

**Hydrogen chloride**

Print date 17.05.2024  
 Revision date 17.05.2024  
 Version 20.0 (en)  
 replaces version of 05.02.2024 (19.0)

**\* SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier**

**Trade name/designation** Hydrogen chloride  
**Art-Nr(n).** 0400-0409, 70040  
**Substance name** hydrogen chloride  
**Index No** 017-002-00-2  
**EC No** 231-595-7  
**REACH No.** 01-2119484862-27  
**CAS No** 7647-01-0

**\* 1.2 Relevant identified uses of the substance or mixture and uses advised against****\* Sector of uses [SU]**

SU8 Manufacture of bulk, large scale chemicals (including petroleum products)  
 SU9 Manufacture of fine chemicals  
 SU10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys)  
 SU16 Manufacture of computer, electronic and optical products, electrical equipment

**\* Process categories [PROC]**

PROC1 Use in closed process, no likelihood of exposure  
 PROC2 Use in closed, continuous process with occasional controlled exposure  
 PROC3 Use in closed batch process (synthesis or formulation)  
 PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)  
 PROC15 Use as laboratory reagent

**\* Environmental release categories [ERC]**

ERC2 Formulation into mixture  
 ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)  
 ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)

**1.3 Details of the supplier of the safety data sheet****Supplier**

GHC Gerling, Holz & Co. Handels GmbH  
 Ruhrstraße 113  
 D-22761 Hamburg  
 Telephone +49 40 853 123 0  
 E-mail hamburg@ghc.de  
 Website www.ghc.com

Department responsible for information:  
 GHC Gerling, Holz & Co. Handels GmbH  
 Telephone +49 40 853 123 0

E-mail (competent person):  
 msds@ghc.de

**1.4 Emergency telephone number**

EN: Poison Information Center Mainz +49 6131 19240

**\* SECTION 2: Hazards identification****\* 2.1 Classification of the substance or mixture**

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

Press. Gas (Liq.), H280

Acute Tox. 3, H331

Skin Corr. 1A, H314

Eye Dam. 1, H318

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**Hazard statements for physical hazards**

H280 Contains gas under pressure; may explode if heated.

**Hazard statements for health hazards**

H314 Causes severe skin burns and eye damage.  
 H318 Causes serious eye damage.  
 H331 Toxic if inhaled.

\* **2.2 Label elements**\* **Labelling according to Regulation (EC) No 1272/2008 [CLP]****Hazard pictograms**

GHS05



GHS06

**Signal word**

Danger

**Hazard statements**

H280 Contains gas under pressure; may explode if heated.  
 H314 Causes severe skin burns and eye damage.  
 H331 Toxic if inhaled.

\*

**Precautionary statements**

P260 Do not breathe gas/vapours.  
 P280 Wear protective gloves/protective clothing/eye protection/face protection.  
 P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
 P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.  
 P315 Get immediate medical advice/attention.  
 P403 Store in a well-ventilated place.  
 P405 Store locked up.

**Supplemental hazard information**

EUH071 Corrosive to the respiratory tract.  
 Please return container with residual pressure.

\* **2.3 Other hazards**

\*

**Adverse human health effects and symptoms**

Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.  
 Irritating to eyes, respiratory system and skin.  
 Contact with liquid may cause cold burns/frostbite.

**Other adverse effects**

The substance/mixture does not contain components identified as having endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated Regulation (EU) 2017/2100 or Commission Delegated Regulation (EU) 2018/605 in quantities of 0.1% or more.

**Results of PBT and vPvB assessment**

The substance/mixture does not contain components meeting the PBT/vPvB criteria of the Reach Regulation, Annex XIII, at levels of 0.1% or higher.

**SECTION 3: Composition / information on ingredients****3.1 Substances**

<b>Substance name</b>	hydrogen chloride
<b>Index No</b>	017-002-00-2
<b>EC No</b>	231-595-7
<b>REACH No.</b>	01-2119484862-27
<b>CAS No</b>	7647-01-0
<b>ATE</b>	ATE(inhalation gas): 4701 ppm

**Additional information**

Content: >= 99,9 %

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### 3.2 Mixtures

not applicable

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

#### General information

Remove contaminated, saturated clothing immediately.  
Call a physician immediately.  
First aider: Pay attention to self-protection!

#### Following inhalation

Remove casualty to fresh air and keep warm and at rest.  
In the event of pulmonary irritation treat initially with corticoid spray, e.g. Ventolair- or Pulmicort- metered-dose aerosol (Ventolair and Pulmicort are registered trademarks).  
In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Obtain medical assistance.

#### Following skin contact

In case of skin contact rinse with warm water.  
In case of frostbite, wash with plenty of water; do not remove clothing.  
In case of frostbite rinse with lukewarm (not hot) water for at least 15 minutes. Do not remove clothing frozen to the skin.  
Thaw with lukewarm water. Apply a sterile dressing. Obtain medical assistance.

#### After eye contact

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical assistance.

#### Following ingestion

Ingestion is not considered a potential route of exposure.

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

#### Symptoms

Cardiopulmonary arrest.  
Dyspnoea  
Shortness of breath.  
Cough  
Headache

#### Effects

Pulmonary oedema

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

#### Notes for the doctor

Treat symptomatically.  
Subsequent observance for pneumonia and lung oedema.  
To supervise the blood circulation.

## \* SECTION 5: Firefighting measures

### 5.1 Extinguishing media

#### Suitable extinguishing media

The product itself does not burn. The product itself does not burn. Match extinguishing measures to surrounding fire.  
Extinguishing powder  
alcohol resistant foam  
Water spray jet  
Carbon dioxide (CO<sub>2</sub>)

#### Unsuitable extinguishing media

Full water jet

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### 5.2 Special hazards arising from the substance or mixture

#### Hazardous combustion products

Risk of explosion when product reacts with metals and forms hydrogen.

### \* 5.3 Advice for firefighters

\* **Special protective equipment for firefighters**  
Wear a self-contained breathing apparatus and chemical protective clothing.

### \* Additional information

If possible, shut off gas valves and move containers to a safe location.  
Use water spray jet to protect personnel and to cool endangered containers.  
Exposure to fire may cause rupture / explosion of the containers.  
Fire fighting water forms corrosive acid solutions.  
Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.  
Dispose of fire residues and contaminated extinguishing water in accordance with local, official regulations.

### \* SECTION 6: Accidental release measures

#### 6.1 Personal precautions, protective equipment and emergency procedures

##### For non-emergency personnel

Use personal protection equipment.  
Leave the danger area.  
Keep people away and stay on the upwind side.

##### For emergency responders

Personal protection by wearing close-fitting protective clothing and breathing apparatus.  
Pay attention to extension of gas especially at ground (heavier than air) and in direction of the wind.  
Remove persons to safety.

#### 6.2 Environmental precautions

If possible, stop flow of product.  
Do not allow to enter into soil/subsoil.  
Do not allow to enter into surface water or drains.

### \* 6.3 Methods and material for containment and cleaning up

#### For containment

If necessary, secure leaky pressure receptacles using a salvage container.  
Prevent the liquid from spreading over a wide area (set up barriers, cover sewage systems).  
Limit expansion of the gas (water spray jet).

#### For cleaning up

Dilute with plenty of water.  
Retain contaminated washing water and dispose it.

#### 6.4 Reference to other sections

Disposal: see section 13  
Personal protection equipment: see section 8

## SECTION 7: Handling and storage

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**7.1 Precautions for safe handling****Protective measures**

Use only in well-ventilated areas.  
 Transfer and handle product only in closed systems.  
 Usual measures for fire prevention.  
 Containers' temperature should not be increased above 50 °C.  
 The working pressure in the receptacle must not exceed the saturation vapour pressure of the pure product resulting at a temperature of 50 °C.  
 Prevent cylinders from falling over.  
 Ensure valve protection device is correctly fitted.  
 Ensure valve outlet cap nut or plug (where provided) is correctly fitted.  
 Open valve slowly to avoid pressure shock.  
 Do not allow backflow into the container.  
 Entering of water into the container must be prevented.  
 No water to valves, flanges and other fittings.  
 Purging of pipes and valves with inert gases - to avoid: water, solvents.

**Advices on general occupational hygiene**

When using do not eat, drink, smoke, sniff.  
 Wash hands before breaks and after work.  
 Remove contaminated clothing and protective equipment before entering eating areas.

**7.2 Conditions for safe storage, including any incompatibilities****Requirements for storage rooms and vessels**

All regulations and local requirements for the storage of containers have to be respected.  
 Keep container tightly closed and in a well-ventilated place.  
 Containers' temperature should not be increased above 50 °C.  
 Prevent cylinders from falling over.  
 Only use containers specifically approved for the substance/product.  
 Information on suitable materials for receptacles and valves see ISO 11114.

**Materials to avoid**

Do not store together with explosives.  
 Do not store together with flammable liquids.  
 Do not store together with flammable solids.  
 Do not store together with pyrophoric and self-heating substances.  
 Do not store together with oxidizing liquids or oxidizing solids.  
 Do not store together with toxic liquids or toxic solids.  
 Do not store together with infectious substances.  
 Do not store together with radioactive material.  
 Do not store together with food or feed.

**7.3 Specific end use(s)****Recommendation**

Exposure scenarios (ES) see annex to this safety data sheet.

**\* SECTION 8: Exposure controls/personal protection****\* 8.1 Control parameters****\* Occupational exposure limit values**

CAS No	EC No	Substance name	occupational exposure limit value
7647-01-0	231-595-7	Hydrogen chloride	5 [ml/m <sup>3</sup> (ppm)] 8 [mg/m <sup>3</sup> ] Short-term(ml/m <sup>3</sup> ) 10 (1) Short-term(mg/m <sup>3</sup> ) 15 (1) (IE)

**\* DNEL worker**

CAS No	Substance name	DNEL value	DNEL type	Remark
7647-01-0	hydrogen chloride	8 mg/m <sup>3</sup>	long-term inhalative (local)	irritation (respiratory trac)
7647-01-0	hydrogen chloride	15 mg/m <sup>3</sup>	acute inhalative (local)	irritation (respiratory trac)

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\* **DNEL Consumer**

CAS No	Substance name	DNEL value	DNEL type	Remark
7647-01-0	hydrogen chloride	8 mg/m <sup>3</sup>	long-term inhalative (local)	irritation (respiratory trac)
7647-01-0	hydrogen chloride	15 mg/m <sup>3</sup>	acute inhalative (local)	irritation (respiratory trac)

\* **8.2 Exposure controls****Appropriate engineering controls****Technical measures to prevent exposure**

Transfer and handle only in enclosed systems.

\* **Personal protection equipment****Eye/face protection**

Protective goggles according to EN 166, in case of increased risk add protective face shield.

**Hand protection**

Safety gloves according to EN 374:

Glove material specification [make/type, thickness, permeation time/life, wetting resistance]: NBR; 0,4 mm; >= 480 min / CR; 0,5 mm; >= 480 min / PVC; 0,7 mm; >= 480 min

**Body protection:**

Safety shoes with steel toecap.

Body covering work clothing or chemical resistant suit at increased risk.

\* **Respiratory protection**

Keep self contained breathing apparatus readily available for emergency use.

Respiratory protection necessary at:

high concentrations

Respiratory protection complying with EN 137.

Short term: filter apparatus, filter E

In case of rescue and maintenance activities in storage containers use environment-independent breathing apparatus because of risk of suffocation due to displacement of oxygen.

**Thermal hazards**

Use cold-resistant protective equipment.

**Environmental exposure controls****Remark**

Prevent release to the environment.

\* **SECTION 9: Physical and chemical properties**\* **9.1 Information on basic physical and chemical properties**\* **Physical state**

Gaseous / liquefied under pressure.

**Colour**

colourless

**Odour**

stinging

**Safety relevant basis data**

	Value	Method	Source, Remark
Odour threshold:			not determined
Melting point/freezing point			not applicable
Boiling point or initial boiling point and boiling range	-85 °C		
flammability			none
Lower and upper explosion limit			none
Flash point			not applicable

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	Value	Method	Source, Remark
Auto-ignition temperature			not determined
Decomposition temperature			No decomposition if used as directed.
pH			not applicable
Viscosity			not applicable
Solubility(ies)	Water solubility 720 g/L (20°C)		
Partition coefficient n-octanol/water (log value)			not determined
Vapour pressure	42600 hPa (20°C)		
Density and/or relative density			not applicable
Relative vapour density	1.27		
particle characteristics			not applicable

**9.2 Other information****Information with regard to physical hazard classes****Gases under pressure****Safety characteristics**

	Value	Method, Result	Source, Remark
Critical temperature	51.4 °C		

**Other information**

Vapours are heavier than air.

**SECTION 10: Stability and reactivity****10.1 Reactivity**

See section "Possibility of hazardous reactions".

**10.2 Chemical stability**

The substance is chemically stable under recommended conditions of storage, use and temperature.

**10.3 Possibility of hazardous reactions**

Risk of explosion when product reacts with metals and forms hydrogen.  
 Must not be mixed with air or oxygen.  
 Reactions with numerous chemical compounds.  
 Reactions with alcohols, amines, aqueous acids and alkalies.

**10.4 Conditions to avoid**

Heat sources / heat - risk of bursting.  
 Humidity.

**10.5 Incompatible materials**

Aluminium / Aluminium alloys.  
 Copper, brass and other copper alloys  
 Oxidising agent, strong  
 Ammonia

**10.6 Hazardous decomposition products**

Hydrogen

**Additional information**

Risk of hydrogen embrittlement.

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**\* SECTION 11: Toxicological information****11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008****\* Acute toxicity****\* Animal data**

	Effective dose	Method, Evaluation	Source, Remark
Acute oral toxicity			Study scientifically not necessary.
Acute dermal toxicity			Study scientifically not necessary.
Acute inhalation toxicity	CAS No7647-01-0 hydrogen chloride Acute inhalation toxicity (gas) LC50: 4701 ppm Species Rat Exposure time 30 min		

**Assessment/classification**  
 Toxic if inhaled.

**Skin corrosion/irritation****Animal data**

Result / Evaluation	Method	Source, Remark
Corrosive. Species Rabbit	OECD 404	Aqueous solution.

**Assessment/classification**  
 Causes severe burns.

**\* Serious eye damage/irritation****Animal data**

Result / Evaluation	Method	Source, Remark
Risk of serious damage to eyes. Species Rabbit	OECD 405	Aqueous solution.

**Assessment/classification**  
 Causes serious eye damage.

**Sensitisation to the respiratory tract**

**Other information**  
 No data available

**Skin sensitisation****Animal data**

Result / Evaluation	Dose / Concentration	Method	Source, Remark
not sensitising.		OECD 406	Aqueous solution.
	Species Laboratory animals		

**Assessment/classification**  
 Based on available data, the classification criteria are not met.

**Germ cell mutagenicity**

	Value	Method	Result / Evaluation	Remark
In vitro mutagenicity/genotoxicity			negative	

**Assessment/classification**  
 Based on available data, the classification criteria are not met.



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**\* Carcinogenicity****Animal data**

	Value	Method	Result / Evaluation	Remark
Carcinogenicity	inhalative NOAEL(C): < 10 ppm Species Rat Exposure duration 2.5 a		negative	

**Assessment/classification**

Based on available data, the classification criteria are not met.

**Reproductive toxicity****Assessment/classification**

Study scientifically not necessary.

**STOT-single exposure****STOT SE 1 and 2****Assessment/classification**

Based on available data, the classification criteria are not met.

**STOT-repeated exposure****Animal data**

	Effective dose	Method	Specific effects:	Organs affected:	Source, Remark
Inhalative specific target organ toxicity (repeated exposure)	NOAEL(C): 20 ppm Species Rat Exposure time 90 d	OECD 413			

**Assessment/classification**

Based on available data, the classification criteria are not met.

**Aspiration hazard****Assessment/classification**

Study technically not feasible.

**11.2 Information on other hazards****Other information**

Risk of strong health injuries in case of long-term exposition.  
 Inhalation can cause damage to the respiratory tract or lungs.  
 Pulmonary damage is possible.  
 Irritates mucous membranes.

**\* SECTION 12: Ecological information****12.1 Toxicity****Aquatic toxicity**

	Effective dose	Method, Evaluation	Source, Remark
Acute (short-term) fish toxicity	LC50: 20.5 mg/L Species Lepomis macrochirus (Bluegill) Test duration 96 h	OECD 203	
Chronic (long-term) fish toxicity	not determined		
Acute (short-term) toxicity to crustacea	EC50 0.45 mg/L Species Daphnia magna (Big water flea) Test duration 48 h	OECD 202	
Chronic (long-term) toxicity to aquatic invertebrate	not determined		

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	Effective dose	Method, Evaluation	Source, Remark
Acute (short-term) toxicity to algae and cyanobacteria	EC50 0.73 mg/L Species Chlorella vulgaris Test duration 72 h	OECD 201	
Chronic (long-term) toxicity to aquatic algae and cyanobacteria	not determined		
Toxicity to other aquatic plants/organisms	not determined		
Toxicity to microorganisms	EC50 0.23 mg/L Species activated sludge (kom.) Test duration 3 h	OECD 209	

**12.2 Persistence and degradability****Assessment/classification**

Study scientifically not necessary.

**12.3 Bioaccumulative potential****Assessment/classification**

Study scientifically not necessary.

**12.4 Mobility in soil****Assessment/classification**

Study scientifically not necessary.

**12.5 Results of PBT and vPvB assessment**

The substance/mixture does not contain components meeting the PBT/vPvB criteria of the Reach Regulation, Annex XIII, at levels of 0.1% or higher.

**\* 12.6 Endocrine disrupting properties**

No data available

**12.7 Other adverse effects**

No data available

**\* SECTION 13: Disposal considerations****\* 13.1 Waste treatment methods****Waste codes/waste designations according to EWC/AVV**

Waste code product	Waste name
160504 *	gases in pressure containers (including halons) containing hazardous substances

**\* Appropriate disposal / Product**

Waste disposal according to directive 2008/98/EC, covering waste and dangerous waste. Prevent release to the environment. No disposal via the sewage.

**Appropriate disposal / Package**

Transportable pressure equipment (empty, residual pressure): Return to supplier / manufacturer.

**SECTION 14: Transport information**

	Land transport (ADR/RID)	Sea transport (IMDG)	Air transport (ICAO-TI / IATA-DGR)
<b>14.1 UN number or ID number</b>	UN 1050	UN 1050	UN 1050
<b>14.2 UN proper shipping name</b>	HYDROGEN CHLORIDE, ANHYDROUS (hydrogen chloride)	HYDROGEN CHLORIDE, ANHYDROUS (hydrogen chloride)	Hydrogen chloride, anhydrous (hydrogen chloride)
<b>14.3 Transport hazard class(es)</b>	2.3 (8)	2.3 (8)	2.3 (8)
<b>14.4 Packing group</b>	-	-	-
<b>14.5 Environmental hazards</b>	No	No	No

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**14.6 Special precautions for user**

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

**14.7 Maritime transport in bulk according to IMO instruments**

No carriage in bulk.

**Land transport (ADR/RID)**

UN number or ID number	UN 1050
UN proper shipping name	HYDROGEN CHLORIDE, ANHYDROUS (hydrogen chloride)
Transport hazard class(es)	2.3 (8)
Hazard label(s)	2.3+8
Classification code	2TC
Packing group	-
Environmental hazards	No
Limited quantity (LQ)	0
Special provisions	-
Tunnel restriction code	C/D

**Sea transport (IMDG)**

UN number or ID number	UN 1050
UN proper shipping name	HYDROGEN CHLORIDE, ANHYDROUS (hydrogen chloride)
Transport hazard class(es)	2.3 (8)
Packing group	-
Environmental hazards	No
Limited quantity (LQ)	0
Marine pollutant	No
EmS	F-C, S-U

**Air transport (ICAO-TI / IATA-DGR)**

UN number or ID number	UN 1050
UN proper shipping name	Hydrogen chloride, anhydrous (hydrogen chloride)
Transport hazard class(es)	2.3 (8)
Packing group	-
Environmental hazards	No

**\* SECTION 15: Regulatory information****\* 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****\* EU legislation****Restrictions of occupation**

Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.  
 Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC).

**\* Other regulations (EU)****\* To follow:**

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances.  
 National and local regulations concerning chemicals shall be observed.

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### 15.2 Chemical Safety Assessment

#### National regulations

For this substance a chemical safety assessment has been carried out.

#### \* SECTION 16: Other information

\*

##### Abbreviations and acronyms

Press. Gas (Liq.): Liquefied gas (LG)  
Skin Corr. 1A: Skin corrosion, Sub-category 1A  
Eye Dam. 1: Serious eye damage, Category 1  
Acute Tox. 3, H331: Acute Toxicity (inhalation), Category 3

##### Key literature references and sources for data

Information from our suppliers and data from the "GESTIS Substances Database" and the "Registered Substances" database of the European Chemicals Agency (ECHA) were used to create this safety data sheet.

##### Additional information

The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.

##### Relevant H- and EUH-phrases (Number and full text)

H280 Contains gas under pressure; may explode if heated.  
H314 Causes severe skin burns and eye damage.  
H331 Toxic if inhaled.

##### Indication of changes

\* Data changed compared with the previous version

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**1. Title of Exposure Scenario : Industrial use of hydrogen chloride (gaseous form)**

**Scenario description :**CGES1\_I: Manufacture of the substance or use as a process chemical or extraction agent within closed or contained systems. Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container)., CGES2\_I: Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities

**Sector of use :**

**SU 8,9:** Manufacture of bulk, large scale substances (including petroleum products); manufacture of fine chemicals,  
**SU 10:** Formulation (mixing) of preparations and/ or re-packaging (excluding alloys), **SU15:** Manufacture of fabricated metal products, except machinery and equipment, **SU16:** Manufacture of computer, electronic and optical products, electrical equipment

**Environmental release category:**

**ERC2:** Formulation of preparations, **ERC6a:** Industrial use resulting in manufacture of another substance (use of intermediates), **ERC8d:** Wide dispersive outdoor use of processing aids in open systems

**Process category:**

**PROC1:** Use in closed process, no likelihood of exposure, **PROC2:** Use in closed, continuous process with occasional controlled exposure, **PROC3:** Use in closed batch process (synthesis or formulation), **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing), **PROC15:** Use as laboratory reagent

**2. Conditions of use - Exposure estimation and reference to its source**

**Control of environmental exposure :**

**General information characteristic:**  
 gas inorganic  
 (> 10 kPa)

**Frequency and duration of use:**

**Continuous exposure:**  
 360 days/year

**Environment factors not influenced by risk management:**

The substance will dissociate upon contact with water ; the only effect is the pH effect. Therefore, after passing through the STP, exposure is considered negligible and with no risk.

**General risk management measures applicable to all activities:**

Water : Prevent leaks and prevent soil / water pollution caused by leaks.

All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments.

Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases.

**3. Risk characterisation ratio:**

Compartment:	Exposure Assessment Method:
All (environment)	Qualitative approach used to conclude safe use.

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the chemical gas specialist

### Control of worker exposure :

#### General Information

##### characteristic:

gas inorganic  
( > 10 kPa )

**Frequency and duration of use:**Covers daily exposures up to 8 hours (unless stated differently). Covers frequency up to: daily yearly use.

**Concentration of the Substance in Mixture/Article:**Covers the percentage of the substance in the product up to 100 % (unless stated differently).

##### General risk management measures applicable to all activities:

Assumes a good basic standard of occupational hygiene is implemented. Ensure operatives are trained to minimise exposures.  
corrosive effects: See chapter : 8. Exposure controls/personal protection

Outdoor location is covered by the worst-case inside location.

#### Exposure routes:

Inhalation exposure

Dermal exposure

#### Exposure Assessment Method:

ECETOC TRA

Qualitative approach used to conclude  
safe use.

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Contributing Scenario	PROC	Operational conditions	Concentration of the Substance in Mixture/Article	Risk Management Measures	Conditions and measures related to personal protection, hygiene and health evaluation	Risk characterisation ratio: ( Long term )			Risk characterisation ratio: ( Short term )		
						Inhalation	Dermal	Combined routes	Inhalation	Dermal	Combined routes
General exposures (closed systems) Continuous process	PROC1	Indoor		Handle substance within a closed system.  Clear transfer lines prior to de-coupling.		< 0,1					
General exposures Process sampling Continuous process	PROC2	Indoor		Handle substance within a closed system.  Ensure material transfers are under containment or extract ventilation. (90 %)  Clear transfer lines prior to de-coupling.		0,75 - 1,0					
General exposures Remanufacture of reject articles Cleaning Use in contained batch processes with sample collection	PROC3	Indoor		Handle substance within a closed system.  Drain down and flush system prior to equipment opening or maintenance.  Ensure material transfers are under containment or extract ventilation. (90 %)  Clear transfer lines prior to de-coupling.	Wear suitable gloves tested to EN374.  Avoid carrying out activities involving exposure for more than 1 hour. If it is not possible : Wear a respirator conforming to EN140 with Type A filter or better. (90 %)	0,1 - 0,5					
Drum and small package filling Drum/batch transfers Equipment cleaning and maintenance	PROC9	Indoor		Handle substance within a predominantly closed system provided with extract ventilation. (90 %)  Or : Fill containers/cans at dedicated filling points supplied with local extract ventilation. (90 %)	Wear a respirator conforming to EN140 with Type A filter or better. (90 %)  If it is not possible : Avoid carrying out activities involving exposure for more than 1 hour.	< 0,75					
Laboratory activities	PROC15	Indoor		Handle in a fume cupboard or under extract ventilation. (90 %)  Or : Carry out in a vented booth or extracted enclosure. (90 %)		0,75 - 1,0					

**Hydrogen chloride**

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**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario**

**For a given contributing scenario, several risk management measures can be proposed. It is your responsibility to select the configuration that best suits your activity.**

**Thesaurus:**

PROC : Process category  
SU : Sectors of end-use  
PC : Product category  
ERC : Environmental release category

RCR : Risk characterisation ratio  
DNEL : Derived No Effect Level (DNEL)  
PNEC : Predicted No Effect Concentration (PNEC)