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

1.1. Product identifier

Trade name : Chlorine, Chlorine N25, Chlorine N28
SDS no : NOAL_0022
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 : Industrial and professional uses. Perform risk assessment prior to use.
Test gas/Calibration gas.
Laboratory use.
Contact supplier for more information on uses.
Uses advised against : Consumer use.
Uses other than those listed above are not supported, contact your supplier for more information on other uses.

1.3. Details of the supplier of the safety data sheet

Company identification

Supplier

AIR LIQUIDE GAS AB
Pulpetgatan 20
215 37 Malmö - SWEDEN
T +46 40 38 10 00
info.sweden@airliquide.com

E-Mail address (competent person) : eunordic-sds@airliquide.com

1.4. Emergency telephone number

Emergency telephone number : 112
Availability
(24 / 7)


Country	Organisation/Company	Address	Emergency number	Comment
Germany	Giftnotruf Erfurt Gemeinsames Giftinformationszentrum der Länder Mecklenburg-Vorpommern, Sachsen, Sachsen-Anhalt und Thüringen, c/o HELIOS Klinikum Erfurt	Nordhäuser Straße 74 99089 Erfurt	+49 (0) 361 730 730	

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

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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=10)
	Hazardous to the aquatic environment – Chronic Hazard, Category 1	H410	

2.2. Label elements


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

Hazard pictograms (CLP)	:	<div>     </div> <div> GHS03 GHS04 GHS06 GHS09 </div>
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. H335 - May cause respiratory irritation. H410 - Very toxic to aquatic life with long lasting effects.
Precautionary statements (CLP)	:	
- Prevention	:	P280 - Wear protective gloves/protective clothing/eye protection/face protection/hearing protection. P271 - Use only outdoors or in a well-ventilated area. P273 - Avoid release to the environment. P220 - Keep away from clothing and other combustible materials. P260 - Do not breathe dust/fume/gas/mist/vapours/spray. P244 - Keep valves and fittings free from oil and grease. P284 - Wear respiratory protection. P264 - Wash hands, forearms and face thoroughly after handling. P220 - Keep away from clothing and other combustible materials.
- Response	:	P332+P313 - If skin irritation occurs: Get medical advice/attention. P337+P313 - If eye irritation persists: Get medical advice/attention. P391 - Collect spillage. P321 - Specific treatment (see supplemental first aid instruction on this label). P320 - Specific treatment is urgent (see supplemental first aid instruction on this label). P370+P376 - In case of fire: Stop leak if safe to do so. P362+P364 - Take off contaminated clothing and wash it before reuse. P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. P310 - Immediately call a POISON CENTER or doctor. P302+P352 - IF ON SKIN: Wash with plenty of soap and water. P312 - Call a POISON CENTRE or doctor 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.
- Storage	:	P403+P233 - Store in a well-ventilated place. Keep container tightly closed. P405 - Store locked up. P403 - Store in a well-ventilated place. P410+P403 - Protect from sunlight. Store in a well-ventilated place.
- Disposal considerations	:	P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

2.3. Other hazards

Not classified as PBT or vPvB.

The substance/mixture has no endocrine disrupting properties.

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SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	Composition [V-%]:	Classification according to Regulation (EC) No. 1272/2008 [CLP]
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 Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335 Aquatic Acute 1, H400 (M=10) Aquatic Chronic 1, H410

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

3.2. Mixtures

Not established.

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. In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- 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.
May cause irritation to the respiratory tract, sneezing, coughing, burning sensation of throat with constricting sensation of the larynx and difficulty in breathing.
See section 11.

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

Obtain medical assistance.


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.

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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. 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.

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product

: Do not breathe gas.
 Avoid release of product into atmosphere.
 The product must be handled in accordance with good industrial hygiene and safety procedures.
 Only experienced and properly instructed persons should handle gases under pressure.
 Consider pressure relief device(s) in gas installations.
 Ensure the complete gas system was (or is regularly) checked for leaks before use.
 Do not smoke while handling product.
 Avoid exposure, obtain special instructions before use.
 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>.
 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.
 Installation of a cross purge assembly between the container and the regulator is recommended.

Safe handling of the gas receptacle


: Refer to supplier's container handling instructions.
 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 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.

7.2. Conditions for safe storage, including any incompatibilities

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 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.
 Segregate from flammable gases and other flammable materials in store.
 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.


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SECTION 8: Exposure controls/personal protection


8.1. Control parameters

Chlorine (7782-50-5)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Chlorine
IOEL STEL	1.5 mg/m ³
IOEL STEL [ppm]	0.5 ppm
Austria - Occupational Exposure Limits	
Local name	Chlor
MAK (mg/m ³)	1.5 mg/m ³
MAK (OEL TWA) [ppm]	0.5 ppm
MAK (OEL STEL)	1.5 mg/m ³
MAK (OEL STEL) [ppm]	0.5 ppm
Belgium - Occupational Exposure Limits	
Local name	Chlore # Chloor
OEL STEL	1.5 mg/m ³
OEL STEL [ppm]	0.5 ppm
Bulgaria - Occupational Exposure Limits	
Local name	Хлор
OEL STEL	1.5 mg/m ³
OEL STEL [ppm]	0.5 ppm
Remark	• (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)
Croatia - Occupational Exposure Limits	
Local name	Klor
KGVI (OEL STEL)	1.5 mg/m ³
KGVI (OEL STEL) [ppm]	0.5 ppm
Remark	EU** T, N
Czech Republic - Occupational Exposure Limits	
Local name	Chlor
PEL (OEL TWA)	0.5 mg/m ³
PEL (OEL TWA) [ppm]	0.17 ppm
NPK-P (OEL C)	1.5 mg/m ³
NPK-P (OEL C) [ppm]	0.52 ppm

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Denmark - Occupational Exposure Limits			
Local name		Chlor	
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Estonia - Occupational Exposure Limits			
Local name		Kloor	
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Finland - Occupational Exposure Limits			
Local name		Kloori	
HTP (OEL STEL)		1.5 mg/m³	
HTP (OEL STEL) [ppm]		0.5 ppm	
France - Occupational Exposure Limits			
Local name		Chlore	
VLE (OEL C/STEL)		1.5 mg/m³	
VLE (OEL C/STEL) [ppm]		0.5 ppm	
Remark		Valeurs réglementaires contraignantes	
Germany - Occupational Exposure Limits (TRGS 900)			
Local name		Chlor	
AGW (OEL TWA) [1]		1.5 mg/m³	
AGW (OEL TWA) [2]		0.5 ppm	
AGW (OEL C) [ppm]		1(l)	
Remark		DFG,EU,Y	
Greece - Occupational Exposure Limits			
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Hungary - Occupational Exposure Limits			
Local name		KLÓR	
CK (OEL STEL)		1.5 mg/m³	
Ireland - Occupational Exposure Limits			
Local name		Chlorine	
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Italy - Occupational Exposure Limits			
Local name		Cloro	

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OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Latvia - Occupational Exposure Limits			
Local name		Hlors	
OEL TWA		1 mg/m³	
OEL TWA [ppm]		0.3 ppm	
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Lithuania - Occupational Exposure Limits			
Local name		Chloras	
TPRV (OEL STEL)		1.5 mg/m³	
TPRV (OEL STEL) [ppm]		0.5 ppm	
Luxembourg - Occupational Exposure Limits			
Local name		Chlore	
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Malta - Occupational Exposure Limits			
Local name		Chlorine	
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Netherlands - Occupational Exposure Limits			
Local name		Chloor	
TGG-15min (OEL STEL)		1.5 mg/m³	
Poland - Occupational Exposure Limits			
Local name		Chlor	
NDS (OEL TWA)		0.7 mg/m³	
NDSCh (OEL STEL)		1.5 mg/m³	
Portugal - Occupational Exposure Limits			
Local name		Cloro	
OEL TWA [ppm]		0.5 ppm	
OEL STEL [ppm]		1 ppm	
Romania - Occupational Exposure Limits			
Local name		Clor	
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	

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Slovakia - Occupational Exposure Limits			
NPHV (OEL STEL)		1.5 mg/m³	
Slovenia - Occupational Exposure Limits			
Local name		klor	
OEL TWA		1.5 mg/m³	
OEL TWA [ppm]		0.5 ppm	
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Spain - Occupational Exposure Limits			
Local name		Cloro	
VLA-EC (OEL STEL)		1.5 mg/m³	
VLA-EC (OEL STEL) [ppm]		0.5 ppm	
Remark		VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo. Todos estos agentes químicos figuran al menos en una de las directivas de valores límite indicativos publicadas hasta ahora (ver Anexo C. Bibliografía). Los estados miembros disponen de un tiempo fijado en dichas directivas para su transposición a los valores límites de cada país miembro. Una vez adoptados, estos valores tienen la misma validez que el resto de los valores adoptados por el país).	
Sweden - Occupational Exposure Limits			
Local name		Klor	
KTV (OEL STEL)		1.5 mg/m³	
KTV (OEL STEL) [ppm]		0.5 ppm	
United Kingdom - Occupational Exposure Limits			
Local name		Chlorine	
WEL STEL (OEL STEL)		1.5 mg/m³	
WEL STEL (OEL STEL) [ppm]		0.5 ppm	
Iceland - Occupational Exposure Limits			
Local name		Klór	
OEL STEL		1.5 mg/m³	
OEL STEL [ppm]		0.5 ppm	
Norway - Occupational Exposure Limits			
Local name		Klor	
Grenseverdi (OEL TWA) [1]		1.5 mg/m³	
Grenseverdi (OEL TWA) [2]		0.5 ppm	
Switzerland - Occupational Exposure Limits			
Local name		Chlor	
MAK (OEL TWA) [1]		1.5 mg/m³	

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MAK (OEL TWA) [2]	0.5 ppm
KZGW (OEL STEL)	1.5 mg/m³
KZGW (OEL STEL) [ppm]	0.5 ppm
Remark	Auge ^{KT HU} & OAW ^{KT HU} - DFG, NIOSH, OSHA
USA - ACGIH - Occupational Exposure Limits	
Local name	Chlorine
ACGIH OEL TWA [ppm]	0.5 ppm
ACGIH OEL STEL [ppm]	1 ppm
Remark (ACGIH)	URT & eye irr

Chlorine (7782-50-5)	
DNEL: Derived no effect level (Workers)	
Acute - local effects, inhalation	1.5 mg/m³
Acute - systemic effects, inhalation	1.5 mg/m³
Long-term - local effects, inhalation	0.75 mg/m³
Long-term - systemic effects, inhalation	0.75 mg/m³

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.
: Wear goggles and a face shield when transfilling or breaking transfer connections.
Standard EN 166 - Personal eye-protection - specifications.
Provide readily accessible eye wash stations and safety showers.

- Eye/face protection
- Skin protection

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- Hand protection	: Wear chemically resistant protective gloves. Wear working gloves when handling gas containers. Standard EN 388 - Protective gloves against mechanical risk, performance level 1 or higher. Standard EN 511 - Cold insulating gloves. Standard EN 374 - Protective gloves against chemicals. Permeation time: minimum >30min short term exposure: material / thickness Chloroprene rubber (Neoprene®) (CR) / 0,4 [mm]. Permeation time: minimum >480min long term exposure : material / thickness Fluoroelastomer (Viton®) (FKM) / 0,7 [mm]. 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.
• Respiratory protection	: Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask. Consult respiratory device supplier's product information for the selection of the appropriate device. Keep self contained breathing apparatus readily available for emergency use. Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
• 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	: Colourless.
Odour	: Odourless. Odour threshold is subjective and inadequate to warn of overexposure.
pH	: If dissolved in water pH-value will be affected.
Melting point / Freezing point	: -101 °C -101 °C
Boiling point	: -34 °C
Flash point	: Not applicable for gases and gas mixtures.
Flammability	: Non flammable.
Explosive limits	: Non flammable.
Lower explosion limit	: Not available
Upper explosion limit	: Not available
Vapour pressure [20°C]	: 6.8 bar(a)
Vapour pressure [50°C]	: 14.3 bar(a)
Density	: Not applicable
Vapour density	: Not applicable for gases and gas mixtures.
Relative density, liquid (water=1)	: 1.6
Relative density, gas (air=1)	: 2.5
Water solubility	: 8620 mg/l
Partition coefficient n-octanol/water (Log Kow)	: Not applicable for inorganic products.
Auto-ignition temperature	: Non flammable.
Decomposition temperature	: Not applicable.
Viscosity, kinematic	: No reliable data available.
Particle characteristics	: Not applicable for gases and gas mixtures.

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9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosive properties	: Not applicable.
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
Evaporation rate	: Not applicable for gases and gas mixtures.
Gas group	: Press. Gas (Liq.)
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

None.
Violently oxidises organic material.

10.4. Conditions to avoid

Avoid moisture in installation systems.
Water, humidity.

10.5. Incompatible materials

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.

LC50 Inhalation - Rat [ppm]	146.5 ppm/4h
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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.

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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 respiratory irritation.
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 : The substance/mixture has no endocrine disrupting properties.

SECTION 12: Ecological information

12.1. Toxicity

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

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information 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

The substance/mixture has no endocrine disrupting properties.


12.7. Other adverse effects

Other adverse effects	: May cause pH changes in aqueous ecological systems.
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.
Must not be discharged to atmosphere.
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.org> for more guidance on suitable disposal methods.
Return unused product in original container to supplier.
16 05 04 *: Gases in pressure containers (including halons) containing hazardous substances.

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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 (ADR/RID) : 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 (ADR/RID)

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 (ADR/RID) : Not established.
Transport by air (ICAO-TI / IATA-DGR) : Not established.
Transport by sea (IMDG) : Not established.


14.5. Environmental hazards

Transport by road/rail (ADR/RID) : Environmentally hazardous substance / mixture.
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 (ADR/RID) : P200
Transport by air (ICAO-TI / IATA-DGR)
Passenger and Cargo Aircraft : Forbidden.
Cargo Aircraft only : Forbidden.
Transport by sea (IMDG) : P200

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

National regulations

Ensure all national/local regulations are observed.

Germany

Water hazard class (WGK) : WGK 2, Significantly hazardous to water (Classification according to AwSV)
National Rules and Recommendations : [German regulations] BetriebssicherheitsV mit TRBSen insbesondere TRBS 3145 / TRGS 725 Ortsbewegliche Druckgasbehälter", TRBS 2141, BGR Regel 500 Teil 2.33: "Umgang mit Gasen", GefahrstoffV mit Technischen Regeln Gefährliche Stoffe TRGS insbesondere TRGS 407 "Tätigkeiten mit Gasen - Gefährdungsbeurteilung", TRGS 400, 500, 510, 900."

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed
SZW-lijst van mutagene stoffen : The substance is not listed
SZW-lijst van reprotoxische stoffen – Borstvoeding : The substance is not listed
SZW-lijst van reprotoxische stoffen – Vruchtbaarheid : The substance is not listed
SZW-lijst van reprotoxische stoffen – Ontwikkeling : The substance is not listed

Denmark


Danish National Regulations : Young people below the age of 18 years are not allowed to use the product

15.2. Chemical safety assessment

A CSA does not need to be carried out for this product.


SECTION 16: Other information

Indication of changes : 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 - European 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
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
Aquatic Chronic 1	Hazardous to the aquatic environment – Chronic Hazard, Category 1
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
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.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
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

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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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Annex to the safety data sheet

This Annex documents the Exposure Scenarios (ESs) related to the identified uses of the registered substance. The ESs detail protective measures for workers and the environment in addition to those described in sections 7, 8, 11, 12 and 13 of the SDS that are required to ensure that the potential exposure to workers and the environment remains within acceptable levels for each of the identified uses.

Table of contents of the Annex

Identified Uses	Es N°	Short title	Page
Formulation of mixtures in pressure receptacles	022-1	Industrial uses, closed contained conditions	19
Electronic component manufacture	022-1	Industrial uses, closed contained conditions	19
Calibration of analysis equipment	022-1	Industrial uses, closed contained conditions	19
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Intermediate (transported, on-site isolated)	022-1	Industrial uses, closed contained conditions	19
Oxidant to dissolve metals	022-1	Industrial uses, closed contained conditions	19
Manufacture of pharmaceutical products	022-1	Industrial uses, closed contained conditions	19

1. 022-1: Industrial uses, closed contained conditions

1.1. Title section

Industrial uses, closed contained conditions

ES Ref.: 022-1

Revision date: 10/1/2016

Association ref code: EIGA022-1

Processes, tasks, activities covered

Industrial uses, including product transfers and associated laboratory activities within different closed or contained systems

Environment

CS01

Use descriptors

Worker

CS02

CS03

Use descriptors

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure:

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

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 m³/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:

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

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:

Product (article) characteristics

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

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:

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:

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.

1.3.3. Worker exposure:

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
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1.4.2. Health

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