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Activity : Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP
Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure

Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.7 Contributing scenario controlling worker exposure for: PROC6: Calendering operations

Activity	:	Calendering operations

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.8 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity	:	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Technical conditions and measures
Ensure operation is undertaken outdoors.

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.9 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Activity	:	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.10 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Activity	:	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.11 Contributing scenario controlling worker exposure for: PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation

Activity	:	Production of preparations or articles by tabletting, compression, extrusion, pelletisation

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.12 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity	:	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks	:	Not applicable

Technical conditions and measures
Provide extract ventilation to points where emissions occur (Effectiveness (of a measure): 30 %)

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC6d	Used ECETOC TRA model.	Not applicable	Fresh water		0.006 mg/l	0.015
			Fresh water sediment		0.023 mg/kg dry weight (d.w.)	0.015
			Soil		0.01 mg/kg dry weight (d.w.)	0.1
			Marine water		0.0006 mg/l	0.015
			Marine sediment		0.002 mg/kg dry weight (d.w.)	0.015

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC1	ECETOC TRA v2.0 Worker	Use in closed process, no likelihood of exposure	Chronic inhalation systemic exposure	0.031 mg/m³	0.001
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	0.347 mg/kg bw/day	0.026
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	0.061 mg/m³	0.001
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.003
			Combined routes	0.343 mg/kg bw/day	0.004
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC2	ECETOC TRA v2.0 Worker	Use in closed, continuous process with occasional controlled exposure	Chronic inhalation systemic exposure	3.087 mg/m³	0.099
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.010
			Combined routes	1.812 mg/kg bw/day	0.109
			Chronic dermal local exposure	0.200 mg/cm2	0.769
			Acute inhalation	6.148 mg/m³	0.099

			systemic exposure		
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.398 mg/kg bw/day	0.0197
			Acute dermal local exposure	0.200 mg/cm2	0.769
PROC3	ECETOC TRA v2.0 Worker	Use in closed batch process (synthesis or formulation)	Chronic inhalation systemic exposure	9.260 mg/m³	0.297
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	1.666 mg/kg bw/day	0.322
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	18.443 mg/m³	0.297
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.025
			Combined routes	0.425 mg/kg bw/day	0.0197
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC4	ECETOC TRA v2.0 Worker	Use in batch and other process (synthesis) where opportunity for exposure arises	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.005
			Combined routes	2.890 mg/kg bw/day	0.503
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.498
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.049
			Combined routes	0.8229 mg/kg bw/day	0.0197
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC5	ECETOC TRA v2.0 Worker	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.010

			Combined routes	3.576 mg/kg bw/day	0.508
			Chronic dermal local exposure	0.200 mg/cm2	0.769
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.509 mg/kg bw/day	0.594
			Acute dermal local exposure	0.200 mg/cm2	0.769
PROC6	ECETOC TRA v2.0 Worker	Calendering operations	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	2.743 mg/kg bw/day	0.021
			Combined routes	4.948 mg/kg bw/day	0.519
			Chronic dermal local exposure	0.200 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.498
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.021
			Combined routes	2.880 mg/kg bw/day	0.0519
			Acute dermal local exposure	0.200 mg/cm2	0.385
PROC8a	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	Chronic inhalation systemic exposure	21.607 mg/m³	0.697
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.010
			Combined routes	4.458 mg/kg bw/day	0.707
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	43.034 mg/m³	0.4694
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.564 mg/kg bw/day	0.792
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC8b	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/	Chronic inhalation systemic exposure	15.433 mg/m³	0.498

		discharging) from/ to vessels/ large containers at dedicated facilities			
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.005
			Combined routes	2.890 mg/kg bw/day	0.503
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.049
			Combined routes	0.823 mg/kg bw/day	0.545
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC9	ECETOC TRA v2.0 Worker	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.005
			Combined routes	2.890 mg/kg bw/day	0.503
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.049
			Combined routes	0.823 mg/kg bw/day	0.545
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC14	ECETOC TRA v2.0 Worker	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	Chronic inhalation systemic exposure	1.543 mg/m³	0.498
			Chronic dermal systemic exposure	0.034 mg/kg bw/day	0.002
			Combined routes	0.563 mg/kg bw/day	0.500
			Chronic dermal local exposure	0.050 mg/cm2	0.192
			Acute inhalation systemic exposure	30.739 mg/m³	0.496
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.024

			Combined routes	0.480 mg/kg bw/day	0.520
			Acute dermal local exposure	0.050 mg/cm2	0.192
PROC8a	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	Chronic inhalation systemic exposure	21.607 mg/m³	0.697
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.010
			Combined routes	4.458 mg/kg bw/day	0.707
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	43.034 mg/m³	0.4694
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.098
			Combined routes	1.564 mg/kg bw/day	0.792
			Acute dermal local exposure	0.100 mg/cm2	0.385

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Environment - Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Further details on scaling and control technologies are provided in SpERC factsheet http://cefic.org/en/reach-for-industries-libraries.html. No additional risk management measures required.
Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Polymer processing, professional.

Main User Groups	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	:	**PROC1:** Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Environmental Release Categories	:	**ERC8a, ERC8c, ERC8d, ERC8f:** Wide dispersive indoor use of processing aids in open systems, Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8c, ERC8d, ERC8f: Wide dispersive indoor use of processing aids in open systems, Wide dispersive indoor use resulting in inclusion into or onto a matrix, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive outdoor use resulting in inclusion into or onto a matrix

Frequency and duration of use

Continuous exposure	:	Continuous release.

Environment factors not influenced by risk management

Remarks	:	Not applicable

2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure

Activity	:	Use in closed process, no likelihood of exposure

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks	:	Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.3 Contributing scenario controlling worker exposure for: PROC2: Use in closed, continuous process with occasional controlled exposure

Activity : Use in closed, continuous process with occasional controlled exposure

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Technical conditions and measures
Provide extract ventilation to points where emissions occur

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.4 Contributing scenario controlling worker exposure for: PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Activity : Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Technical conditions and measures
Provide extract ventilation to points where emissions occur

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)
If above technical/organisational control measures are not feasible, then adopt following PPE:, Wear respiratory protection. (Effectiveness (of a measure): 90 %)

2.5 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Activity : Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use
Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure
Remarks : Not applicable

Technical conditions and measures
Provide extract ventilation to points where emissions occur

Organisational measures to prevent /limit releases, dispersion and exposure
Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

2.6 Contributing scenario controlling worker exposure for: PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation

Activity : Production of preparations or articles by tabletting, compression, extrusion, pelletisation

Product characteristics
Concentration of the Substance in : Covers the percentage of the substance in the product up to

Mixture/Article 100 % (unless stated differently).

Physical Form (at time of use) : Liquid, vapour pressure < 0.5 kPa at STP

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Not applicable

Technical conditions and measures

Provide extract ventilation to points where emissions occur

Organisational measures to prevent /limit releases, dispersion and exposure

Not applicable

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374. (Effectiveness (of a measure): 80 %)

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC8a	Used ECETOC TRA model.	Not applicable	Fresh water		0.008 mg/l	0.02
			Fresh water sediment		0.03 mg/kg dry weight (d.w.)	0.02
			Soil		0.003 mg/kg dry weight (d.w.)	0.05
			Marine water		0.0008 mg/l	0.02
			Marine sediment		0.003 mg/kg dry weight (d.w.)	0.02
ERC8c	Used ECETOC TRA model.	Not applicable	Fresh water		0.005 mg/l	0.013
			Fresh water sediment		0.02 mg/kg dry weight (d.w.)	0.013
			Soil		0.003 mg/kg dry weight (d.w.)	0.05
			Marine water		0.0005 mg/l	0.012
			Marine sediment		0.002 mg/kg dry weight (d.w.)	0.012
ERC8d	Used ECETOC	Not	Fresh water		0.009 mg/l	0.02

	TRA model.	applicable				
			Fresh water sediment		0.03 mg/kg dry weight (d.w.)	0.02
			Soil		0.004 mg/kg dry weight (d.w.)	0.05
			Marine water		0.0009 mg/l	0.02
			Marine sediment		0.0032 mg/kg dry weight (d.w.)	0.02
ERC8f	Used ECETOC TRA model.	Not applicable	Fresh water		0.0053 mg/l	0.012
			Fresh water sediment		0.02 mg/kg dry weight (d.w.)	0.012
			Soil		0.004 mg/kg dry weight (d.w.)	0.05
			Marine water		0.0005 mg/l	0.012
			Marine sediment		0.002 mg/kg dry weight (d.w.)	0.012

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC1	ECETOC TRA v2.0 Worker	Use in closed process, no likelihood of exposure	Chronic inhalation systemic exposure	0.031 mg/m³	0.01
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.002
			Combined routes	0.347 mg/kg bw/day	0.004
			Chronic dermal local exposure	0.100 mg/cm2	0.385
			Acute inhalation systemic exposure	0.061 mg/m³	0.001
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.002
			Combined routes	0.343 mg/kg bw/day	0.004
			Acute dermal local exposure	0.100 mg/cm2	0.385
PROC2	ECETOC TRA v2.0 Worker	Use in closed, continuous process with occasional controlled exposure	Chronic inhalation systemic exposure	6.148 mg/m³	0.498
			Chronic dermal	0.137 mg/kg	0.010

			systemic exposure	bw/day	
			Combined routes	0.165 mg/kg bw/day	0.508
			Chronic dermal local exposure	0.020 mg/cm2	0.769
			Acute inhalation systemic exposure	15.3698 mg/m³	0.498
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.010
			Combined routes	1.440 mg/kg bw/day	0.508
			Acute dermal local exposure	0.020 mg/cm2	0.769
PROC8a	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	Chronic inhalation systemic exposure	15.433 mg/m³	0.498
			Chronic dermal systemic exposure	1.371 mg/kg bw/day	0.021
			Combined routes	3.576 mg/kg bw/day	0.0519
			Chronic dermal local exposure	0.100 mg/cm2	0.769
			Acute inhalation systemic exposure	30.739 mg/m³	0.498
			Acute dermal systemic exposure	1.371 mg/kg bw/day	0.021
			Combined routes	1.509 mg/kg bw/day	0.519
			Acute dermal local exposure	15.433 mg/cm2	0.769
PROC8b	ECETOC TRA v2.0 Worker	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities	Chronic inhalation systemic exposure	3.087 mg/m³	0.100
			Chronic dermal systemic exposure	0.686 mg/kg bw/day	0.010
			Combined routes	1.267 mg/kg bw/day	0.110
			Chronic dermal local exposure	0.100 mg/cm2	0.769
			Acute inhalation systemic exposure	6.148 mg/m³	0.100
			Acute dermal systemic exposure	0.686 mg/kg bw/day	0.010
			Combined routes	0.713 mg/kg	0.110

				bw/day	
			Acute dermal local exposure	0.100 mg/cm2	0.769
PROC14	ECETOC TRA v2.0 Worker	Production of preparations or articles by tabletting, compression, extrusion, pelletisation	Chronic inhalation systemic exposure	6.173 mg/m³	0.199
			Chronic dermal systemic exposure	0.343 mg/kg bw/day	0.005
			Combined routes	1.225 mg/kg bw/day	0.204
			Chronic dermal local exposure	0.050 mg/cm2	0.385
			Acute inhalation systemic exposure	12.295 mg/m³	0.199
			Acute dermal systemic exposure	0.343 mg/kg bw/day	0.005
			Combined routes	0.399 mg/kg bw/day	0.204
			Acute dermal local exposure	0.050 mg/cm2	0.385

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Environment - Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. Further details on scaling and control technologies are provided in SpERC factsheet http://cefic.org/en/reach-for-industries-libraries.html. No additional risk management measures required.
Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 7.1 Revision Date 04.10.2016
Print Date 18.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Diisopropyl ether
Product Number	:	38270
Brand	:	Sigma-Aldrich
Index-No.	:	603-045-00-X
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	108-20-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Flammable liquids (Category 2), H225
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H336	May cause drowsiness or dizziness.

Precautionary statement(s)

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.

Supplemental Hazard information (EU)

EUH019	May form explosive peroxides.
EUH066	Repeated exposure may cause skin dryness or cracking.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.
May form explosive peroxides.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Isopropyl ether
Formula	:	$C_6H_{14}O$
Molecular weight	:	102,17 g/mol
CAS-No.	:	108-20-3
EC-No.	:	203-560-6
Index-No.	:	603-045-00-X

No components need to be disclosed according to the applicable regulations.

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0,3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 35 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -85 °C - lit.
f)	Initial boiling point and boiling range	68 - 69 °C - lit.
g)	Flash point	-29 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 21 %(V) Lower explosion limit: 1 %(V)
k)	Vapour pressure	227 hPa at 25 °C 160 hPa at 20 °C
l)	Vapour density	3,53 - (Air = 1.0)

m)	Relative density	0,725 g/mL at 25 °C
n)	Water solubility	3,11 g/l at 20,2 °C - soluble
o)	Partition coefficient: n-octanol/water	log Pow: 2,4
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density 3,53 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Contains the following stabiliser(s):
BHT (0,001 %)

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 8.470 mg/kg

LC50 Inhalation - Rat - 162.000 mg/m3
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Change in motor activity (specific assay). Behavioral:Muscle contraction or spasticity.

LD50 Dermal - Rabbit - 14.480 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

Reproductive toxicity - Rat - Inhalation
Maternal Effects: Other effects. Specific Developmental Abnormalities: Musculoskeletal system.

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: TZ5425000

Nausea, Headache, Vomiting, narcosis
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 0 % - Not biodegradable (OECD Test Guideline 301D) Remarks: No data available
Ratio BOD/ThBOD	19 %

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 1159 IMDG: 1159 IATA: 1159

14.2 UN proper shipping name

ADR/RID: DIISOPROPYL ETHER
IMDG: DIISOPROPYL ETHER
IATA: Diisopropyl ether

14.3 Transport hazard class(es)

ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packaging group

ADR/RID: II IMDG: II IATA: II

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

EUH019	May form explosive peroxides.
EUH066	Repeated exposure may cause skin dryness or cracking.
H225	Highly flammable liquid and vapour.
H336	May cause drowsiness or dizziness.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.5 Revision Date 17.05.2016
Print Date 18.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Chlorine
Product Number	:	295132
Brand	:	Aldrich
Index-No.	:	017-001-00-7
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	7782-50-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Oxidizing gases (Category 1), H270
Gases under pressure (Compressed gas), H280
Acute toxicity, Inhalation (Category 3), H331
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram

Signal word	Danger
Hazard statement(s)	
H270	May cause or intensify fire; oxidizer.
H280	Contains gas under pressure; may explode if heated.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
Precautionary statement(s)	
P220	Keep/Store away from clothing/ combustible materials.
P244	Keep valves and fittings free from oil and grease.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Cl_2
Molecular weight	:	70,91 g/mol
CAS-No.	:	7782-50-5
EC-No.	:	231-959-5
Index-No.	:	017-001-00-7

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Chlorine			
CAS-No. EC-No. Index-No.	7782-50-5 231-959-5 017-001-00-7	Ox. Gas 1; Press. Gas Compr. Gas; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2; STOT SE 3; Aquatic Acute 1; H270, H280, H331, H315, H319, H335, H400 M-Factor - Aquatic Acute: 100	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Contents under pressure.
Storage class (TRGS 510): Gases

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Compressed gas Colour: yellow
b)	Odour	pungent
c)	Odour Threshold	No data available
d)	pH	1,8 at 6,4 g/l at 20 °C
e)	Melting point/freezing point	Melting point/range: -101 °C - lit.
f)	Initial boiling point and boiling range	-34 °C - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	6.399 hPa at 20 °C
l)	Vapour density	2,44 - (Air = 1.0)
m)	Relative density	1,563 g/cm3 at -33,99 °C
n)	Water solubility	ca.10 g/l at 20 °C
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	The substance or mixture is classified as oxidizing with the category 1.

9.2 Other safety information

Relative vapour density	2,44 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Alcohols

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LC50 Inhalation - Rat - 1 h - 293 ppm

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Human
lymphocyte
Cytogenetic analysis

Mouse
sperm

Carcinogenicity

Carcinogenicity - Rat - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Leukaemia

Carcinogenicity - Monkey - Inhalation
Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

Reproductive toxicity - Rat - Oral
Effects on Newborn: Biochemical and metabolic.

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: FO2100000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Cough, Shortness of breath, Headache, Nausea

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0,014 mg/l - 96,0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0,019 mg/l - 24 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: 1017 IMDG: 1017 IATA: 1017

14.2 UN proper shipping name
ADR/RID: CHLORINE
IMDG: CHLORINE
IATA: Chlorine
Passenger Aircraft: Not permitted for transport
Cargo Aircraft: Not permitted for transport

14.3 Transport hazard class(es)
ADR/RID: 2.3 (5.1, 8) IMDG: 2.3 (5.1, 8) IATA: 2.3 (5.1, 8)

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: yes IMDG Marine pollutant: yes IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H270	May cause or intensify fire; oxidizer.
H280	Contains gas under pressure; may explode if heated.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010
Version 6.0 Revision Date 16.07.2015
Print Date 18.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Ethanolamine
Product Number	:	411000
Brand	:	Aldrich
Index-No.	:	603-030-00-8
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	141-43-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin corrosion (Category 1B), H314
Chronic aquatic toxicity (Category 3), H412
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram

Signal word Danger

Hazard statement(s)	
H302 + H312 + H332	Harmful if swallowed, in contact with skin or if inhaled
H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)	
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Monoethanolamine 2-Aminoethyl alcohol 2-Aminoethanol
Formula	:	C_2H_7NO
Molecular weight	:	61,08 g/mol
CAS-No.	:	141-43-5
EC-No.	:	205-483-3
Index-No.	:	603-030-00-8

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Ethanolamine			
CAS-No. EC-No. Index-No.	141-43-5 205-483-3 603-030-00-8	Acute Tox. 4; Skin Corr. 1B; STOT SE 3; Aquatic Chronic 3; H302, H332, H312, H314, H335, H412 Concentration limits: >= 5 %: STOT SE 3, H335;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

hygroscopic Handle and store under inert gas.

Storage class (TRGS 510): Combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0,6 mm
Break through time: 480 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	amine-like
c)	Odour Threshold	No data available
d)	pH	12,1 at 100 g/l at 20 °C
e)	Melting point/freezing point	Melting point/range: 10 - 11 °C - lit.
f)	Initial boiling point and boiling range	170 °C - lit. 69 - 70 °C at 13 hPa
g)	Flash point	91 °C - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 17 %(V) Lower explosion limit: 2,5 %(V)
k)	Vapour pressure	0,3 hPa at 20 °C
l)	Vapour density	2,11 - (Air = 1.0)
m)	Relative density	1,012 g/mL at 25 °C
n)	Water solubility	1.000 g/l at 20 °C - completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -2,299 at 25 °C
p)	Auto-ignition temperature	424 °C
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density	2,11 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Absorbs carbon dioxide (CO_2) from air.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Exposure to moisture
Heat, flames and sparks.

10.5 Incompatible materials
Strong acids and oxidizing agents, Iron, Copper, Brass, Rubber

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 1.089 mg/kg
(OECD Test Guideline 401)

Inhalation: Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

LD50 Dermal - Rabbit - 1.015 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Causes burns.
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive
(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Ames test
Salmonella typhimurium
Result: negative

OECD Test Guideline 474
Mouse - male and female
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KJ5775000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Cyprinus carpio (Carp) - 150 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 65 mg/l - 48 h
Toxicity to algae	static test EC50 - Selenastrum capricornutum (green algae) - 2,8 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	EC50 - Pseudomonas putida - 110 mg/l - 17 h (DIN 38 412 Part 8)

12.2 Persistence and degradability

Biodegradability: aerobic - Exposure time 28 d
Result: > 70 % - Readily biodegradable
(OECD Test Guideline 301F)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Toxic to aquatic life.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 2491 IMDG: 2491 IATA: 2491

14.2 UN proper shipping name

ADR/RID: ETHANOLAMINE
IMDG: ETHANOLAMINE
IATA: Ethanolamine

14.3 Transport hazard class(es)

ADR/RID: 8 IMDG: 8 IATA: 8

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H302 + H312 + H332	Harmful if swallowed, in contact with skin or if inhaled
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.2 Revision Date 10.05.2017
Print Date 18.09.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Bentonite
Product Number	:	285234
Brand	:	Sigma-Aldrich
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	1302-78-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Chemie GmbH Riedstrasse 2 D-89555 STEINHEIM
Telephone	:	+49 89-6513-1444
Fax	:	+49 7329-97-2319
E-mail address	:	eurtechserv@sial.com

1.4 Emergency telephone number

Emergency Phone #	0800 181 7059 (CHEMTREC Deutschland) +49 (0)696 43508409 (CHEMTREC weltweit)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

2.2 Label elements

Not a hazardous substance or mixture.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Montmorillonite
Molecular weight	:	180,1 g/mol
CAS-No.	:	1302-78-9

EC-No. : 215-108-5

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance Form: granules

		Colour: grey, beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	6,0 - 9,0
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	2,400 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong acids

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Aluminum oxide, silicon oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Intravenous - Rat - 35 mg/kg
Remarks: Lungs, Thorax, or Respiration:Acute pulmonary edema.

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Carcinogenicity - Mouse - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Liver:Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: CT9450000

Lung irritation, Asthma

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 19.000 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

ANNEX 7

“Chemical risks assessment mission preliminary results”

Presentation delivered on September 22, 2017 to the Ministry of Emergency Situation

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Confederazione Svizzera
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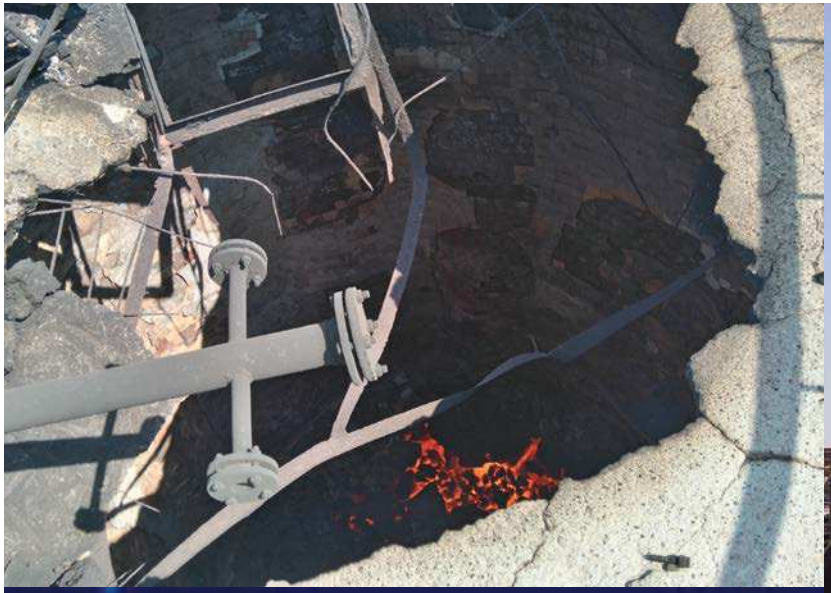
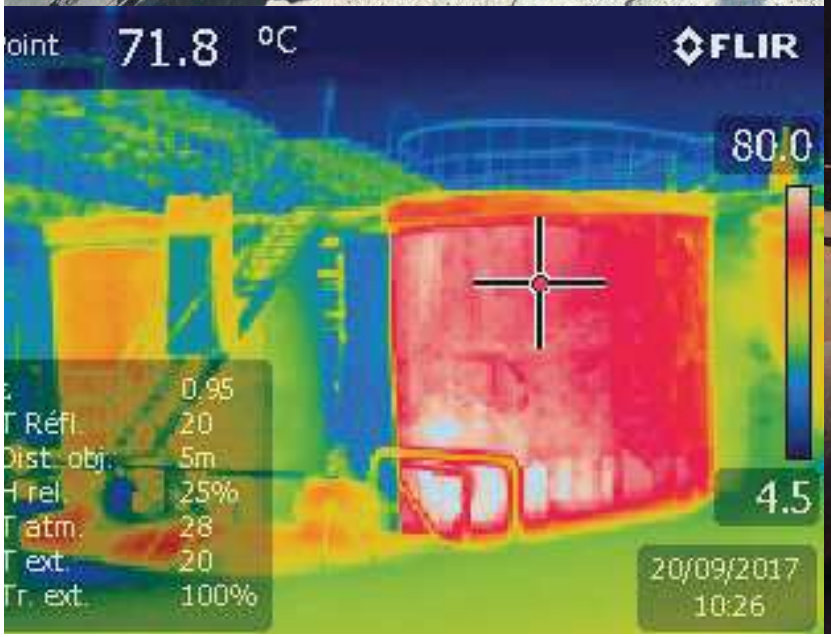
Swiss Agency for Development and Cooperation SDC

UN Chemical Risks Assessment Mission to Armenia
Nairit Plant – Yerevan





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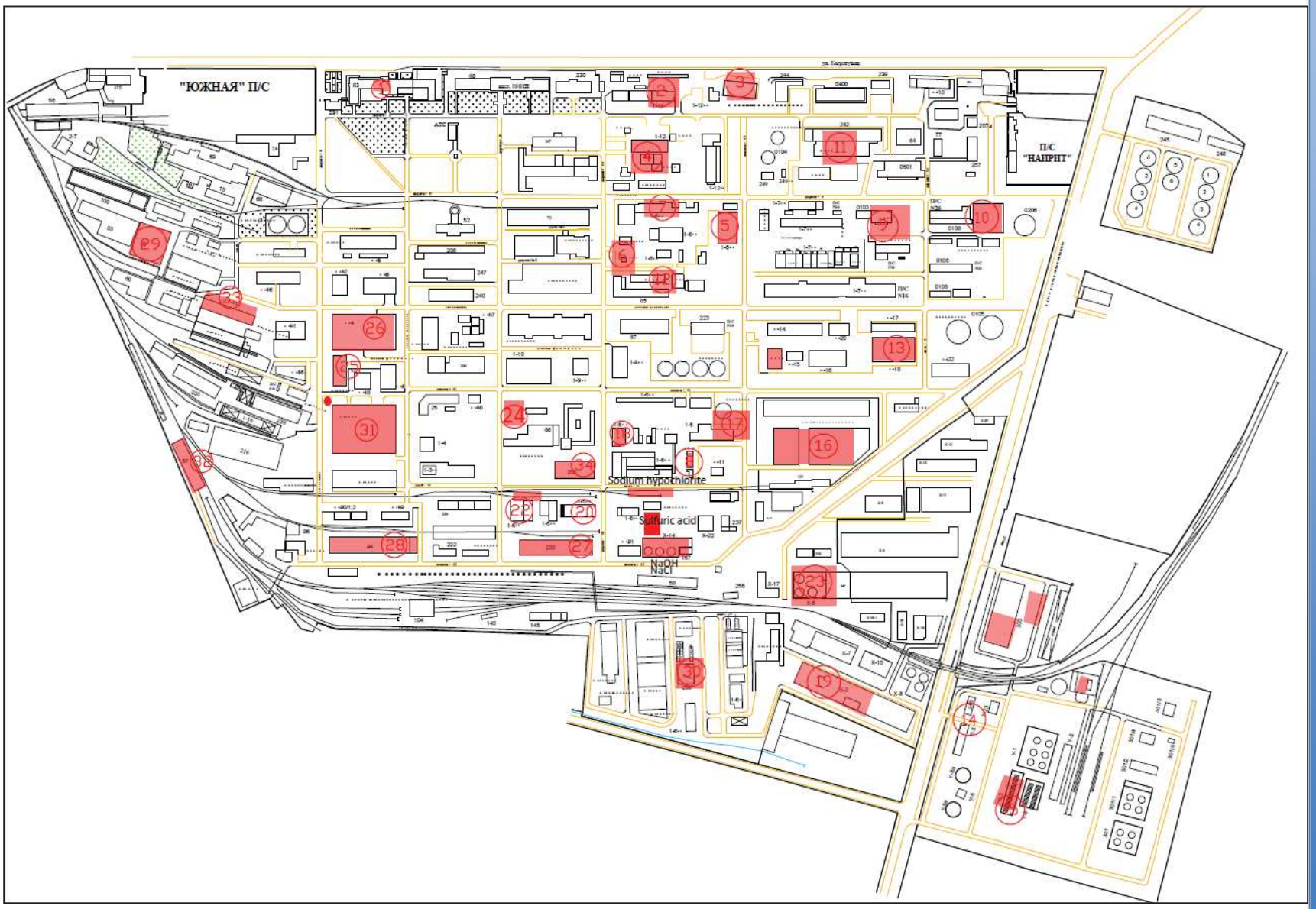

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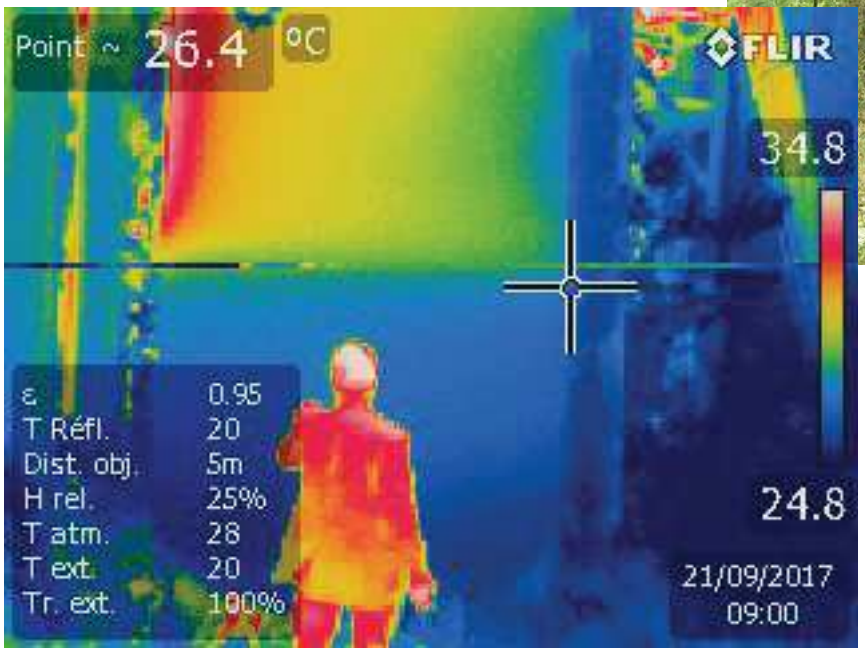
Chemicals are not always clearly located and identified



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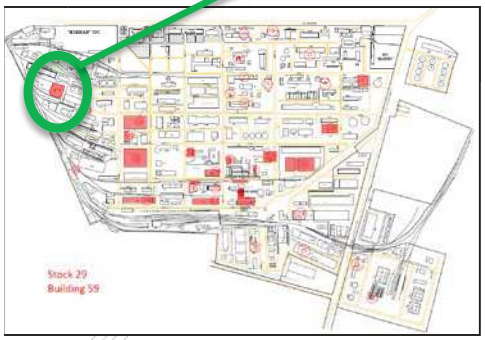

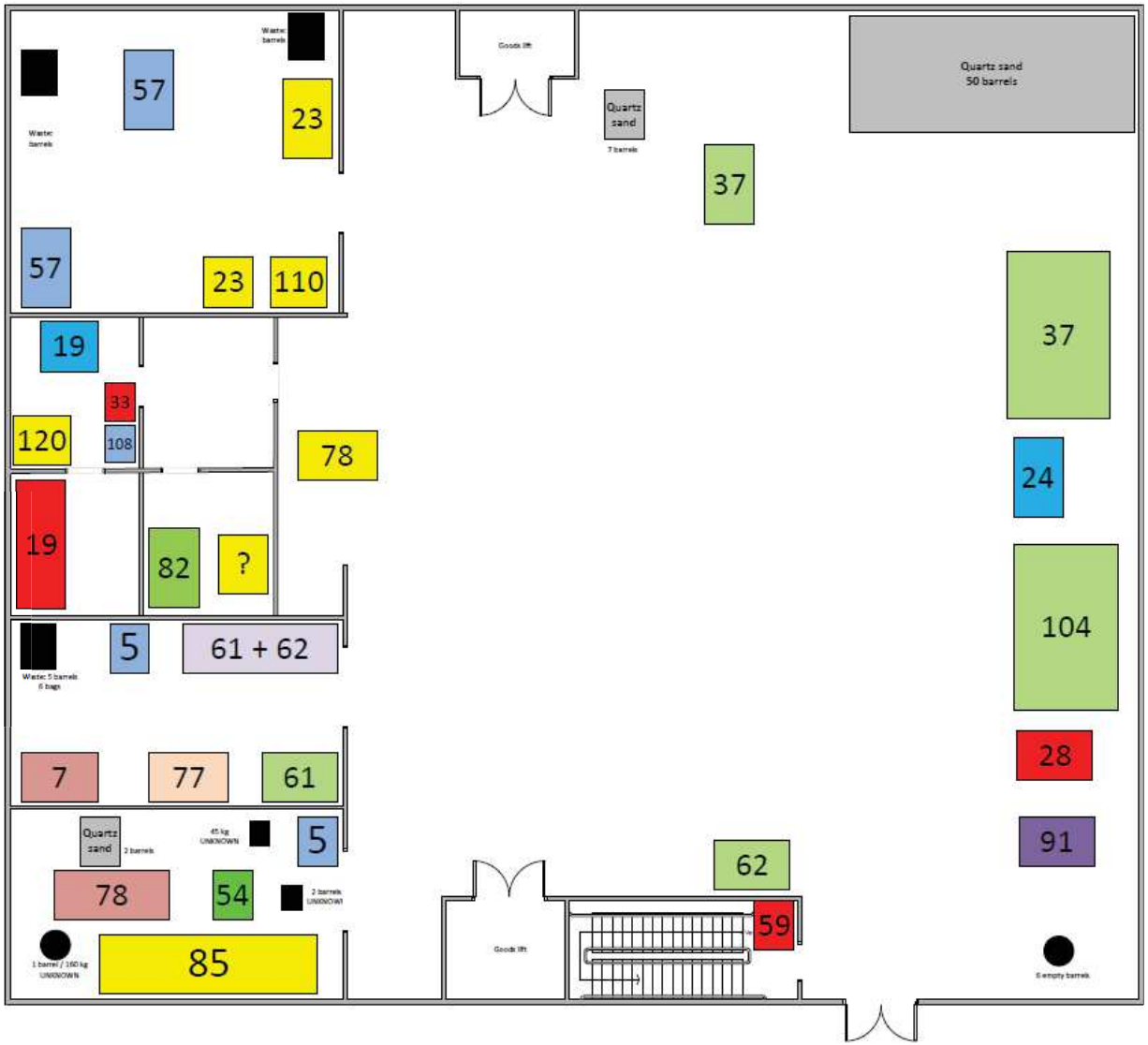

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N°	CAS number	Chemical name	Level of purity	State (S, L, G)	Storage location(s)	Container size	Total Weight	Container conditions							
5	85-44-9	Phtalic anhydrid		S	29L0-1	Barrel	127	Open							
5				S	29L0-2	25 kg bags	900	Good							
7		Anionite	100	S	29L0-2	25 kg bags	900	Good							
19		Hexacianfertical	100	S	29L0-4	25 kg bags	200	Good							
			100	S	29L0-5	25 kg bags	3500	Good							
23	111-42-2	Diethanolamine		L	29L07	200 L Barrel		Bad							
				L	29L0-5	200 L Barrel 1 L bottle		Good							
24	25167-70-8	Diisobutylene		L	29L0-8	200 L Barrel	50	Good							
28	88-58-4	Di-te-butylhydroquinone		S	29L0-8	200 L Barrel C	2800	Good							
33	61790-51-0	Dresinate x		S	20L0-5	20 kg bags	850	Medium							
37	97-90-5	Ethylene dimetacryl glycol		L	29L0-8	200 L Barrel	4180	Bad							
54		Resin		S	29L0-1	200 L Barrel	390	Open	NH	NH	NH	NH	NH	NH	NH
57	149-30-4	Captax (2-Mercaptobenzothiazole)		S	29L0-7	25 kg bags	8200	Medium							
59	75-20-7	Calcium carbide		S	29L0-8	Open Bag		Bad -							
61		Coagulant A		S	29L0-2	10 kg bags	2000	Good							
62		Coagulant MR-473 I/K	100	S	29L0-8	10 kg bags	2400	Good							
			100	S	29L0-2	25 kg bags	2200	Medium							
77	7631-99-4	Sodium nitrate, NaNO3	100	S	29L0-2	50 kg bags	100	Medium							

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UN Chemical Risks Assessment Mission to Armenia
Nairit Plant – Yerevan

Actions to undertake

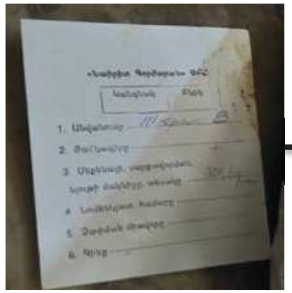
1.  Labelling
2.  Repacking
3.  Temporary storage
4. 

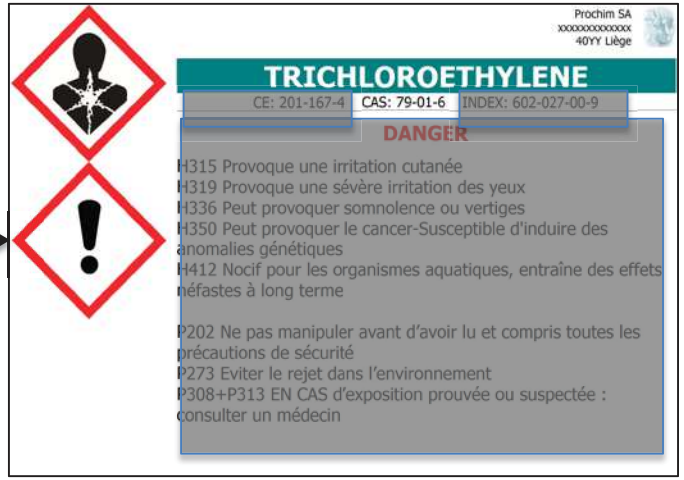
Chemicals Waste Management

UN Chemical Risks Assessment Mission to Armenia
Nairit Plant – Yerevan

1. LABELLING

To mitigate risks of storage mistakes and identify chemical hazards





- **The report will give all the indications, using a light version of CLP :**

24	2600104200	Դիիզոբուտիլեն	25167-70-8	Diisobutylene							

- **Average cost : 5 000 $ / 2,5 millions of Drams to edit plastified labels**

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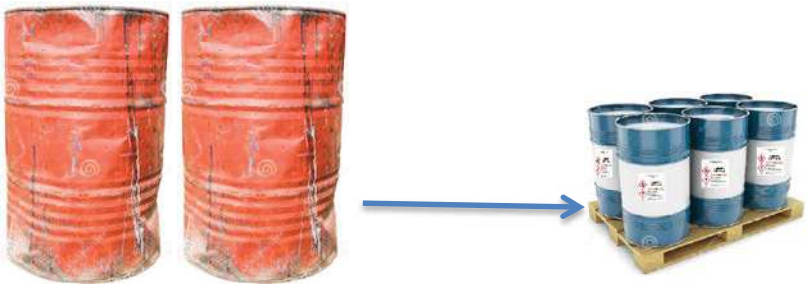
2. REPACKING

When package is damaged, using adapted package safe to handle



- **The report will propose procedures and indications : PPE, Package compatibility with waste …**

- **Average cost : 0,5-1 millions $ / 250-500 millions**

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3. Temporary storage

Using an existing building, easy to secure and prepare for storage

- **Specifications :**
  - Surface : average 4000 m^2
  - Few windows, large door for handing
  - Natural ventilation
  - 200 m from the property limit.

- **Organisation :**
  - Storage by category and compatibilities (Acid – Caustic – Oxydant – etc.)
  - On one level only
  - Liquids on retention pools, with adapted absorbent
  - Dry sand and extinguisher

- **Average cost : 100 000 $ / 50 millions Drams**

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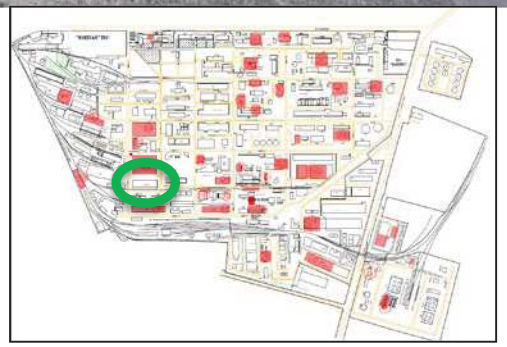
3. Temporary storage



The most adapted building is, in a first approximation the P3 (Main map nomenclature)

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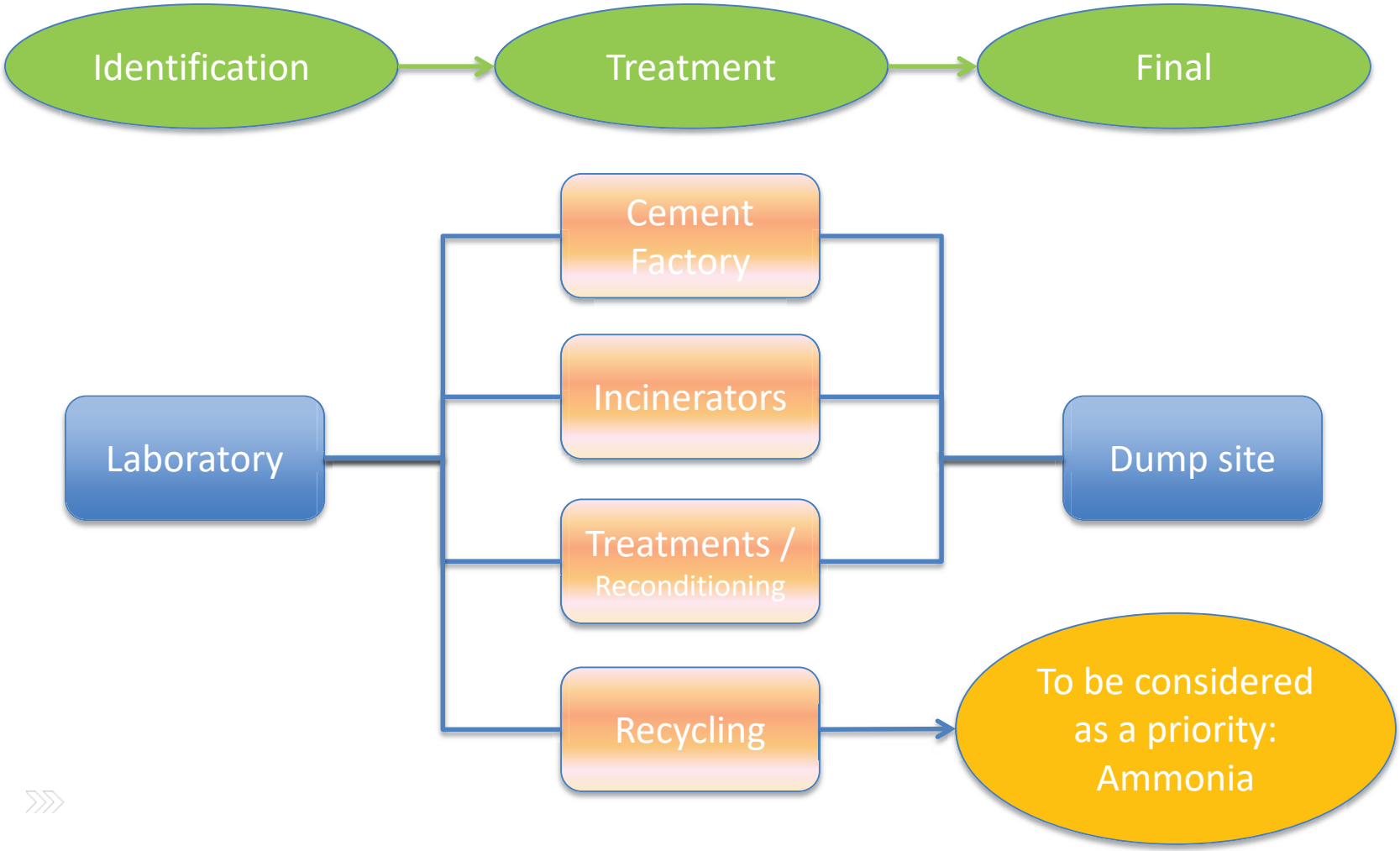
4. Waste management

Analyse to determine the best way of elimination



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4. Waste management

Identification of the best way for elimination

- **Needs :**
  - Identify companies which can reuse / recycle chemicals
  - Identify cement factory willing to use chemicals as fuel
  - Organize transport in safe conditions
  - Identify and prepare a dump site integrate in a wider context

- **Average cost for elimination : 5 to 10 millions $ / 2500 to 5000 millions Drams**

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How to continue

- Tests to understand how to remove safely the “Lack Etinol” polymerized in tanks?
- Map the cement fiber containing asbestos elements / recover and properly dump the material
- Map the electrical transformers potentially containing PCB oil
- Map underground sewage and pipes network to prevent pollution and fire/explosion
- Work on identification of proper solutions to eliminate the hazards (for instance incineration)

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Swiss Agency for Development and Cooperation SDC

Thank you for your attention