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

1.1. Product identifier

Trade name : Hydrogen chloride, HYDROGEN CHLORIDE (N28, N47, N50, UHP)

SDS no : 069

Chemical description : Hydrogen chloride
CAS-No. : 7647-01-0
EC-No. : 231-595-7
EC Index-No. : 017-002-00-2

Registration-No. : 01-2119484862-27

Chemical formula : HCl

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
See the list of identified uses and exposure scenarios in the annex of the safety data sheet.
Contact supplier for more information on uses.

Uses advised against : Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification

Supplier
AIR LIQUIDE Deutschland GmbH
Luise-Rainer-Straße 5
40235 Düsseldorf - GERMANY
T +49 (0)211 6699-0 - F +49 (0)211 6699-222
info@airliquide.de

E-Mail address (competent person) : info.SDB@airliquide.de

1.4. Emergency telephone number

Emergency telephone number : +49 (0)2151 398668
Availability
(24 / 7)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Physical hazards	Gases under pressure : Liquefied gas	H280
Health hazards	Acute toxicity (inhalation:gas) Category 3	H331
	Skin corrosion/irritation, Category 1A	H314
	Serious eye damage/eye irritation, Category 1	H318

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS04 GHS05 GHS06

Signal word (CLP) : Danger

Hazard statements (CLP) : H280 - Contains gas under pressure; may explode if heated..
H331 - Toxic if inhaled..
H314 - Causes severe skin burns and eye damage..
EUH071 - Corrosive to the respiratory tract..

Precautionary statements (CLP)

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

2.3. Other hazards

: None.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	Composition [V-%]:	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Hydrogen chloride	(CAS-No.) 7647-01-0 (EC-No.) 231-595-7 (EC Index-No.) 017-002-00-2 (Registration-No.) 01-2119484862-27	100	Press. Gas (Liq.), H280 Acute Tox. 3 (Inhalation:gas), H331 Skin Corr. 1A, H314 Eye Dam. 1, H318

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. Apply artificial respiration 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 severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product.
Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.
Refer to 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.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Specific hazards : 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

: Try to stop release.

Evacuate area.

Monitor concentration of released product.

Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

Use chemically protective clothing.

Ensure adequate air ventilation.

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

Act in accordance with local emergency plan.

Stay upwind.

6.2. Environmental precautions

: Reduce vapour with fog or fine water spray.

Try to stop release.

6.3. Methods and material for containment and cleaning up

: Hose down area with water.

Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost).

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 : 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 regularily) checked for leaks before use.

Do not smoke while handling product.

Avoid exposure, obtain special instructions before use.

Avoid contact with aluminium.

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 cylinder 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.

Avoid suck back of water, acid and alkalis.

Do not breathe gas.

Avoid release of product into atmosphere.

Safe handling of the gas receptacle : Refer to supplier's container handling instructions.

Do not allow backfeed into the container.

Protect cylinders 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 cylinder 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 cylinder contents.

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.

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

Hydrogen chloride (7647-01-0)		
OEL : Occupational Exposure Limits		
EU	TWA IOELV (EU) 8 h [mg/m³]	8 mg/m³
	TWA IOELV (EU) 8 h [ppm]	5 ppm
	STEL IOELV (EU) 15 min [mg/m³]	15 mg/m³
	STEL IOELV (EU) 15 min [ppm]	10 ppm
Germany	TWA (DE) OEL 8h [mg/m3] TRGS 900	3 mg/m³
	TWA (DE) OEL 8h [ppm] TRGS 900	2 ppm
	Peak exposure limitation factor (DE) OEL TRGS 900	2(I)
	Remark (TRGS 900)	DFG,EU,Y

Hydrogen chloride (7647-01-0)	
DNEL: Derived no effect level (Workers)	
Acute - local effects, inhalation	15 mg/m³
Long-term - local effects, inhalation	8 mg/m³

Hydrogen chloride (7647-01-0)	
PNEC: Predicted no effect concentration	
Aqua (freshwater)	0.036 mg/l
Aqua (marine water)	0.036 mg/l
Aquatic, intermittent releases	0.045 mg/l
Micro-organisms in sewage treatment plant (STP)	0.036 mg/l

8.2. Exposure controls

8.2.1. Appropriate engineering controls

: Provide adequate general and local exhaust ventilation.
Product to be handled in a closed system.
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.
Standard EN 166 - Personal eye-protection - specifications.
Provide readily accessible eye wash stations and safety showers.

• Skin protection

- Hand protection : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.
Wear cold insulating gloves when transfilling or breaking transfer connections.
Standard EN 511 - Cold insulating gloves.
Wear chemically resistant protective gloves.
Standard EN 374 - Protective gloves against chemicals.
Permeation time: minimum >480min long term exposure : material / thickness Chloroprene rubber (CR) / 0.5 [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 : 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.
Recommended: Filter E (yellow).
Gas filters do not protect against oxygen deficiency.
Standard EN 14387 - Gas filter(s), combined filter(s) and full face mask - EN 136.
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.
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	:	Colourless. Gives off white fumes in moist air.
Odour	:	Pungent.
Odour threshold	:	Odour threshold is subjective and inadequate to warn of overexposure.
Melting point		-114 °C
Boiling point	:	-85 °C
Flash point	:	Not applicable for gases and gas mixtures.
Flammability range	:	Non flammable.
Relative vapour density at 20 °C	:	Not applicable.
Evaporation rate (ether=1)	:	Not applicable for gases and gas mixtures.
Vapour pressure [20°C]	:	42.6 bar(a)
Vapour pressure [50°C]	:	80.6 bar(a)
Relative density, gas (air=1)	:	1.3
Relative density, liquid (water=1)	:	1.2
Solubility in water	:	720000 mg/l
pH value	:	If dissolved in water pH-value will be affected.
Partition coefficient n-octanol/water [log Kow]	:	Not applicable for inorganic gases.
Decomposition point [°C]	:	Not applicable.
Auto-ignition temperature	:	Non flammable.
Viscosity [20°C]	:	No reliable data available.
Explosive Properties	:	Not applicable.
Oxidising Properties	:	Not applicable.

9.2. Other information

Molar mass	:	36.5 g/mol
Critical temperature [°C]		51.4 °C
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

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

10.4. Conditions to avoid

: Avoid moisture in installation systems.

10.5. Incompatible materials

: Reacts with most metals in the presence of moisture, liberating hydrogen, an extremely flammable gas.

With water causes rapid corrosion of some metals.

Reacts with water to form corrosive acids.

May react violently with alkalis.

Moisture.

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 toxicological effects

Acute toxicity : Toxic if inhaled.
Delayed fatal pulmonary oedema possible.

LC50 inhalation rat (ppm)	1405 ppm/4h

Skin corrosion/irritation : Causes severe skin burns and eye damage.

Serious eye damage/irritation : Causes serious eye damage.

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.

Reproductive toxicity :

Toxic for reproduction : Fertility : No known effects from this product.

Toxic for reproduction : unborn child : No known effects from this product.

STOT-single exposure : Severe corrosion to the respiratory tract at high concentrations.

STOT-repeated exposure : No known effects from this product.

Aspiration hazard : Not applicable for gases and gas mixtures.

SECTION 12: Ecological information

12.1. Toxicity

Assessment : Classification criteria are not met.

EC50 48h - Daphnia magna [mg/l] : 4.92 mg/l

EC50 72h - Algae [mg/l] : 4.7 mg/l

LC50 96 h - Fish [mg/l] : 3.25 - 3.5

12.2. Persistence and degradability

Assessment : Not applicable for inorganic gases.

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. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.

Effect on the ozone layer : None.

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.

Gas may be scrubbed in alkaline solution under controlled conditions to avoid violent reaction.

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 cylinder to supplier.

List of hazardous waste codes (from Commission Decision 2001/118/EC) : 16 05 04 *: Gases in pressure containers (including halons) containing dangerous 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

UN-No. : 1050

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : HYDROGEN CHLORIDE, ANHYDROUS

Transport by air (ICAO-TI / IATA-DGR) : Hydrogen chloride, anhydrous

Transport by sea (IMDG) : HYDROGEN CHLORIDE, ANHYDROUS

14.3. Transport hazard class(es)

Labelling :

2.3 : Toxic gases.

8 : Corrosive substances.

Transport by road/rail (ADR/RID)

Class : 2.

Classification code : 2TC.

Hazard identification number : 268.

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 (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) : None.

Transport by air (ICAO-TI / IATA-DGR) : None.

Transport by sea (IMDG) : None.

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.

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 cylinder 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. Transport in bulk according to Annex II of Marpol and the IBC Code

: 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) : Listed.

National regulations

National legislation : Ensure all national/local regulations are observed.

Germany

Water hazard class (WGK) : Water hazard class (WGK) 1, low hazard to waters (Classification according to VwVwS, Annex 1 or 2; ID No. 238)

Other information, restrictions and prohibition regulations : [German regulations] BetriebssicherheitsV mit TRBSen insbesondere TRBS 3145 / TRGS 725 Ortsbewegliche Druckgasbehälter", TRBS 2141, BGRegel 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."

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 453/2010.

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

Training advice : Users of breathing apparatus must be trained.

Ensure operators understand the toxicity hazard.

Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Full text of H- and EUH-statements

Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
Skin Corr. 1A	Skin corrosion/irritation, Category 1A
H280	Contains gas under pressure; may explode if heated.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
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.

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

1. 069-1: Industrial uses, closed contained conditions

1.1. Title section

Industrial uses, closed contained conditions

ES Ref.: 069-1 Revision date: 01/10/2016	Association ref code: EIGA069-1

Processes, tasks, activities covered	Industrial uses, including product transfers and associated laboratory activities within different closed or contained systems Formulation
Environment	Use descriptors
CS1	ERC1, ERC2, ERC4, ERC6a, ERC6b, ERC8d
Worker	Use descriptors
CS4	PROC8b
CS3	PROC2
CS2	PROC1
Assessment method	ECETOC TRA 2.0

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: ERC1, ERC2, ERC4, ERC6a, ERC6b, ERC8d

ERC1	Manufacture of substances
ERC2	Formulation of preparations
ERC4	Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids
ERC8d	Wide dispersive outdoor use of processing aids in open systems

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)	260

Technical and organisational conditions and measures	
Use appropriate air emissions abatement systems (e.g. wet or dry scrubber or local STP) to ensure that the emission levels defined by local regulations are not exceeded	
Soil emission controls are not applicable as there is no direct release to soil	
Ensure operatives are trained to minimise releases	

Conditions and measures related to sewage treatment plant	
Substance will dissociate upon contact with water, only the pH is affected, therefore after passing through the STP exposure is considered negligible and with no risk	

Conditions and measures related to treatment of waste (including article waste)	
See section 13 of the SDS	

Other conditions affecting environmental exposure	
No additional information	

1.2.2. Control of worker exposure: PROC8b

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

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 (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	<= 4 h/day
Covers frequency up to:	5 days/week

Technical and organisational conditions and measures	
Handle product within a closed system	
Provide a good standard of controlled ventilation (10 to 15 air changes per hour)	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points were emissions could occur. Outdoor, LEV is not generally required.	
Ensure samples are obtained under containment or extract ventilation.	
Fill containers at dedicated fill points supplied with local extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
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	
Wear suitable gloves tested to EN374. Mandatory since the product is corrosive	Personal protection measures have to be applied in case of potential exposure only.
Wear gloves providing a minimum efficiency of (%):	95
Use suitable eye protection	
Wear suitable face shield	
Wear suitable working clothes	
Wear suitable coveralls to prevent exposure to the skin	
If inhalative exposure above the occupational exposure limit cannot be excluded, adequate respiratory protection equipment must be used.	
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor use	

1.2.3. Control of worker exposure: PROC2

PROC2	Use in closed, continuous process with occasional controlled 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 (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and 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	
Provide a good standard of controlled ventilation (10 to 15 air changes per hour)	
During indoor processes or in cases where natural ventilation is not sufficient, LEV should be in place at points were emissions could occur. Outdoor, LEV is not generally required.	
Ensure samples are obtained under containment or extract ventilation.	
Drain down and flush system prior to equipment break-in or maintenance.	
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	
Wear suitable gloves tested to EN374. Mandatory since the product is corrosive	
Wear gloves providing a minimum efficiency of (%):	95
Use suitable eye protection	
Wear suitable face shield	
Wear suitable working clothes	
Wear suitable coveralls to prevent exposure to the skin	
If inhalative exposure above the occupational exposure limit cannot be excluded, adequate respiratory protection equipment must be used.	
See section 8 of the SDS.	

Other conditions affecting workers exposure	
Indoor use	

1.2.4. Control of worker exposure: PROC1

PROC1	Use in closed process, no likelihood of 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 (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.	
Exposure duration	<= 8 h/day
Covers frequency up to:	8 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 use	

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: ERC1, ERC2, ERC4, ERC6a, ERC6b, ERC8d

Qualitative approach used to conclude safe use

1.3.2. Worker exposure: PROC8b

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects		Since the product has corrosive properties, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario	

Dermal - Acute - systemic effects		Since the product has corrosive properties, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario	
Acute - Local - Inhalation	13.69 mg/m³	Indoor use , With LEV xx%90%	0.913
Long term - Local - Inhalation	4.11 mg/m³	Indoor use , With LEV xx%90%	0.514

1.3.3. Worker exposure: PROC2

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects		Since the product has corrosive properties, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario	
Dermal - Acute - systemic effects		Since the product has corrosive properties, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario	
Acute - Local - Inhalation	13.69 mg/m³	Indoor use , With LEV xx%90%	0.913
Long term - Local - Inhalation	4.11 mg/m³	Indoor use , With LEV xx%90%	0.514

1.3.4. Worker exposure: PROC1

Route of exposure and type of effects	Exposure estimate	Assessment conditions	RCR
Dermal - Long-term - systemic effects		Since the product has corrosive properties, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario	
Dermal - Acute - systemic effects		Since the product has corrosive properties, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario	
Acute - Local - Inhalation	0.03 mg/m³		0.002
Long term - Local - Inhalation	0.015 mg/m³		0.002

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	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see :