

Safety Data Sheet

chlorine

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878

SDS Reference Number: D-Cl2-022

Issue date: 4/1/2015 Revision date: 12/17/2025 Supersedes version of: 2/11/2022 Version: 4.3

Danger



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

1.1. Product identifier

Trade name : chlorine
SDS no : D-Cl2-022
Other means of identification : chlorine
CAS-No. : 7782-50-5
EC-No. : 231-959-5
EC Index-No. : 017-001-00-7
REACH registration No : 01-2119486560-35
Chemical formula : Cl₂

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

Relevant identified uses : See the list of identified uses and exposure scenarios in the annex of the safety data sheet.
Perform risk assessment prior to use.

Uses advised against : Consumer use.
Uses other than those listed above are not supported, contact your supplier for more information on other uses.
Attention: These products must not be applied to humans or animals unless they are expressly designated as medical or medicinal gases!.

1.3. Details of the supplier of the safety data sheet

Messer Industriegase GmbH
Messer- Platz 1
D - 65812 Bad Soden am Taunus
Germany
T +49 (0) 6196 7760-200, F +49 (0) 6196 7760-280
SDB.de@messergroup.com, www.messer.de

1.4. Emergency telephone number

Emergency telephone number : Messer Produktionsgesellschaft mbH Salzgitter, +49 (0) 5341 21-9333, erreichbar Montags 0:00 bis Sonntags 24:00

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

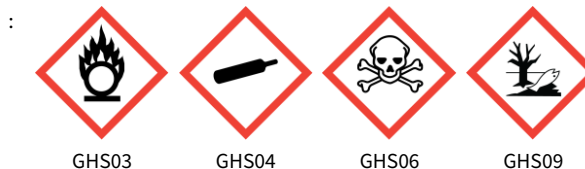
Classification according to Regulation (EC) No. 1272/2008 [CLP]

| | | | |
|-----------------------|--|------|---------|
| Physical hazards | Oxidising Gases, Category 1 | H270 | |
| | Gases under pressure : Liquefied gas | H280 | |
| Health hazards | Acute toxicity (inhalation:gas) Category 2 | H330 | |
| | Skin corrosion/irritation, Category 2 | H315 | |
| | Serious eye damage/eye irritation, Category 2 | H319 | |
| | Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation | H335 | |
| Environmental hazards | Hazardous to the aquatic environment – Acute Hazard, Category 1 | H400 | (M=100) |

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



Signal word (CLP)

: Danger

Hazard statements (CLP)

: H270 - May cause or intensify fire; oxidiser.
 H280 - Contains gas under pressure; may explode if heated.
 H315 - Causes skin irritation.
 H319 - Causes serious eye irritation.
 H330 - Fatal if inhaled.
 EUH071 - Corrosive to the respiratory tract.

 EUH071 supersedes H335 when assigned in the classification.

Precautionary statements (CLP)

- Prevention

: P280 - Wear eye protection, face protection, protective clothing, protective gloves.
 P273 - Avoid release to the environment.
 P260 - Do not breathe gas, vapours.
 P244 - Keep valves and fittings free from oil and grease.
 P220 - Keep away from clothing and other combustible materials.

- Response

: P332+P313 - If skin irritation occurs: Get medical advice/attention.
 P304+P340+P315 - IF INHALED : Remove person to fresh air and keep comfortable for breathing. Get immediate medical advice.
 P305+P351+P338+P315 - IF IN EYES : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice.
 P370+P376 - In case of fire: Stop leak if safe to do so.
 P302+P352 - IF ON SKIN: Wash with plenty of water.

- Storage

: P405 - Store locked up.
 P403 - Store in a well-ventilated place.

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2.3. Other hazards

Not classified as PBT or vPvB.
The substance/mixture has no endocrine disrupting properties.
Not classified as PMT or vPvM.

SECTION 3: Composition/information on ingredients

3.1. Substances

| Name | Product identifier | % | Classification according to Regulation (EC) No. 1272/2008 [CLP] ATE, EUH-statements, M-Factors |
|----------|--|-----|---|
| chlorine | CAS-No.: 7782-50-5 EC-No.: 231-959-5 EC Index-No.: 017-001-00-7 REACH registration No: 01-2119486560-35 | 100 | Ox. Gas 1, H270 Press. Gas (Liq.), H280 Acute Tox. 2 (Inhalation:gas), H330 (ATE=146.5 ppmv/4h) Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335 Aquatic Acute 1, H400 (M=100) |

| Name | Product identifier | Specific concentration limits (%) |
|----------|--|-----------------------------------|
| chlorine | CAS-No.: 7782-50-5 EC-No.: 231-959-5 EC Index-No.: 017-001-00-7 REACH registration No: 01-2119486560-35 | (1 ≤ C ≤ 100) STOT SE 3; H335 |

Contains no other components or impurities which will influence the classification of the product.

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
- Skin contact : Remove contaminated clothing. Drench affected area with water for at least 15 minutes.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

May cause irritation to cornea (with temporary disturbance to vision).
May cause irritation to skin.
Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.
See section 11.

4.3. Indication of any immediate medical attention and special treatment needed

Obtain medical assistance.
Treat with corticosteroid spray as soon as possible after inhalation.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog.
Product does not burn, use fire control measures appropriate for the surrounding fire.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Specific hazards : Supports combustion.
Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : None that are more hazardous than the product itself.

5.3. Advice for firefighters

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel
- : Act in accordance with local emergency plan.
 - Try to stop release.
 - Evacuate area.
 - Eliminate ignition sources.
 - Ensure adequate air ventilation.
 - Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
 - Stay upwind.
 - See section 8 of the SDS for more information on personal protective equipment.
- For emergency responders
- : Monitor concentration of released product.
 - Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
 - See section 5.3 of the SDS for more information.

6.2. Environmental precautions

- Try to stop release.
- Reduce vapour with fog or fine water spray.

6.3. Methods and material for containment and cleaning up

- Hose down area with water.
- Wash contaminated equipment or sites of leaks with copious quantities of water.

6.4. Reference to other sections

- See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product

- : Avoid contact with aluminium.
- Use no oil or grease.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Avoid exposure, obtain special instructions before use.
- Do not smoke while handling product.
- Keep equipment free from oil and grease. For more guidance, refer to the EIGA Doc. 33 - Cleaning of Equipment for Oxygen Service downloadable at <http://www.eiga.eu>.
- Avoid suck back of water, acid and alkalis.
- Only experienced and properly instructed persons should handle gases under pressure.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Installation of a cross purge assembly between the container and the regulator is recommended.
- Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
- The product must be handled in accordance with good industrial hygiene and safety procedures.
- Consider pressure relief device(s) in gas installations.
- Do not breathe gas.
- Avoid release of product into work area.
- Use only lubricants and sealings approved for the specific gas service.

Safe handling of the gas receptacle

- : Do not allow backfeed into the container.
- Protect containers from physical damage; do not drag, roll, slide or drop.
- When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
- Leave valve protection caps, when provided, in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- If user experiences any difficulty operating valve discontinue use and contact supplier.
- Never attempt to repair or modify container valves or safety relief devices.
- Damaged valves should be reported immediately to the supplier.
- Keep container valve outlets clean and free from contaminants particularly oil and water.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to transfer gases from one cylinder/container to another.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Do not remove or deface labels provided by the supplier for the identification of the content of the container.
- Suck back of water into the container must be prevented.
- Open valve slowly to avoid pressure shock.

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7.2. Conditions for safe storage, including any incompatibilities

Store locked up.
 Segregate from flammable gases and other flammable materials in store.
 Observe all regulations and local requirements regarding storage of containers.
 Containers should not be stored in conditions likely to encourage corrosion.
 Container valve guards or caps, when provided, should be in place.
 Containers should be stored in the vertical position and properly secured to prevent them from falling over.
 Stored containers should be periodically checked for general condition and leakage.
 Keep container below 50°C in a well ventilated place.
 Store containers in location free from fire risk and away from sources of heat and ignition.
 Keep away from combustible materials.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

| chlorine (7782-50-5) | |
|--|--|
| Germany - Occupational Exposure Limits (TRGS 900) | |
| Local name | Chlor |
| AGW (OEL TWA) | 1.5 mg/m ³ |
| | 0.5 ppm |
| Peak exposure limitation factor | 1(l) |
| Remark | DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich); Y - Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden |
| Regulatory reference | TRGS900 |

| chlorine (7782-50-5) | |
|--|------------------------|
| DNEL: Derived no effect level (Workers) | |
| Acute - local effects, inhalation | 1.5 mg/m ³ |
| Acute - systemic effects, inhalation | 1.5 mg/m ³ |
| Long-term - local effects, inhalation | 0.75 mg/m ³ |
| Long-term - systemic effects, inhalation | 0.75 mg/m ³ |

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| chlorine (7782-50-5) | |
|---|---------------|
| PNEC: Predicted no effect concentration | |
| Aqua (freshwater) | 0.00021 mg/l |
| Aqua (marine water) | 0.000042 mg/l |
| Aquatic, intermittent releases | 0.00026 mg/l |
| Micro-organisms in sewage treatment plant (STP) | 0.03 mg/l |

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Product to be handled in a closed system and under strictly controlled conditions.
 Provide adequate general and local exhaust ventilation.
 Preferably use permanent leak-tight installations (e.g. welded pipes).
 Systems under pressure should be regularly checked for leakages.
 Ensure exposure is below occupational exposure limits (where available).
 Gas detectors should be used when toxic gases may be released.
 Consider the use of a work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:

PPE compliant to the recommended EN/ISO standards should be selected.

• Eye/face protection

: Wear goggles and a face shield when transfilling or breaking transfer connections.

Provide readily accessible eye wash stations and safety showers.

Standard EN 166 - Personal eye-protection - specifications.

Standard EN ISO 16321-1 - Eye and face protection for occupational use Part 1: General requirements.

• Skin protection

- Hand protection

: Wear working gloves when handling gas containers.

Wear chemically resistant protective gloves.

Standard EN 374 - Protective gloves against chemicals.

Standard EN 388 - Protective gloves against mechanical risks, performance level 1 or higher.

Recommended types include wrist gloves from leather or synthetic material with equivalent performance, fabric gloves, fabric gloves with leather palms.

Permeation time: minimum >30min short term exposure: material / thickness [mm] Chloroprene rubber (CR) 0,4.

Permeation time: minimum >480min long term exposure: material / thickness [mm]

Fluoroelastomer (FKM) 0,7.

Consult glove manufacturer's product information on material suitability and material thickness.

The breakthrough time of the selected gloves must be greater than the intended use period.

- Other

: Keep suitable chemically resistant protective clothing readily available for emergency use.

Standard EN943-1 - Full protective suits against liquid, solid and gaseous chemicals.

Wear safety shoes while handling containers.

Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

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- Respiratory protection
 - : Recommended: Filter B (grey).
 - Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
 - Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known.
 - Use gas filters with full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers.
 - Gas filters do not protect against oxygen deficiency.
 - Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks .
 - Keep self contained breathing apparatus readily available for emergency use.
 - Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

- Thermal hazards
 - : None in addition to the above sections.

8.2.3. Environmental exposure controls

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

- Physical state at 20°C / 101.3kPa : Gas.
- Colour : Greenish gas.
- Odour : Pungent.
- Melting point / Freezing point : -101 °C
- Boiling point : -34 °C
- Flammability : Non flammable.
- Lower explosion limit : Not applicable.
- Upper explosion limit : Not applicable.
- Flash point : Not applicable for gases and gas mixtures.
- Auto-ignition temperature : Non flammable.
- Decomposition temperature : Not applicable.
- pH : If dissolved in water pH-value will be affected.
- Viscosity, kinematic : No reliable data available.
- Water solubility [20°C] : 8620 mg/l
- Partition coefficient n-octanol/water (Log Kow) : Not applicable for inorganic products.
- Vapour pressure [20°C] : 6.8 bar(a)
- Vapour pressure [50°C] : 14.3 bar(a)
- Density and/or relative density : Not applicable for gases and gas mixtures.
- Relative vapour density (air=1) : 2.5
- Particle characteristics : Not applicable for gases and gas mixtures.
Nanoforms are not relevant for gases and gas mixtures.

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Oxidising properties : Oxidiser.
- Coefficient of oxygen equivalency (Ci) : 0.7
Critical temperature [°C] : 144 °C

9.2.2. Other safety characteristics

Molar mass : 71 g/mol
Other data : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Violently oxidises organic material.

10.4. Conditions to avoid

Avoid moisture in installation systems.

10.5. Incompatible materials

May react violently with alkalis.
With water causes rapid corrosion of some metals.
Reacts with water to form corrosive acids.
Moisture.
May react violently with combustible materials.
May react violently with reducing agents.
Keep equipment free from oil and grease. For more guidance, refer to the EIGA Doc. 33 - Cleaning of Equipment for Oxygen Service downloadable at <http://www.eiga.eu>.
For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity : Fatal if inhaled.

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| chlorine (7782-50-5) | |
|-----------------------------|--|
| LC50 Inhalation - Rat [ppm] | 293 ppm/1h (ADR) 146.5 ppm/4h (CLP) |

- Skin corrosion/irritation** : Causes skin irritation.
 - Serious eye damage/irritation** : Causes serious eye irritation.
 - Respiratory or skin sensitisation** : No known effects from this product.
 - Germ cell mutagenicity** : No known effects from this product.
 - Carcinogenicity** : No known effects from this product.
 - Toxic for reproduction : Fertility** : No known effects from this product.
 - Toxic for reproduction : unborn child** : No known effects from this product.
 - STOT-single exposure** : May cause inflammation of the respiratory system.
Severe corrosion to the respiratory tract at high concentrations.
 - Target organ(s)** : Respiratory tract.
 - STOT-repeated exposure** : No known effects from this product.
 - Aspiration hazard** : Not applicable for gases and gas mixtures.
- 11.2. Information on other hazards**
- Other information : Delayed fatal pulmonary oedema possible.
The substance/mixture has no endocrine disrupting properties.

SECTION 12: Ecological information

12.1. Toxicity

- Assessment : Very toxic to aquatic life.
- EC50 48h - Daphnia magna [mg/l] : 0.141 mg/l
- EC50 72h - Algae [mg/l] : 0.001 - 0.01 mg/l
- LC50 96 h - Fish [mg/l] : 0.032 mg/l

12.2. Persistence and degradability

- Assessment : Not applicable for inorganic products.

12.3. Bioaccumulative potential

- Assessment : No data available.

12.4. Mobility in soil

- Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.
Partition into soil is unlikely.

12.5. Results of PBT and vPvB assessment

- Assessment : Not classified as PBT or vPvB.

12.6. Endocrine disrupting properties

- Assessment : The substance/mixture has no endocrine disrupting properties.

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12.7. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.
Not classified as PMT or vPvM.

Effect on the ozone layer : No effect on the ozone layer.

Effect on global warming : No known effects from this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.

Ensure that the emission levels from local regulations or operating permits are not exceeded.

Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.eu> for more guidance on suitable disposal methods.

Must not be discharged to atmosphere.

Return unused product in original container to supplier.

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 16 05 04 *: Gases in pressure containers (including halons) containing hazardous substances.

13.2. Additional information

External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information

14.1. UN number or ID number

In accordance with ADR / RID / IMDG / IATA / ADN
UN-No. : 1017

14.2. UN proper shipping name

Transport by road/rail/inland waterways (ADR/RID/ADN) : CHLORINE

Transport by air (ICAO-TI / IATA-DGR) : Chlorine

Transport by sea (IMDG) : CHLORINE

14.3. Transport hazard class(es)

Labelling



2.3 : Toxic gases.

5.1 : Oxidizing substances.

8 : Corrosive substances.

Environmentally hazardous substances

Transport by road/rail/inland waterways (ADR/RID/ADN)

Class : 2

Classification code : 2TOC

Hazard identification number : 265
Tunnel Restriction : C/D - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage :
Passage forbidden through tunnels of category D and E

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.3 (5.1, 8)
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-U

14.4. Packing group

Transport by road/rail/inland waterways : Not applicable.
(ADR/RID/ADN)
Transport by air (ICAO-TI / IATA-DGR) : Not applicable.
Transport by sea (IMDG) : Not applicable.

14.5. Environmental hazards

Transport by road/rail/inland waterways : Environmentally hazardous substance / mixture.
(ADR/RID/ADN)
Transport by air (ICAO-TI / IATA-DGR) : Environmentally hazardous substance / mixture.
Transport by sea (IMDG) : Marine pollutant.

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail/inland waterways : P200.
(ADR/RID/ADN)
Transport by air (ICAO-TI / IATA-DGR)
Passenger and Cargo Aircraft : Forbidden.
Cargo Aircraft only : Forbidden.
Transport by sea (IMDG) : P200.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Before transporting product containers:
- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

SECTION 15: Regulatory information

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

EU-Regulations

Restrictions on use : None.

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Other information, restriction and prohibition regulations : None.
 Not listed on the PIC list (Regulation EU 649/2012).
 Not listed on the POP list (Regulation EU 2019/1021).

Seveso Directive : 2012/18/EU (Seveso III) : Listed.

| Seveso III Part II (Named dangerous substances) | Qualifying quantity (tonnes) | |
|---|------------------------------|------------|
| | Lower-tier | Upper-tier |
| 10. Chlorine | 10 | 25 |

National regulations

Water hazard class (WGK) : 2 - Significantly hazardous to water.

Kenn-Nr. : 223

Regulatory reference : Law on the Protection of Young People at Work (Jugendarbeitsschutzgesetz-JArbSchG)
 Ordinance on Industrial Safety and Health (BetrSichV)
 TRBS 3145/TRGS 745 - Transportable pressurized gas containers - Filling, holding, internal transport, emptying
 TRGS 510 - Storage of hazardous substances in transportable containers
 TRGS 407 - Activities with gases - Risk assessment
 TRBS 2141 - Hazards due to steam and pressure - General requirements
 The Ordinance on Installations for the Handling of Substances Hazardous to Water (AwSV)
 Storage class according to TRGS 510: 2A Gases (without aerosol dispensers and lighters)
 Technical Instructions on Air Quality Control (TA Luft).
 Gesetz zum Schutz von Müttern bei der Arbeit, in der Ausbildung und im Studium (Mutterschutzgesetz - MuSchG)
 Verordnung über Verbote und Beschränkungen des Inverkehrbringens gefährlicher Stoffe, Zubereitungen und Erzeugnisse nach dem Chemikaliengesetz (Chemikalien-Verbotsverordnung-ChemVerbotsV).

15.2. Chemical safety assessment

A CSA has been carried out.

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 2020/878.

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Abbreviations and acronyms

- : ATE - Acute Toxicity Estimate.
- CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008.
- REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.
- EINECS - European Inventory of Existing Commercial Chemical Substances.
- CAS# - Chemical Abstract Service number.
- PPE - Personal Protection Equipment.
- LC50 - Lethal Concentration to 50 % of a test population.
- RMM - Risk Management Measures.
- PBT - Persistent, Bioaccumulative and Toxic.
- vPvB - Very Persistent and Very Bioaccumulative.
- STOT- SE : Specific Target Organ Toxicity - Single Exposure.
- CSA - Chemical Safety Assessment.
- EN - European Standard.
- UN - United Nations.
- ADR - Agreement concerning the International Carriage of Dangerous Goods by Road.
- IATA - International Air Transport Association.
- IMDG code - International Maritime Dangerous Goods.
- RID - Regulations concerning the International Carriage of Dangerous Goods by Rail.
- WGK - Water Hazard Class.
- STOT - RE : Specific Target Organ Toxicity - Repeated Exposure.
- UFI : Unique Formula Identifier.
- ADN -International Carriage of Dangerous Goods by Inland Waterways.
- PROC -Process category.
- ERC – Environmental release category.
- PMT - Persistent, Mobile and Toxic.
- vPvM – very Persistent and very Mobile.

Training advice

- : Users of breathing apparatus must be trained.
- Ensure operators understand the toxicity hazard.

Further information

- : Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP).
- Key literature references and sources of data are maintained in EIGA Doc 169 : 'Classification and Labelling Guide', downloadable at <http://www.Eiga.eu> .

| Full text of H- and EUH-statements | |
|------------------------------------|--|
| Acute Tox. 2 (Inhalation:gas) | Acute toxicity (inhalation:gas) Category 2 |
| Aquatic Acute 1 | Hazardous to the aquatic environment – Acute Hazard, Category 1 |
| Eye Irrit. 2 | Serious eye damage/eye irritation, Category 2 |
| Ox. Gas 1 | Oxidising Gases, Category 1 |
| Press. Gas (Liq.) | Gases under pressure : Liquefied gas |
| Skin Irrit. 2 | Skin corrosion/irritation, Category 2 |
| STOT SE 3 | Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation |
| H270 | May cause or intensify fire; oxidiser. |

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| | |
|--------|---|
| H280 | Contains gas under pressure; may explode if heated. |
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H330 | Fatal if inhaled. |
| H335 | May cause respiratory irritation. |
| H400 | Very toxic to aquatic life. |
| EUH071 | Corrosive to the respiratory tract. |

DISCLAIMER OF LIABILITY

: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

Details given in this document are believed to be correct at the time of going to press.

Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.



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Table of contents of the Annex

| Identified Uses | Es N° | Short title | ERC | PROC | Page |
|---|-----------|--|--------------------------------|--|------|
| Formulation of mixtures in pressure receptacles | EIGA022-1 | Industrial uses, closed contained conditions | ERC2 | PROC1 | 20 |
| Electronic component manufacture | EIGA022-1 | Industrial uses, closed contained conditions | ERC6a | PROC1 | 20 |
| Calibration of analysis equipment | EIGA022-1 | Industrial uses, closed contained conditions | ERC7 | PROC1 PROC2 | 20 |
| Transfiling in pressure receptacles | EIGA022-1 | Industrial uses, closed contained conditions | ERC2 | PROC8b PROC9 | 20 |
| Feedstock in chemical processes | EIGA022-1 | Industrial uses, closed contained conditions | ERC1 ERC4 ERC6a ERC6b | PROC1 PROC2 PROC3 | 20 |
| Paper bleaching | EIGA022-1 | Industrial uses, closed contained conditions | ERC6b | PROC1 PROC2 PROC8a PROC15 | 20 |
| Water treatment | EIGA022-1 | Industrial uses, closed contained conditions | ERC6b | PROC1 PROC2 PROC3 PROC4 | 20 |
| Manufacture of optical fibres | EIGA022-1 | Industrial uses, closed contained conditions | ERC6a | PROC1 | 20 |
| Purification of molten aluminium | EIGA022-1 | Industrial uses, closed contained conditions | ERC6b | PROC1 PROC2 PROC3 PROC4 PROC22 | 20 |
| Metal treatment | EIGA022-1 | Industrial uses, closed contained conditions | ERC6b | PROC1 PROC2 PROC3 PROC4 PROC22 | 20 |
| Intermediate (transported, on-site isolated) | EIGA022-1 | Industrial uses, closed contained conditions | ERC1 ERC6a | PROC1 PROC2 PROC3 | 20 |
| Oxidant to dissolve metals | EIGA022-1 | Industrial uses, closed contained conditions | ERC6b | PROC1 PROC2 PROC3 | 20 |



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| | | | | | |
|--|-----------|--|------|-----------------|-----------|
| | | | | PROC4 PROC22 | |
| Manufacture of pharmaceutical products | EIGA022-1 | Industrial uses, closed contained conditions | ERC7 | PROC1 | 20 |

Exposure scenario

chlorine

Annex to the safety data sheet

Reference number: D-Cl2-022

CAS-No.: 7782-50-5 Product form: Substance Physical state: Gas

1. EIGA022-1: Industrial uses, closed contained conditions

1.1. Title section

Industrial uses, closed contained conditions

ES Ref.: EIGA022-1

Revision date: 10/1/2016

| | |
|--------------------------------------|--|
| Processes, tasks, activities covered | Industrial uses, including product transfers and associated laboratory activities within different closed or contained systems |
|--------------------------------------|--|

| Environment | Use descriptors |
|-------------|-------------------|
| CS1 | ERC2, ERC4, ERC6b |

| Worker | Use descriptors |
|--------|------------------------------------|
| CS2 | PROC1 |
| CS3 | PROC2, PROC3, PROC4, PROC8b, PROC9 |

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: ERC2, ERC4, ERC6b

| | |
|-------|---|
| ERC2 | Formulation into mixture |
| ERC4 | Use of non-reactive processing aid at industrial site (no inclusion into or onto article) |
| ERC6b | Use of reactive processing aid at industrial site (no inclusion into or onto article) |

| Product (article) characteristics | |
|---------------------------------------|---|
| Physical form of product | See section 9 of the SDS, No additional information |
| Concentration of substance in product | ≤ 100 % |

| Amount used, frequency and duration of use (or from service life) | |
|--|--------------------|
| The actual tonnage handled per site is not considered to influence the immissions as such for this scenario as there is practically no release | |
| Emission Days (days/year) | 365 |
| Covers frequency up to: | Continuous release |

Exposure scenario

chlorine

Annex to the safety data sheet

Reference number: D-Cl2-022

CAS-No.: 7782-50-5 Product form: Substance Physical state: Gas

| Technical and organisational conditions and measures | |
|---|--|
| Soil emission controls are not applicable as there is no direct release to soil | |
| Wastewater emission controls are not applicable as there is no direct release to wastewater | |
| Ensure operatives are trained to minimise releases | |

| Conditions and measures related to sewage treatment plant | |
|---|------------------------|
| Size of the sewage treatment plant (STP) | 2000 m ³ /d |

| Conditions and measures related to treatment of waste (including article waste) | |
|---|--|
| No additional information | |

| Other conditions affecting environmental exposure | |
|---|----------------------|
| Dilution of STP emissions at least: | 10 Rivers |
| Dilution of STP emissions at least: | 100 Coastal zones |

1.2.2. Control of worker exposure: PROC1

| | |
|-------|--|
| PROC1 | Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions |
|-------|--|

| Product (article) characteristics | |
|---------------------------------------|---|
| Physical form of product | See section 9 of the SDS, No additional information |
| Concentration of substance in product | ≤ 100 % |

| Amount used (or contained in articles), frequency and duration of use/exposure | |
|--|-------------|
| The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential. | |
| Exposure duration | ≤ 8 h/day |
| Covers frequency up to: | 5 days/week |

Exposure scenario

chlorine

Annex to the safety data sheet

Reference number: D-Cl2-022

CAS-No.: 7782-50-5 Product form: Substance Physical state: Gas

Technical and organisational conditions and measures

| | |
|---|--|
| Handle product within a closed system | |
| Apply a good standard of general or controlled ventilation when maintenance activities are carried out. | |
| Ensure operatives are trained to minimise exposure | |
| Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed | |

Conditions and measures related to personal protection, hygiene and health evaluation

| | |
|---------------------------|--|
| See section 8 of the SDS. | |
|---------------------------|--|

Other conditions affecting workers exposure

| | |
|-----------------------|--|
| Indoor or outdoor use | |
|-----------------------|--|

1.2.3. Control of worker exposure: PROC2, PROC3, PROC4, PROC8b, PROC9

| | |
|--------|--|
| PROC2 | Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions |
| PROC3 | Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition |
| PROC4 | Chemical production where opportunity for exposure arises |
| PROC8b | Transfer of substance or mixture (charging and discharging) at dedicated facilities |
| PROC9 | Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |

Product (article) characteristics

| | |
|---------------------------------------|---|
| Physical form of product | See section 9 of the SDS, No additional information |
| Concentration of substance in product | ≤ 100 % |

Amount used (or contained in articles), frequency and duration of use/exposure

| | |
|--|-----------|
| The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation and level of containment/automation (as reflected in the technical conditions) is the main determinant of the process-intrinsic emission potential. | |
| Exposure duration | ≤ 8 h/day |

Exposure scenario

chlorine

Annex to the safety data sheet

Reference number: D-Cl2-022

CAS-No.: 7782-50-5 Product form: Substance Physical state: Gas

| | |
|-------------------------|-------------|
| Covers frequency up to: | 5 days/week |
|-------------------------|-------------|

| Technical and organisational conditions and measures | |
|--|--|
| Handle product within a closed system | |
| Fill containers at dedicated fill points supplied with local extract ventilation. | |
| Ensure samples are obtained under containment or extract ventilation. | |
| Drain down and flush system prior to equipment break-in or maintenance. | |
| During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points where emissions could occur. Outdoor, LEV is not generally required. | |
| Apply a good standard of general or controlled ventilation when maintenance activities are carried out. | |
| Ensure operatives are trained to minimise exposure | |
| Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed | |

| Conditions and measures related to personal protection, hygiene and health evaluation | |
|--|---|
| Face mask with type B filter. Self-contained breathing apparatus should be worn in case of medium confinement/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection. Wear suitable gloves tested to EN374. Neoprene rubber (HNBR) | Personal protection measures have to be applied in case of potential exposure only. |
| Wear suitable coveralls to prevent exposure to the skin | |
| See section 8 of the SDS. | |

| Other conditions affecting workers exposure | |
|---|--|
| Indoor or outdoor use | |

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: ERC2, ERC4, ERC6b

The exposure of aquatic, terrestrial, sediment and sewage treatment microorganisms is considered to be negligible because the substance partitions primarily to air when released to the environment.

1.3.2. Worker exposure: PROC1

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Exposure scenario

chlorine

Annex to the safety data sheet

Reference number: D-Cl2-022

CAS-No.: 7782-50-5 Product form: Substance Physical state: Gas

1.3.3. Worker exposure: PROC2, PROC3, PROC4, PROC8b, PROC9

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposure of workers and indirect human exposure via the environment is not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

1.4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

1.4.1. Environment

| | |
|------------------------|--|
| Guidance - Environment | Check that RMMs and OCs are as described above or of equivalent efficiency |
|------------------------|--|

1.4.2. Health

| | |
|-------------------|--|
| Guidance - Health | Check that RMMs and OCs are as described above or of equivalent efficiency |
|-------------------|--|

End of document