

Hydroxylammonium chloride



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IDENTIFICATION

Hydroxylammonium chloride
Hydroxylamine hydrochloride

ZVG No: 5080
CAS No: 5470-11-1
EC No: 226-798-2
INDEX No: 612-123-00-2

CHARACTERISATION

SUBSTANCE GROUP CODE

128130 Hydroxylamine and hydroxylammonium salts
133210 Chlorides

STATE OF AGGREGATION

The substance is solid.

PROPERTIES

crystalline
white
odourless

CHEMICAL CHARACTERISATION

Non-combustible substance.
Freely soluble in water.
Chemically unstable at increased temperature.
In particular, violent decomposition takes place while heating in a closed container.
Acute or chronic health hazards result from the substance.
The substance is hazardous to the aquatic environment.
(see: chapter REGULATIONS).

[Substance information in Wikipedia](#)

DUST EXPLOSIVENESS

No risk of dust explosion.

Quelle: [99999](#)

FORMULA

NH_3OHCl

$\text{NH}_2\text{OH} \cdot \text{HCl}$

H_4ClNO

$\text{HO}-\text{NH}_3^+ \quad \text{Cl}^-$

Molar mass: 69,49 g/mol

PHYSICAL AND CHEMICAL PROPERTIES

[Melting point](#) | [Density](#) | [Solubility](#) | [pH-value](#) |
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MELTING POINT

The substance decomposes when heated (see decomposition temperature).

Reference: [99999](#)

DENSITY

DENSITY

Value: 1,70 g/cm³

Temperature: 20,2 °C

Reference: [01211](#)

SOLUBILITY IN WATER

Concentration: 470 g/l

Temperature: 20 °C

Reference: [01211](#)

pH-VALUE

pH-value: 2,5 ... 3,5

Temperature: 20 °C

Concentration: 50 g/l

Reference: [01211](#)

HAZARDOUS REACTIONS

Decomposition temperature: > 140 °C

Explosion.

Under vacuum condition, already at 80 degree centigrade.

The thermal decomposition is accelerated by impurities.

Decompositon products

Hydrogen chloride
hydroxylamine

Hazardous chemical reactions

Risk of explosion in contact with:
bases
oxidizing agents
impact; friction; fire; heat; ignition sources
heavy metal salts
nitrates

TOXICOLOGY / ECOTOXICOLOGY

TOXICOLOGICAL DATA

LD50 oral rat

Value: 141 mg/kg

NTIS** National Technical Information Service. (Springfield, VA 22161) Formerly U.S. Clearinghouse for Scientific & Technical Information. Vol. OTS0555279. (RTECS)

Reference: 00438

OCCUPATIONAL HEALTH AND FIRST AID

[Routes of exposure](#) | [Toxic effects](#) | [First Aid](#) |
[Occupational health check](#)

ROUTES OF EXPOSURE

Main routes of exposure

The main intake pathway for hydroxylammonium chloride (H. hydrochloride) proceeds via the respiratory tract. [99999]

Respiratory tract

H. hydrochloride is a crystalline solid which is soluble in water and has a very low vapor pressure, so inhalative exposure could be mainly to dust but also to aerosols from solutions.

Inhalative toxicity tests carried out on rats (under conditions which may not have been optimal) did not reveal any significant effects, so that no indication on whether absorption took place can be derived from them. [8021, 99999]

Skin

Substance-specific data on absorption through the skin are not available. [99983]

Systemic effects seen following dermal application of bis(hydroxylammonium) sulfate (BHAS) to rabbits and a reported (high) dermal LD50 indicate that the hydroxylammonium ion penetrates the skin. [8021]

Nevertheless, the dermal absorption of BHAS from aqueous solutions is thought to be limited and a default value of 10% has been assumed. [2050]

Similar relationships could be expected for H. hydrochloride. [99999]

Gastrointestinal tract

Significant systemic effects seen following the swallowing of H. hydrochloride solution by humans indicate that toxicologically relevant absorption takes place. [8021]

Quantitative data are not available. [99983]

TOXIC EFFECTS

Main toxic effects

Acute:

Strong irritation to the eyes, mild irritation to the skin;

sensitization of the skin; [7619]

damage to the blood (formation of methemoglobin, hemolytic effect) and consequential effects

Chronic:

Skin changes through to skin damage,

hematotoxic effects and possibly damage to other organs [7619, 8021, 2050]

Acute toxicity

Valid information on irritation to the eyes and skin of humans is not available. [99983]

Severe edema and opacity of the cornea was seen in rabbits' eyes one hour following instillation of 50 mg of solid H. hydrochloride. The damage was not reversible within 8 days, so the substance was strongly irritating to rabbits' eyes.

There was no corneal damage when drops of an 8% solution were continually added for 5 min into the conjunctival sack of rabbits' eyes but when this was done for 30 min the conjunctiva were extremely swollen with dilatation of the pupil. No opacity of the cornea was seen but on the next day it was cyanotic and strongly edematous.

Skin contact with an 80% aqueous preparation of H. hydrochloride caused only minor irritation (flecks of reddening) which were reversible within a week. The classification was: slightly irritating to rabbits' skin.

H. hydrochloride causes sensitization both dermally and subcutaneously according to the available findings from animal studies.

Dermal toxicity testing of H. hydrochloride has apparently not been carried out. Nevertheless, investigations carried out on rats and rabbits using BHAS indicate that occlusive application of even low doses of hydroxylammonium salts (from about 10 mg/kg bw) can cause changes in the blood, in particular formation of methemoglobin (MetHb) and a reduction of the erythrocyte count. Higher doses led to higher levels of MetHb with signs of severe poisoning such as cyanosis and hypothermia. After 14 days the erythrocyte and leukocyte counts were still low and there was an increase in the reticulocyte count, also a discoloration and enlargement of the spleen.

Inhalative studies on rats which were exposed for 8 hours to an atmosphere saturated with H. hydrochloride at 20°C or inhaled a mist from a solution saturated with H. hydrochloride did not show any clinical findings. [8021]

Nevertheless, a MetHb content of up to 25% at the end of an 8 hour shift was reported from workplaces where hydroxylamine or its salts were handled. This must have resulted from inhalative or dermal exposure.

Oral intake of about 30 ml of an H. hydrochloride solution by a woman initially led to 2 hours without any complaints and then to nausea, vomiting, cyanosis and hemolytic anemia with leukocytosis and an increased erythrocyte sedimentation rate which persisted for weeks. [8021, 99999]

The result of an oral test on rats was an LD50 of 141 mg/kg bw. [2071]

Chronic toxicity

Following repeated exposure to H. hydrochloride, workers developed allergic dermatitis (erythematous-squamous type). The dermatitis appeared following exposure for 1 - 2 weeks but sometimes only after 3 - 5 years. The areas of the body affected were mainly the trunk and the lower third of the forearms. [7619, 7636]

In several studies workers (who had apparently already been sensitized) were tested diagnostically. For these persons, the application of 0.1% or 1% H. hydrochloride solution set off contact dermatitis. The only information available on systemic effects following repeated application is the results of oral, subcutaneous and intravenous animal experiments (on rats, cows and rabbits). In all cases damage to the blood (formation of MetHb, anemia, reticulocytosis and decreased hematocrit values) were seen. In one study an enlargement of the spleen and atrophy of the thyroid gland were also seen.

The hematotoxic effects (-> anemia) are also considered to be relevant to humans when there is long-term exposure to hydroxylamine and its salts. There could also be damage to the liver and kidneys (kidney damage probably resulting from the hemolysis).

A distinct neurotoxic effect was found in a study on rats following oral administration of 200 mg/kg bw of a 2% H. hydrochloride solution every 2nd day for 2 months (massive degeneration of the myelin sheath at the sciatic nerve with resulting paralysis). [8021]

Reproductive toxicity, mutagenicity, carcinogenicity

For classifying the reproductive toxicity and mutagenic and carcinogenic potential see list in Annex VI of the CLP regulation / TRGS 905 / List of MAK values (see section REGULATIONS).

Reproductive toxicity:

Embryotoxic or teratogenic effects were mostly only caused by H. hydrochloride under exceptional experimental conditions. Malformations were not even seen in rats following intraperitoneal administration of maternally toxic doses.

Mutagenicity:

There are a lot of data on the genotoxic potential of hydroxylamine and its salts but the data are often not valid, are partially inconsistent and the evaluation of the data apparently also differs.

[8021] Various in-vitro tests for gene mutation gave positive results but not the Ames tests.

H. hydrochloride gave negative results in an in-vivo chromosome aberration test conducted in the bone marrow of mice but was weakly positive in the mouse lymphoma assay. [8021, 2050]

Carcinogenicity:

There are grounds for suspecting carcinogenic potential.

[7510]

Several tests have been carried out on the cell transformation potential of H. hydrochloride and BHAS. The results of the tests were in part contradictory.

In a long-term feeding study on 2 strains of mice, the administration of 1% or 2% by weight in their feed had no influence on the life span of the animals and there were signs that H. hydrochloride inhibits the formation of spontaneous tumors. However, no carcinogenicity tests have been carried out in accordance with test guidelines currently used. [8021]

Biotransformation and excretion

It has been shown in comparative studies with liver preparations that in various species H. hydrochloride is reduced to ammonia by hydroxylamine reductase. These reductases show a strong dependency on the substrate. They carry out their functions only at very low concentrations and are hardly effective above these concentrations. In this way the organism is protected to a large extent against having the reverse reaction get the upper hand, i.e. the oxidation of ammonia to hydroxylamine. On the other hand, hydroxylamine is subjected to metabolic oxidation to form nitrate which is excreted via the urine. [8021]

Annotation

This occupational health information was compiled on 13.11.2012.

It will be updated if necessary.

FIRST AID

Eyes

As soon as possible:

Rinse the affected eye with widely spread lids for 10 minutes under running water whilst protecting the unimpaired eye.

Then, immediately transport the casualty to an eye doctor / to hospital.

Continue rinsing during the transport with isotonic saline solution, alternatively with water.

[2001, 99999]

Skin

Remove contaminated clothing while protecting yourself.

Rinse the affected skin areas for at least 10 to 20 minutes under running water.

Under no circumstances should alcohol, gasoline or other solvents be used.

Arrange for medical treatment.

Even if there is no/little irritation, following contact over a large area call an emergency physician to the site of the accident.

[2001, 99999]

Respiratory tract

Whilst protecting yourself remove the casualty from the hazardous area and take him to the fresh air.
Lay the casualty down in a quiet place and protect him against hypothermia.

Arrange medical treatment.

In the case of breathing difficulties have the casualty inhale oxygen.

If the casualty is unconscious but breathing lay him in a stable manner on his side.

[5200]

Whenever irritation is felt or is otherwise apparent in the airways:

As soon as possible repeatedly have the casualty deeply breath a glucocorticoid inhalation spray in.

Poisoning symptoms can appear after a period of delay.

[22]

Swallowing

Rinse the mouth and spit the fluids out.

If the casualty is conscious have him drink 1 glass of water (ca 200 ml).

During spontaneous vomiting hold the head of the casualty low with the body in a prone position in order to avoid aspiration.

In the meantime, call a physician to the site of the accident.

[5200]

Information for physicians

Once hydrolyzed, aqueous solutions of H. hydrochloride are acidic. A 0.1 molar solution has a pH of 3.4. However, the irritation expected seems to be less important than the systemic effects.

- Symptoms of acute poisoning:

Eyes: caused by the solid: corneal edema, corneal opacity, ciliary injection and purulence, iritis, danger of formation of staphyloma; caused by dilute solutions, possibly after a latency period of some hours: swelling of the conjunctiva, mydriasis, edematous cornea (foregoing information from animal experiments only)

Skin: mostly only patches of reddening, skin damage possibly more due to sensitization than to irritation, systemic effects expected following prolonged contact over a large skin area

Inhalation: no valid information available on the concentration-effect relationship; irritation in the airways could be caused by highly concentrated aerosols; absorptive effects not to be excluded

Ingestion: gastrointestinal irritation, absorptive effects

Absorption: (after a latency period) nausea, vomiting, cyanosis following formation of MetHb, increase in erythrocyte sedimentation rate; kidney function disturbances (albuminuria); possibly damage to other organ systems, e.g. spleen, liver and nervous systems, most likely due to high subacute exposure. [8021]

- Medical advice:

Following contact with the eyes, carry out first aid (very intensive rinsing with physiological saline solution), then further treatment by an ophthalmologist is required, irrespective of the extent of primary symptoms. [99999]

Wash contaminated skin areas thoroughly with water and soap. Areas affected by hyperemia can be treated with a dermatocorticoid foam spray. [7638] Even if contact with the skin is only suspected of having been intensive, watch for poisoning symptoms and admit the casualty to hospital in order to diagnose systemic effects (see below).

The same applies to inhalation of aerosols from the salts. In addition, the lung function should be checked because information is not available on the intensity of the irritation caused by aerosols.

Assisted ventilation with oxygen is recommended in any case. [99999]

If there is irritation in the airways following inhalation of aerosols prophylaxis for pulmonary edema using glucocorticoids is worthy of consideration. [22]

Following ingestion, irrespective of there was spontaneous vomiting, a gastrolavage (in intubation) should be considered provided it can be done within the first hour. For hypotension, carry out an early infusion using a blood plasma substitute (volume expander). For acidosis, infusion with sodium bicarbonate solution is required. [8088]

For seizures/spasm diazepam can be injected intravenously.

In any case, a therapy should be commenced early on if there are any signs of methemoglobinemia which can appear very rapidly (see below). [99999]

If there is any suspicion of poisoning pay special attention to checking the function of the cardiovascular system and kidneys, blood parameters (particularly MetHb level and hemogram) and acid-base balance. For increased MetHb level, immediate intravenous injection of toluidine blue (initially 2 - 4 mg/kg bw of a 3% solution) is indicated and repeated injection as necessary. As an adjuvant ascorbic acid (>1 g) can be administered orally or i.v. [8088]

Good diuresis is essential! [22]

An exchange blood transfusion is worthy of consideration following severe poisoning. [8088]

Recommendations

During the rehabilitation period carry out liver and kidney function tests, check the hemogram, function of the lungs and EEG. [7638]

Persons having damaged skin and those suffering from allergies should not be exposed to hydroxylamine and its salts. [7636]

Annotation

This first aid information was compiled on 13.11.2012.

It will be updated if necessary.

OCCUPATIONAL HEALTH CHECK

Prophylaxis offer: Occupational medical prevention has to be offered, when activities with exposure to this substance are conducted.

Deadlines: Occupational medical prevention has to be offered to employees prior to taking up work. Deadlines for the proposal of regularly recurrent occupational medical prevention are to gather from the Occupational Health Rule (Arbeitsmedizinische Regel) "[AMR Nummer 2.1](#)".

SAFE HANDLING

[Handling](#) | [Storage](#) | [Fire and explosion protection](#) | [Organisational measures](#) | [Personal protection](#) | [Disposal considerations](#) | [Accidental release measures](#) | [Fire fighting measures](#)

TECHNICAL MEASURES - HANDLING

Workplace

Work areas should be physically separated if possible.
Provision of good ventilation in the working area.
The floor should not have a floor drain.
Washing facility at the workplace required.
Eye bath required. These locations must be signposted clearly.

Equipment

Use closed apparatus if possible.
If release of the substance cannot be prevented, then it should be suctioned off at the point of exit.
Consider emission limit values, a purification of waste gases if necessary.
Label containers and pipelines clearly.

Unsuitable materials:

Copper
Aluminium
Zinc
tin

Advice on safer handling

Take care to maintain clean working place.
The substance must not be present at workplaces in quantities above that required for work to be progressed.
Do not leave container open.
Sufficient ventilation must be guaranteed for refilling, transfer, or open use.
Avoid spillage.
Fill only into labelled container.
Avoid any contact when handling the substance.
Avoid rising dust.
Use an appropriate exterior vessel when transporting in fragile containers.

Cleaning and maintenance

All rooms and equipment have to be cleaned regularly.
Use protective equipment while cleaning if necessary.
Avoid dust formation. Dust formation that cannot be avoided must be collected regularly.
Use tested industrial vacuum cleaners of class M.
Do not raise dust while cleaning.
Use of a blower for cleaning is not permitted.
A device that has become dirty may only be used in other work areas after it has been cleaned.
Only conduct maintenance and other work on or in the vessel or closed spaces after obtaining written permission.

TECHNICAL MEASURES - STORAGE

Storage

Do not use any food containers - risk of mistake.
Containers have to be labelled clearly and permanently.
Store in the original container as much as possible.
Do not use any metal containers.
Keep container tightly closed.
Recommended storage at room temperature.
Store in a dry place.
Protect from overheating/heating up.

Conditions of collocated storage

Storage class 4.1 A (Other explosive substances)

Only substances of the same storage class should be stored together.

Other potentially explosive substances of the storage group III as described in the second regulation to the "Sprengstoffgesetz". Combustion speed and effects of the fire are comparable to those for combustible substances.

Collocated storage with the following substances is prohibited:

- Pharmaceuticals, foods, and animal feeds including additives.
- Infectious, radioactive und explosive substances.
- Gases.
- Aerosols (spray bottles).
- Flammable liquids of storage class 3.
- Pyrophoric substances.
- Substances liberating flammable gases in contact with water.
- Strongly oxidizing and oxidizing substances of storage classes 5.1A and 5.1B.
- Ammonium nitrate and preparations containing ammonium nitrate.
- Combustible and non combustible acutely toxic substances of storage classes 6.1A and 6.1B.
- Combustible toxic or chronically acting substances of storage class 6.1C.
- Noncombustible toxic or chronically acting substances of storage class 6.1D.

Under certain conditions the collocated storage with the following substances is permitted (For more details see [TRGS 510](#) and the guidelines for storage of explosives No. 300 and 340):

- Flammable solid substances or desensitized substances of storage class 4.1B.
- Organic peroxides and self reactive substances.
- Combustible corrosive substances of storage class 8A.
- Noncombustible corrosive substances of storage class 8B.
- Combustible liquids of storage class 10.
- Combustible solids of storage class 11.
- Noncombustible liquids of storage class 12.
- Noncombustible solids of storage class 13.

The substance should not be stored with substances with which hazardous chemical reactions are possible.

TECHNICAL MEASURES - FIRE AND EXPLOSION PROTECTION

Technical, constructive measures

Substance is non-combustible. Select fire and explosion prevention measures according to the other used substances.
Inspect the electrical fittings regularly against the higher risk of corrosion.

ORGANISATIONAL MEASURES

Instruction on the hazards and the protective measures using instruction manual ([TRGS 555](#)) are required with signature if just more than one minor hazard was detected.

Instruction must be provided before employment and then at a minimum of once per annum thereafter.

An escape and rescue plan must be prepared when the location, scale, and use of the work-site so demand.

Observe the restrictions on juvenile employment as defined in the "Jugendarbeitsschutzgesetz".

PERSONAL PROTECTION

Body protection

Depending on the risk, wear a suitable protective clothing or a suitable chemical protection suit.

Respiratory protection

In an emergency (e.g.: unintentional release of the substance) respiratory protection must be worn. Consider the maximum period for wear.

Respiratory protection: Particle filter P3, colour code white.

Use insulating device for concentrations above the usage limits for filter devices, for oxygen concentrations below 17% volume, or in circumstances which are unclear.

Eye protection

Sufficient eye protection must be worn.

Wear glasses with side protection.

Hand protection

Use protective gloves. The glove material must be sufficiently impermeable and resistant to the substance. Check the tightness before wear. Gloves should be well cleaned before being removed, then stored in a well ventilated location. Pay attention to skin care.

Skin protection cremes do not protect sufficiently against the substance.

The following information is valid for aqueous, saturated solutions of the substance.

The following materials are suitable for protective gloves (Permeation time \geq 8 hours):

Natural rubber/Natural latex - NR (0,5 mm) (use non-powdered and allergen free products)

Polychloroprene - CR (0,5 mm)

Nitrile rubber/Nitrile latex - NBR (0,35 mm)

Butyl rubber - Butyl (0,5 mm)

Fluoro carbon rubber - FKM (0,4 mm)

Polyvinyl chloride - PVC (0,5 mm)

The times listed are suggested by measurements taken at 22 °C and constant contact. Temperatures raised by warmed substances, body heat, etc. and a weakening of the effective layer thickness caused by expansion can lead to a significantly shorter breakthrough time. In case of doubt contact the gloves' manufacturer. A 1.5-times increase / decrease in the layer thickness doubles / halves the breakthrough time. This data only applies to the pure substance. Transferred to mixtures of substances, these figures should only be taken as an aid to orientation.

Occupational hygiene

Foods, beverages and other articles of consumption must not be consumed at the work areas.

Suitable areas are to be designated for these purposes.

Avoid contact with skin. In case of contact wash skin.

Avoid contact with eyes. In case of contact rinse the affected eye(s).

Avoid inhalation of dust.

Avoid contact with clothing. Contaminated clothes must be exchanged and cleaned carefully.

Provide washrooms with showers and if possible rooms with separate storage for street clothing and work clothing.

The skin must be washed with soap and water before breaks and at the end of work. Apply fatty skin-care products after washing.

Take care of personal hygiene.

DISPOSAL CONSIDERATIONS

Hazardous waste according to Waste Catalogue Ordinance (AVV).

If there is no way of recycling it must be disposed of in compliance with the respective national and local regulations.

Do not put/place waste into sink or dust bin.

Explosive substances (storage class 4.1A) should be packed separately and tightly sealed for disposal. Ensure sufficient phlegmatization by water or the stated phlegmatizing agent.

ACCIDENTAL RELEASE MEASURES

Wear personal protective equipment (see chapter Personal Protection).

Pick up without creating dust.

Afterwards ventilate area and wash spill site.

Endangerment of water:

Severe hazard to waters. Avoid penetration into water, drainage, sewer, or the ground. Inform the responsible authorities about penetration of even small quantities.

FIRE FIGHTING MEASURES

Instructions

Substance is incombustible. Select fire fighting measures according to the surrounding conditions.

In case of ambient fire:

Cool surrounding containers with water spray.

If possible, take container out of dangerous zone.

Rise in pressure and risk of bursting when heating.

Explosive decomposition above 100 degree C.

Do not allow runoff to get into the sewage system.

Special protective equipment

In the case of inclusion in an ambient fire hazardous substances can be released.

Nitrous gases (nitric oxides)

Hydrogen chloride

Wear self-contained breathing apparatus and special tightly sealed suit.

REGULATIONS

[GHS Classification/Labelling](#) | [Workplace labelling](#) | [Water hazard class](#) | [Air quality control](#) | [Transport Regulations](#) | [MAK recommendations](#) | [SevesoIII](#) | [Restriction of use](#) | [Technical rules](#) | [Regulations of accident insurers](#) | [Occupational health check](#)

EUROPEAN GHS CLASSIFICATION AND LABELLING

Classification

Corrosive to metals, Category 1; H290

Acute toxicity, Category 4, oral; H302

Acute toxicity, Category 4, dermal; H312

Skin irritation, Category 2; H315

Skin sensitisation, Category 1; H317

Eye irritation, Category 2; H319

Carcinogenicity, Category 2; H351

Specific Target Organ Toxicity (repeated exposure), Category 2; H373

Hazardous to the aquatic environment, Acute Category 1; H400



Signal Word "Warning"

Hazard Statement - H-phrases

H290: May be corrosive to metals.
H302+H312: Harmful if swallowed or in contact with skin.
H315: Causes skin irritation.
H317: May cause an allergic skin reaction.
H319: Causes serious eye irritation.
H351: Suspected of causing cancer.
H373: May cause damage to organs through prolonged or repeated exposure.
H400: Very toxic to aquatic life.

Precautionary Statement - P-phrases

P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+P312+P330: IF SWALLOWED: Call a POISON CENTER or doctor/physician 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.

Manufacturer's specification by Sigma-Aldrich

GESTIS advice:

Substances or mixtures classified as corrosive to metals but not classified as skin corrosion or as serious eye damage (Category 1) do not require on the label the hazard pictogram GHS05.' (Regulation (EU) No. 2016/918 of 19th May 2016 - Annex I).

Reference: [01221](#)

State: 2018

Checked: 2019

The substance is listed in appendix VI, table 3 of CLP regulation.
The given classification can deviate from the listed classification, since this classification is to be complemented concerning missing or divergent danger classes and categories for the respective substance.

Reference: [99999](#)

GHS-CLASSIFICATION OF MIXTURES

The classification of mixtures containing this substance results from Annex 1 of Regulation (EC) 1272/2008.

Special rules for supplemental label elements according to Regulation (EC) No 1272/2008 Annex II, No 2.8: The label on the packaging of mixtures containing at least one substance classified as sensitising and present in a concentration equal to or greater than 0,1 % or in a concentration equal to or greater than that specified under a specific note for the substance in part 3 of Annex VI shall bear the statement:

EUH208 - 'Contains (name of sensitising substance). May produce an allergic reaction'

Reference: [07501](#)

WORKPLACE LABELLING ACCORDING TO GERMAN ASR A1.3

Precept label



Use safety goggles



Wear safety
gloves

GERMAN WATER HAZARD CLASS

Substance No: 2937

WGK 3 - severe hazard to waters

Classification according to the announcement of the list of substances hazardous to water in the Federal Register of 10.08.2017, last update 24.11.2023

TECHNICAL INSTRUCTIONS ON AIR QUALITY CONTROL (TA LUFT)

Chapter 5.2.2 Inorganic Dusts, class III

Also with the presence of several substances of the same class, the following values are not allowed to be exceeded in the exhaust gas:

Mass flow: 5 g/hr

or

Mass conc.: 1 mg/m³

TRANSPORT REGULATIONS

UN Number: 2923

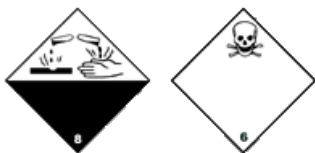
Shipping name: Corrosive solid, toxic,
n.o.s.

Hazard Identification Number: 86

Class: 8 (Corrosive Substances)

Packing Group: III (low danger)

Danger Label: 8/6.1



Special labelling: Symbol (fish and tree)



Classification code: CT2

Tunnel restrictions:

Passage forbidden through tunnels of category E.

Reference: [01221](#)

RECOMMENDATIONS OF MAK-COMMISSION

This data is recommended by scientific experience and is not established law.

Risk of sensitization of skin

DIRECTIVE 2012/18/EU (Seveso III)

The substance is subject to the hazard categories of the Hazardous Incident Ordinance:

E1 Hazardous to the aquatic environment, Category Acute 1 or Chronic 1

Quantity thresholds for determination of operation scopes:

Annex I Part 1 Section: E1
Hazardous to the aquatic environment
Qualifying quantity for the application of
Lower-tier requirements: 100 t
Upper-tier requirements: 200 t

RESTRICTIONS OF USE / BANS OF USE

REACH Regulation (EC) No 1907/2006 Annex XVII

Annex XVII, Point 75

Mixtures containing certain hazardous substances shall no longer be placed on the market for tattooing purposes. Mixtures containing such substances in specified concentrations shall no longer be used for tattooing purposes after 04.01.2022. Substances falling within one or more of the following points:

- carcinogenic or reproductive toxic substances according to Part 3 of Annex VI to CLP Regulation (excluding the classification due to effects only following exposure by inhalation),
- skin-sensitising, skin-corrosive, skin-irritant, serious eye-damaging or eye-irritant substances according to Annex VI Part 3 of the CLP Regulation,
- substances listed with specified conditions in Annex II or IV to Regulation (EC) No 1223/2009 [Cosmetics Regulation], and
- substances listed in Appendix 13 to Annex XVII (point 75) of the REACH Regulation.

In general, mixtures placed on the market for use for tattooing purposes must be labelled "Mixture for use in tattoos or permanent make-up." from 04.01.2022 on and may not be used for tattooing purposes without this labelling. Further safety information shall be provided on the packaging or in the instructions for use. Before using a mixture for tattooing purposes, the person using the mixture shall provide this information to the person undergoing the procedure.

Further information on the restrictions, concentration limits and exemptions can be taken from the Regulation.

Annex XVII to Regulation (EC) No 1907/2006, [consolidated version](#) (BAUA) (only in German)

TECHNICAL RULES FOR HAZARDOUS SUBSTANCES

[TRGS 201](#)

Einstufung und Kennzeichnung bei Tätigkeiten mit Gefahrstoffen; Ausgabe Februar 2017, zuletzt geändert und ergänzt April 2018

[TRGS 400](#)

Gefährdungsbeurteilung für Tätigkeiten mit Gefahrstoffen; Ausgabe Juli 2017

[TRGS 555](#)

Betriebsanweisung und Information der Beschäftigten; Ausgabe Februar 2017

[TRGS 600](#)

Substitution; Ausgabe Juli 2020

[TRGS 401](#)

Gefährdung durch Hautkontakt, Ermittlung - Beurteilung - Maßnahmen; Ausgabe Oktober 2022

[TRGS 500](#)

Schutzmaßnahmen; Ausgabe September 2019

[TRGS 509](#)

Lagern von flüssigen und festen Gefahrstoffen in ortsfesten Behältern sowie Füll- und Entleerstellen für ortsbewegliche Behälter; Ausgabe Juni 2022

[TRGS 510](#)

Lagerung von Gefahrstoffen in ortsbeweglichen Behältern; Ausgabe Januar/Dezember 2020

REGULATIONS OF GERMAN ACCIDENT INSURERS

[DGUV Regel 112-190](#)

Benutzung von Atemschutzgeräten; Ausgabe November 2021
(in German only)

LINKS

[DGUV Information 213-098: List of substances - lesson in schools \(in German only\)](#)

REFERENCES

Quelle: 00001

IFA: Erfassungs- und Pflegehandbuch der GESTIS-Stoffdatenbank (nicht öffentlich)
Data acquisition and maintenance manual of the GESTIS substance database (non-public)

Quelle: 00022

G. Hommel
"Handbuch der gefährlichen Güter" Loseblattsammlung mit Ergänzungslieferungen
"Handbook of dangerous goods " loose-leaf collection with supplement deliveries
Springer-Verlag, Heidelberg

Quelle: 00438

Registry of Toxic Effects of Chemical Substances (RTECS)

Quelle: 01211

GHS-Sicherheitsdatenblatt, Merck
GHS Material Safety Data Sheet, Merck

Quelle: 01221

GHS-Sicherheitsdatenblatt, Sigma-Aldrich
GHS Material Safety Data Sheet, Sigma-Aldrich

Quelle: 01271

GHS-Sicherheitsdatenblatt, BASF
GHS Material Safety Data Sheet, BASF

Quelle: 02001

International Chemical Safety Cards (ICSC)

Quelle: 02050

European Union "Risk Assessment Report" European Chemicals Bureau

Quelle: 02071

Toxicological Data, compiled by the National Institute of Health (NIH), USA, selected and distributed by Technical Database Services (TDS), New York, 2009

Quelle: 05116

Kühn-Birett-Merkblätter: 116. Ergänzungslieferung; 04/99

Quelle: 05200

Kühn-Birett "Merkblätter Gefährliche Arbeitsstoffe" Loseblattsammlung mit Ergänzungslieferungen, ecomed Sicherheit, Landsberg

Quelle: 05300

[TRGS 510](#) "Lagerung von Gefahrstoffen in ortsbeweglichen Behältern" Ausgabe Dezember 2020

Quelle: 06002

L. Roth, U. Weller

"Gefährliche Chemische Reaktionen" Loseblattsammlung mit Ergänzungslieferungen, ecomed-Verlag ("Dangerous chemical reactions" loose-leaf collection with supplement deliveries)

Quelle: 07501

Verordnung (EG) Nr. 790/2009 der Kommission vom 10. August 2009 zur Änderung der Verordnung (EG) Nr. 1272/2008 des Europäischen Parlaments und des Rates über die Einstufung, Kennzeichnung und Verpackung von Stoffen und Gemischen zwecks Anpassung an den technischen und wissenschaftlichen Fortschritt (EG-GHS-Verordnung, 1. Änderung)

Quelle: 07510

Verordnung (EG) Nr. 1272/2008 des Europäischen Parlaments und des Rates vom 16. Dezember 2008 über die Einstufung, Kennzeichnung und Verpackung von Stoffen und Gemischen, geändert durch Verordnung (EG) Nr. 790/2009 der Kommission vom 10. August 2009 (EG-GHS-Verordnung) (ehemals Richtlinie 67/548/EWG mit Anpassungsrichtlinien in der jeweils gültigen Fassung).

Quelle: 07580

Bekanntmachung der Liste der wassergefährdenden Stoffe im Bundesanzeiger vom 10.08.2017, zuletzt geändert 24.11.2023

Quelle: 07619

DFG Deutsche Forschungsgemeinschaft: The MAK-Collection for Occupational Health and Safety, nach Veröffentlichungsdatum zu finden unter:

bis 2002 Verlag Chemie

ab 2002 Online: <http://onlinelibrary.wiley.com/book/10.1002/3527600418/topics?filter=#>

ab 2020 Online:

<https://series.publisso.de/en/pgseries/overview/mak/dam/allContents/alphabetical>

Quelle: 07636

L. Parmeggiani (Edt.) "Encyclopedia of Occupational Health and Safety" 3. Auflage, International Labour Office, Genf 1983

Quelle: 07638

M. Daunerer "Toxikologische Enzyklopädie - Klinische Toxikologie - Giftinformation, Giftnachweis, Vergiftungstherapie" Loseblatt-Ausgabe, ecomed-Verlagsgesellschaft mbH, Landsberg

Quelle: 07795

H. Geerßen "GloSaDa 2000 Plus - Glove Safety Data"

Quelle: 08021

BG Chemie "Toxikologische Bewertungen" Ausgabe 11/2000

Quelle: 08088

Reinhard Ludewig, Ralf Regenthal "Akute Vergiftungen und Arzneimittelüberdosierungen" 10. Auflage, Wissenschaftliche Verlagsgesellschaft Stuttgart, 2007

Quelle: 08112

DFG Deutsche Forschungsgemeinschaft: MAK- und BAT-Werte-Liste 2023, Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe, Mitteilung 59; GMS PUBLISSO

Quelle: 99983

Liste arbeitsmedizinisch-toxikologischer Standardwerke (2)

List of standard references regarding occupational health and toxicology (2)

Quelle: 99999

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