

Hydrochloric Acid

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Chemical name:	Hydrochloric Acid 30% - 38% (aqueous solution of hydrogen chloride)
EC number:	231-595-7
CAS No.	7647-01-0
Index No:	017-002-01-X
Registration number:	01-2119484862-27-0069
Chemical characterization:	Inorganic mono-constituent substance

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

Relevant Identified Uses:

Manufacture of HCl in gaseous and liquid form; Recycling of HCl; Distribution of the substance (Industrial); Formulation & (re)packing of substances and mixtures (Industrial, Professional); Intermediate (at industrial sites); Use as pH-regulator, flocculant, precipitant, neutralization agent (industrial, Health Services); Use as washing, cleaning agent and cleaning product; Use as water treatment chemical by industry/professionals/public domain; Use as a laboratory chemical; Use as reagent in experimental kits; Use in welding and soldering products.

For more information see the corresponding Exposure Scenario attached to this SDS.

Uses advised against: Any use involving aerosol formation, vapour release (>10 ppm) or risk of splashing into eyes or onto skin where workers without protective breathing or eye/skin equipment may be exposed

1.3 Details of the supplier of the safety data sheet

Company:	BONDALTI CHEMICALS, SA Rua do Amoníaco Português, nº 10 Quinta da Indústria, Beduído 3860-680 Estarreja - Portugal
Telephone:	+351 234 810 300
Fax:	+351 234 810 361
Web page:	www.bondalti.com
Contact:	Maria José Alves
E-mail	fds@bondalti.com

Hydrochloric Acid

1.4 Emergency telephone number

BONDALTI CHEMICALS, SA Telephone: Fax:	+351 234 810 300 (24 hours/day - 7 days/week) +351 234 810 361
National Emergency No.	112
SOS – Poisons Centre	England and Wales: NHS 111 - dial 111 Scotland: NHS 24 - dial 111 North Ireland: Contact local GP or pharmacist during normal hours; Republic of Ireland: 01 809 2166 Unite States of America: 1-800-222-1222 Cyprus: Department of Labour Inspection, Ministry of Labour

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Self-Classification of Hydrochloric Acid according to CLP regulation 1272/2008 criteria

Hazard Class	Hazard Category	Hazard Statements
Skin Corrosion/Irritation	Skin Corr. 1A	H314: Causes severe skin burns and eye damage.
Specific target organ toxicity – single exposure	STOT SE 3	H335: May cause respiratory irritation
Corrosive to metals	Met. Corr. 1	H290: May be corrosive to metals

Specific concentration limits:

Concentration(%)	Classification
≥ 25	Met. Corr. 1; Skin Corr. 1A; STOT SE3; Eye Damage 1/H318: Causes serious eye damage.
≥ 10 - < 25	Met. Corr. 1 ; Skin Corr. 1B ; STOT SE3; Eye Damage 1/H318: Causes serious eye damage.
≥ 1 - < 10	Met. Corr. 1 ; Eye Damage 1/H318: Causes serious eye damage.
≥ 0.1 - < 1	Met. Corr. 1

Additional information

Human and environmental risks:

Concentrated hydrochloric acid (chloric acid gas) forms acid clouds. Both the gas and the solution have a corrosive effect on human tissue and can potentially damage respiratory organs, skin and intestines. When chloric acid is mixed with common oxidising chemicals such as sodium hypochlorite (bleach, NaClO) or potassium permanganate (KMnO₄), the toxic gas chlorine is produced. Environmental consequences may occur on a local scale due to the pH effects.

Hydrochloric Acid

2.2 Label elements

REGULATION (EC) No. 1272/2008

Hazard Pictogram:



GHS05



GHS07

Signal – Word: **Danger**

Hazard Statements: **H314:** Causes severe skin burns and eye damage.

H335: May cause respiratory irritation.

H290: May be corrosive to metals

Precautionary statements:

P234: Keep only in original container

P260: Do not breathe vapours

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P303+P361+P353: IF ON SKIN (OR HAIR): Take off immediately all contaminated clothing. Rinse skin with water.

P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P501: Dispose of container to in accordance with local regulation

When the substance is sold to the general public at a concentration of 0.2% or above, the following is compulsory:

- The packaging must be fitted with child-resistant fastenings.
- The label must carry a tactile hazard warning.

The product packaging must have:

- A single seal fastener for opening.
- EC No.
- Indication of "EC Labelling".

2.3 Other hazards

The substance is not classified as PBT and vPvB.

Hydrochloric Acid

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Hazardous substances

Chemical name	CAS No.	EC No.	REACH No.	Concentration [%]
Hydrogen Chloride	7647-01-0	231-595- 7	01-21194 84862-27- 0069	30 < C < 38

Hydrogen chloride (in gas), and **HCl** in aqueous acid (**hydrochloric acid**), have the same CAS Registry No. Since the gas transforms into acid in aqueous systems and the gas may become volatile from aqueous systems, it is often difficult to determine which is being considered in any particular article in the literature.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General advice:	If exposed to the substance and casualty feels unwell: Call SOS POISONS (INEM) or consult a physician. Show this safety sheet to the physician on duty.
If inhaled:	Remove casualty to fresh air and keep at rest in a position comfortable for breathing. If symptoms persist or breathing gets difficult, consult a physician.
In case of skin contact	Take off immediately all contaminated clothing including shoes. Rinse skin with water or shower. In case of reddened skin or burns, seek medical advice.
In case of eye contact	Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Eyelids should be held away from the eyeball to ensure a thorough rinsing. Always consult an eye doctor!
If swallowed	Only when casualty is conscious, rinse mouth with plenty with water. Give water to drink. Do NOT induce vomiting. Take the casualty immediately to hospital!

First aider protection:

Respiratory protection:	Low concentrations and short term activity (max 15 min): filter masks with filter type E. Be aware of the filter capacity and the use-time limitation! High concentrations or unknown exposure or prolonged activity: self-contained breathing apparatus.
Hand protection:	Use suitable gloves tested by EN374 Suited glove material: fluoro rubber, butyl rubber, chloroprene, nitrile rubber, PVC, latex.

Hydrochloric Acid

	The suitability of a specific glove of a supplier must be determined depending on the use conditions (chemical, mechanical, thermal stress, and use/contact time)
Eye protection:	Safety glasses with side protection shield or goggles conform to EN 166. Full face mask.

4.2 Most important symptoms and effects, both acute and delayed**4.2.1 Inhalation**

May cause respiratory irritation.

4.2.2 Skin contact

Causes severe skin burns.

4.2.3. Eye contact

Causes eyesight to deteriorate.
Highly corrosive to eyes.

4.2.4. Swallowing

If swallowed, causes burns in mucosa.

4.3 Indication of any immediate medical attention and special treatment needed

Symptomatic treatment is advised.
Remove contaminated clothing immediately and rinse immediately with water.
Rinse the skin/eyes with water or shower.

SECTION 5: FIREFIGHTING MEASURES**5.1 Extinguishing media:**

Suitable extinguishing media:	Use extinguishing media suited to the local circumstances and surroundings (for example): Dry chemical powder and CO ₂ . Non-flammable product
Unsuitable extinguishing media:	Not applicable.

Hydrochloric Acid**5.2 Special hazards arising from the substance or mixture**

- Product is neither flammable nor explosive and does not induce combustion.
- Remove container from the fire and cool with water in a protected area.
- Product reacts with most metals, producing highly inflammable and explosive hydrogen gas and hydrogen chloride.
- Hydrogen chloride is easily disassociated in water into hydrated protons and chloride ions.

5.3 Advice for firefighters

- In case of fire or insufficient ventilation, wear self-contained breathing apparatus and acid-proof resistant suit.
- Use personal protective equipment.
- Wear chemically resistant suit.
- Cool containers/tanks with pulverised water.

SECTION 6: ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures****6.1.1. For non-emergency personnel**

- Prevent additional spillage, if safe to do so.
- Keep product away from incompatible products.
- Call the emergency brigade.
- Move people to safety area. (Keep upwind).

6.1.2 For emergency responders

- Wear suitable personal protective equipment (e.g.: chemical protective suit; goggles; protective footwear, gloves and suitable respiratory protective equipment)
- Evacuate staff to safety areas (Keep upwind).
- Keep people away from and upwind of the spillage.
- Ventilate the area.
- Suppress gas cloud with water spray jet.

6.2 Environmental precautions

- Avoid release to the environment.
- Do not allow to enter into drain or surface waters.
- If the product contaminates rivers, lakes or sewers, inform the responsible authorities.
- Absorb with inert, damp and non-combustible material, then rinse with water.
- Gather the spilt product in acid resistant containers, seal them and hand over for destruction at the appropriate locations according to legal regulations.
- Stop the leak by closing the valves if this can be done safely.
- Dispose the contaminated material and its container as hazardous waste according to local regulations.

Hydrochloric Acid**6.3 Methods and material for containment and cleaning up****6.3.1** - Contain the spill with protective barriers.

- Stop the leak by closing the valves if this can be done safely.
- Cover sewer entrances.

6.3.2 - Use absorbent material. Retain leaking product with earth, diatomaceous earth (kieselguhr) or universal absorbant.

- Gather the spilt product in acid resistant containers, seal them and hand over for destruction at the appropriate locations according to legal regulations.
- Keep the waste in duly labelled containers.
- Absorb with inert, damp and non-combustible material, then rinse with water.
- Neutralise small spillages with lime or soda ash.
- Rinse remnant with plenty of water into drains.
- Clean contaminated tools with plenty of water.

6.3.3 - Never use water on spills of this product.**6.4 Reference to other sections**

- See Sections 7 and 8 for protective measures.
- See Section 13 on waste treatment.

SECTION 7: HANDLING AND STORAGE**7.1 Precautions for safe handling**

- Use the product in closed systems.
- When diluting, add the product to water. Never add water to the product.
- Use only equipment and materials compatible with the product.
- Keep it away from incompatible products.
- To avoid thermal decomposition, do not overheat.
- Transfer preferably using pump or gravity.
- Place eye baths and emergency showers near work stations.
- Do not to eat, drink and smoke in work areas.
- Wash hands after use.
- Remove contaminated clothing and protective equipment before eating areas.

7.2 Conditions for safe storage, including any incompatibilities

- Store in steel tanks lined with hard rubber or other resistant coating or inliner, or in plastic containers made of PE, PP, chloro or fluoro polymers, or in glass bottles.
- Keep containers tightly closed in a dry and well-ventilated place.
- Keep in duly labelled and sealed containers.
- Corrosive to metals.

Hydrochloric Acid

- Provide impermeable flooring and corrosion-resistant equipment.
- Store only in double-walled leakage monitored tanks, or in tanks/containers in a bunded area.
- Provide sufficient air exchange and/or exhaust in work rooms.

To be avoided:

- Unprotected metals, glass-fibre reinforced plastic (GRP).
- The formation of aerosols, non-coated metals and plastic materials with reinforced fibreglass (GRP).
- Do not store with alkaline products and oxidising agents.

7.3 Specific end use(s)

Given the corrosive properties of the substance, always wear suitable protective clothing and protect eyes and skin.

For further information, consult the additional exposure scenario. Use only metal containers with an inner layer resistant to acid since the product can be corrosive to metals.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Legal basis
Hydrogen chloride(*)	7647-01-0	STEL (15 min)	10 ppm 15 mg/m ³	COMMISSION DIRECTIVE 2000/39/EC of 8 June 2000
		TLV-TWA (8 h)	5 ppm 8 mg/m ³	

(*) Form of exposure: Aerosols, vapour and gas

DNEL/PNEC values

DNEL Values – For workers and general population

DNEL (inhalation, local long term): 5 ppm (8 mg/m³)

DNEL (inhalation, local short term): 10 ppm (15 mg/m³)

DNEL (dermal systemic): n.a. (skin corrosive)

n.a (Systemic toxicity is not relevant based on the properties and use of the substance)

PNEC Values:

PNEC values were not calculated for the following reasons:

It is accepted that the toxic effects of HCl result from the presence of the H⁺ ion and from the resulting low pH. A full study of aquatic toxicity is available, which shows the effects of low pH with hydrochloric

Hydrochloric Acid

acid. The aquatic toxicity data show that a different acidic pH is harmful to aquatic organisms (pH < 3-5). However, to reach this level of pH in natural waters (= worst case) at least 10 mg/L of HCl is necessary (OECD SIDS on Hydrogen Chloride, 2002, chapter 2.2.2 with Table 2-1 (based on Groot de W.A. and Dijk van N.R.M., 2002, Addition of hydrochloric acid to a solution with sodium bicarbonate to a fixed pH., Solvay Pharmaceuticals; Study No. A SOL.S.027).

Accordingly, as the resulting pH in the environment will depend on the buffering capacity of the water, the toxicological parameters in mg/L of hydrochloric acid are considered insignificant. Similarly, it is not considered useful to calculate PNEC values for hydrochloric acid due to factors such as: buffering capacity, natural pH and pH fluctuations very specific to a certain ecosystem.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

- Ensure adequate ventilation.
- Ensure that there are eye-baths and an emergency shower next to the workplace.

8.2.2 Individual protection measures, such as personal protective equipment

Respiratory protection:	Low concentrations and short term activity (max 15 min): filter masks with filter type E. Be aware of the filter capacity and the use-time limitation! High concentrations or unknown exposure or prolonged activity: self-contained breathing apparatus.
Hand protection:	Use suitable gloves tested by EN374 Suited glove material: fluoro rubber, butyl rubber, chloroprene, nitrile rubber, PVC, latex. The suitability of a specific glove of a supplier must be determined depending on the use conditions (chemical, mechanical, thermal stress, and use/contact time)
Eye protection:	Safety glasses with side protection shield or goggles conform to EN 166. Full face mask.
Body and skin protection:	Acid-proof protective overall, safety shoes or boots. Choose a protective suit according to the quantity and concentration of the substance in the workplace.
Hygiene measures:	Handle according to good health and safety practices. Do not eat, drink and smoke at work, keep away foodstuffs and beverages. Wash hands immediately after handling chemicals, before breaks and at the end of the work day.
Protective measures:	Plan first aid action before starting to work with this product. Avoid contact with skin and eyes. Do not inhale gas or aerosol (mist). Apply Personal Protective Equipmente as required. Remove contaminated clothing immediately.

Hydrochloric Acid

8.2.3 Environmental exposure control

Discard rinse water in compliance with applicable regulations:

- 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council;
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives and other amendments;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 - replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic Physical and Chemical Properties

a) Appearance:	Colourless to slightly yellow liquid
b) Odour:	Pungent and irritant
c) Odour threshold:	No available (*)
d) pH:	<1 (5% water)
e) Melting point/freezing point:	No available (*)
f) Initial boiling point and boiling range:	-85°C at 101.3 kPa
g) Flash point:	Product is non flammable in air
h) Evaporation rate:	No data (*)
i) Flammability (solid, gas):	Product is non flammable in air
j) Upper/lower limits of flammability or explosivity:	The product is neither flammable nor explosive
k) Vapour pressure:	4620 kPa at 25°C
l) Vapour density:	1.26 (Air = 1)
m) Relative density:	1.18 (Water)
n) Solubility(ies):	Water soluble; Soluble in ethanol and 2-propanol 500 g/L at 20°C
o) Partition coefficient n-octanol/water:	The endpoint is waived: The substance is inorganic. (**)

Hydrochloric Acid

p) Auto-ignition temperature:	Product is non flammable
q) Decomposition temperature:	No available (*)
r) Viscosity:	1.7mm ² /s at 20°C
s) Explosive properties:	Non-explosive
t) Oxidising properties:	Non oxidising

(*) No reliable data source for this data

(**) Chemical Safety Report

9.2 Other information

Dissociation constant: The endpoint is waived: The study is scientifically impossible, HCl is a very strong acid that dissociates completely in water and therefore the pKa is infinitely.

SECTION 10: STABILITY AND REACTIVITY**10.1 Reactivity**

The product reacts with:

- common construction metals with evolution of highly flammable hydrogen gas,
- alkali and organic bases with violent evolution of heat,
- lime stone, marble, dolomite and other carbonic minerals with evolution of suffocating CO₂ gas,
- sulphides with evolution of toxic H₂S gas,
- sulphites, hydrogen sulphites and pyro sulphites with evolution of toxic SO₂ gas,
- with sodium azide to highly toxic and explosive hydrazoic acid,
- any other chemical, that is prone to (dangerous) reaction/decomposition with acids.
- with strong oxidants (bleaching agents, conc. H₂O₂, HNO₃, etc. and their salts, chromates, permanganates, etc) with evolution of toxic chlorine gas.

10.2 Chemical stability

Product is stable under recommended storage and use conditions.

10.3 Possibility of hazardous reactions

Product reacts with metals and produces highly flammable hydrogen. Acid reacts violently with alkali when heat is produced.

Hydrochloric Acid

10.4 Conditions to avoid

Any use involving aerosol formation or vapour release and where workers may be exposed without respiratory protective equipment.

Any use involving risk of splashing eyes/skin where workers may be exposed without eye or skin protection

10.5 Incompatible materials

Metals and oxidising agents

10.6 Hazardous decomposition products

Hydrogen Chloride, Chlorine and Hydrogen. By heating evolution of corrosive and toxic hydrogen chloride gas.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Chloric acid is a very strong and highly corrosive acid. The substance causes only local and non-systemic effects. Chloric acid disassociates rapidly and almost completely in contact with water, releasing the chloride ion and the hydrogen ion that combine with water to form the hydronic ion. Both chlorine and hydronic ions are generally present in our body.

Test results/Data: There are no data available, information provided based on chloric acid properties (see toxicological summary).

Hazard Class	Dose descriptor	Method/reference
Acute oral and dermal toxicity	Testing for acute systemic toxicity of the corrosive substance by oral or dermal route is not appropriate.	Chemical Safety Report
Acute inhalation toxicity	Toxic signs in rats during exposure to HCl gas or aerosol were essentially identical. HCl was severely irritating to the eyes, mucous membranes and exposed areas of skin. HCL gas: LC ₅₀ (5 min exposure): 40989 ppm (34803-48272) LC ₅₀ (30 min exposure): 4701 ppm (4129-5352) = 7521 mg/m ³	Chemical Safety Report

Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

Processed by computer
 FS-84-002

Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

Hazard Class	Dose descriptor	Method/reference
Acute inhalation toxicity	HCl aerosols: LC ₅₀ (5 min exposure): 45.6 mg/L (39.5-52.8) equivalent to 31008 ppm (26824-35845) LC ₅₀ (30 min exposure): 8.3 mg/L (7.2-9.7) equivalent to 5666ppm (4855-6614) Adverse effect observed: LC ₅₀ = 7051 mg/m ³	Chemical Safety Report
Skin Corrosion/ Irritation	Corrosive. Rabbit: 0.5 ml, 37% HCl, exposure 1 hour: corrosive Rabbit: 0.5 ml, 17% HCl, exposure 4 hours: corrosive. 0.5 ml, 15% HCl, exposure 4 hours: non- corrosive. Concentrations below 10% are not irritating Concentrations from 10% and higher should be considered corrosive Cat.1B, and from 25% Cat.1A.	Potokar et al, 1985 Vernot et al, 1977 Human in vivo, York et al, 1996 in vitro OECD 431, Warren, 2013
Serious Eye Lesions/ Eye irritation	Corrosive to the eyes from concentrations ≥1%	Chemical Safety Report
Respiratory Sensitisation	Not Sensitising. Based on the test findings in an MEST and GPMT and in accordance to Regulation (EC) nº 1272/2008, HCl does not have to be classified as a skin and respiratory sensitizer.	Chemical Safety Report
Skin Sensitisation	Not Sensitising for animals or humans	Gad S.C., Dunn B.J., Dobbs D.W., Reilly C. and Walsh R.D. 1986 Ryan. C.F. 1987
Germ cell mutagenicity	Based on in vitro test results HCl should not be classified for genotoxic toxic effects.	Chemical Safety Report
Carcinogenicity	NOAEL = <10 ppm (inhalation, Sprague-Dawley rat, male) Hydrochloric acid did not evoke a carcinogenic response in treated rats. NOAEC = 15 mg/m ³ (Inhalation, Chronic, rat)	Orientation test OECD 451, 1981 Sellakumar A.R., Snyder C.A., Solomon J.J. and Albert R.E. 1985
Reproductive Toxicity	Based the local nature of the toxic effects of hydrogen chloride and on animal welfare grounds, reproductions toxicity studies are not considered necessary.	Chemical Safety Report

Hydrochloric Acid

Hazard Class	Dose descriptor	Method/reference
STOT – SE:	Affected Organs: Lungs; respiratory system (Route of exposure: Inhalation – C ≥10% w/W Rat [other species] (Rat - Sprague-Dawley (CD); Rat - Fisher-344 (CDF)) male/female sub-chronic toxicity: inhalation Vehicle: unchanged (no vehicle) Exposure: Either 4 days or 13 weeks (Daily, 6 hours a day, 5 days per week) NOAEL: 20 ppm (male/female) Mortality, clinical signs, food consumption, body weights and organ weights. NOEL (rats): 10 ppm (male/female) Mortality, clinical signs, food consumption, body weights and organ weights	equivalent or similar to OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study) [./.]
STOT- RE:	Lack of data.	Chemical Safety Report
Aspiration Hazard:	Lack of data.	Chemical Safety Report
Developmental toxicity:	Based the local nature of the toxic effects of hydrogen chloride and on animal welfare grounds, developmental toxicity testing is not considered necessary, either in rodent or non-rodent species.	Chemical Safety Report

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Information on environmental effects

For chloric acid it is not relevant to determine toxicity in terms of mg/L due to buffering capacity of different test systems and different aquatic ecosystems. Aquatic studies are being made using buffered media and, therefore, as discussed in the acute toxicity aquatic studies, the standard chronic test methods led to different results based on the different buffering capacity of the specific test systems. Apart from that, the exact maintenance of pH values over time in chronic studies, may be problematic. It is possible that the results of the aquatic toxicity of chloric acid arise from the fact that there is sufficient acid to produce a lower pH (i. e. pH 3-5).

Given that assessment of the environmental exposure shows insignificant disturbance in the aquatic levels of pH, both in the formulation of the product and in its use, there is considered to be no long-term risk to aquatic organisms, and, therefore, information on the chronic effects on fish is unnecessary.

Hydrochloric Acid

In the aquatic environment the effects of HCl are clearly related to the effects of pH, since HCl dissociates completely in the H_3O^+ & Cl ions, and the latter does not constitute a harmful substance. The substance itself will therefore not reach land environment or sediments.

Hazard Class	Dose descriptor	Method/reference
Acute toxicity for fish:	Lepomis macrochirus, freshwater: LC_{50} (96h) = 20.5 mg/l (pH 3.25 - 3.5).	Ellgaard, E.G., and Gilmore III, J.Y (1984)
Acute Toxicity to daphnia and other aquatic invertebrates:	Daphnia magna, freshwater, static: EC_{50}/LC_{50} (48h) = pH 4.92 (0.45 mg/L)	OECD Guideline 202 (Daphnia sp. Acute Immobilisation test) Cross N. 2008
Toxicity to algae/cyanobacteria	Chlorella vulgaris, freshwater algae: EC_{50}/LC_{50} (72h) = pH 4.7 (0.73 mg/L) EC_{10}/LC_{10} (72h) = pH 5.0 (0.364 mg/L)	OECD guideline 201 (Algae, Growth inhibition test [before 23 March 2006]) Brown, R.J. 2008
Toxicity to microorganisms:	EC_{50} (3 h): pH 5.0 - 5.5. (0.23 mg/L) nominal (activated sludge, domestic, freshwater) based on: inhibition of total respiration - respiration rate	OECD Guideline 209 (Activated sludge, respiration inhibition test [before 22 July 2010]) Daniels, M. 2008

12.2 Persistence and degradability

Biodegradability: No relevant information available.

Abiotic Degradation: No relevant information available.

12.3 Bioaccumulative potential

No potential for bioaccumulation. The substance dissociates when entering the aquatic compartment and will not be taken up as such even more chlorine and hypo are considered not toxic and have no bioaccumulate potential the effect is only a pH effect.

12.4 Mobility in soil

Land behaviour is not expected to be relevant. If released into soil, soil particle absorption will be insignificant. Depending on the buffering capacity of the soil, the H^+ will be neutralised in the soil water by natural organic or inorganic matter or the pH may decrease.

12.5 Results of PBT and vPvB assessment

HCl does not fulfil the criteria for Persistence and Bioaccumulation given in Annex XIII of the REACH Regulation and therefore is not PBT. It is not very persistente (vP) nor very bioaccumulative (vB).

Hydrochloric Acid**12.6 Other adverse effects**

Data unavailable.

SECTION 13: DISPOSAL CONSIDERATIONS**13.1 Waste treatment methods****Waste disposal procedures:**

- Dilute with large amounts of water.
- Solutions with low pH must be neutralised with inorganic base before disposal.
- It is not advisable to discharge hydrochloric acid waste through wastewater.
- Dispose of product as hazardous waste according to local regulations.
- EWC Code 06 01 02(*) – Hydrochloric Acid.
- EWC Code 06 01 99 – Wastes not otherwise specified (Contaminated Hydrochloric Acid).
- EWC Code 15 02 02(*) – Absorbents, filter materials contaminated by hazardous substances.

Packaging treatment:

- Recycling of packaging is preferable to elimination or incineration.
- Rinse containers with water.
- Dispose of contaminated packaging/containers as hazardous waste according to local regulations.
- EWC Code 15 01 10(*) – Packaging containing residues of or contaminated by hazardous substances.

Applicable regulations:

- 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council;
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives and other amendments;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 - replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives

Hydrochloric Acid

SECTION 14: TRANSPORT INFORMATION

	ADR	IATA	IMDG	RID
14.1 UN number:	1789	1789	1789	1789
14.2 UN proper shipping name:	Hydrochloric Acid	Hydrochloric Acid	Hydrochloric Acid	Hydrochloric Acid
14.3 Transport hazard class(es):	8	8	8	8
Labels:	8	8 - Corrosive	8 - Corrosive	8
Packing Instruction:	P001 IBC02		P001 IBC02	
Packing Instruction (cargo aircraft):		855/Max Liq Qty/Pkg: 30 L		
Packing Instruction (cargo passenger):		851/Max Liq Qty/Pkg: 1 L		
Packing Instruction (LQ):	1 L	Y840/Max. Liq Qty/Pkg: 0,5 L	1 L	
Packing Instruction (EQ):	E2			
14.4 Packing group:	II	II	II	II
14.5 Environmentally hazardous:	No	No	No	No
14.6 Special precautions for user:				
Tunnel restriction code:	(E)			
EmS:			F-A; S-B	
HI:	80			80
14.7 Transport in Bulk according to Annex II of Marpol and the IBC Code:				
Pollution Category:			Z	
Hazards:			S/P	
Ship Type:			3	

SECTION 15: REGULATORY INFORMATION

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

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC and other amendments;
- Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 and other amendments;;
- Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work;

Hydrochloric Acid

- Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) and other amendments;
- Commission Directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work;
- 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council;
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives and other amendments;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 - replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives;
- Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008, on the inland transport of dangerous goods (ADR; RID and ADN) and other amendments;

15.2 Chemical safety assessment

A chemical safety report was made.

SECTION 16: OTHER INFORMATION

This information refers only to the aforementioned product and is not valid if used with any other product or process. This information is in accordance with our current knowledge; it is complete and given in good faith but with no guarantee. The user is responsible for ensuring that the information is complete and appropriate for his specific use of the product.

Recommendations for occupational training:

- Provide the operators with suitable information, instruction and training on the product.

Changes: Changes are in blue text.

DATE	REVISION	CHANGES MADE
14-11-2019	15	Exposure Scenarios

Hydrochloric Acid**Abbreviations mentioned on the Sheet:**

ADR – European Agreement concerning the International Carriage of Dangerous Goods by Road
APF - Assigned Protection Factor
CAS no. – World authority for chemical information
CLP – Classification, Labelling and Packaging Regulation
DNEL – Derived Non Effect Concentration
EC No. – European Community
EC₁₀ – Median effect concentration (generating an effect response in 10% of the test population)
EC₅₀ – Half of maximum effective concentration
ERC - Environmental Release Category
ES - Exposure Scenario
EWC - European Waste Catalogue
Eye Damaged 1 - Serious eye damage, category 1
IATA – International Air Transport Association
IMDG – International Maritime Dangerous Goods
LC₁₀ – Lethal Concentration
LC₅₀ – Median Lethal Concentration
LEV – Low exposure level
Met. Corr. 1 – Substance corrosive to metals, category 1
NOAEC – No observed adverse effect concentration
NOAEL – No observed adverse effect level
NOEL – No Observed Effect Level
PBT - Persistent, bioaccumulative and toxic.
PC - Product Category
PNEC – Predicted No Effect Concentration
PROC - Process Category
REACH - Registration, Evaluation, Authorization and Restriction of Chemicals
RID – International Rule for Transport of Dangerous Substances by Railway
RMM – Risk Management Measures
SDS – Safety Data Sheet
Skin Corr. 1A - Skin corrosion, category 1A
Skin Corr. 1B - Skin corrosion, category 1B
STEL – Short Time Exposure Limit
STOT – SE – Specific Target Organ Toxicant - Single Exposure
STOT- RE – Specific Target Organ Toxicant - Repeated Exposure
STOT SE 3 - Specific target organ toxicity – Single Exposure, category 3
SU - Sector of Use
TLV – Threshold limit value
TWA – Time weighted average
UNO – United Nations Organisation
vPvB - Very persistent and very bioaccumulative.

References:

Chemical Safety Report Hydrogen chloride EC 231-595-7, CAS 7647-01-0; 2016-07-08

Hydrochloric Acid

Annex – Exposure Scenarios

Annex 1 - Exposure Scenario 1: Manufacture of HCl in an aqueous solution. Recycling and distribution

Annex 2 - Exposure Scenario 2: Use as intermediate by industry

Annex 3 - Exposure Scenario 3a: Formulation and Repackaging by industry

Annex 4 - Exposure Scenario 3b: Formulation and Repackaging by professionals

Annex 5 - Exposure Scenario 4: Use by industry

Annex 6 - Exposure Scenario 5: Use by professionals

Annex 7 - Exposure Scenario 6: Use by consumers

Hydrochloric Acid

ANNEX 1

Exposure Scenario 1 - Manufacture of HCL in an aqueous solution. Recycling and distribution

ES1: Manufacture of > 35-40 % HCl in aqueous solution at ambient temperature

Section 1	Exposure Scenario Title
Title	Manufacture and use of HCl; CAS: 7647-01-0
Use Descriptor	<p>Sector of Use: Industrial SU3: Industrial uses SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure. PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as a laboratory reagent</p> <p>Environmental Release Categories: ERC1: Manufacture of the substance ERC2: Formulation into mixture (repacking)</p>
Processes, tasks, activities covered	Manufacture of substance. Includes recycling/recovery, material transfers, storage, maintenance and (un)loading (including road car and/or bulk container), sampling and associated laboratory activities. Loading (including marine vessel/barge, rail/road car and IBC loading) including its distribution.
Exposure Criteria	<p><u>Worker</u></p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p>

Hydrochloric Acid

Qualitative risk assessment:

Skin corrosive cat. 1A and Eye damage 1 (H314)
 STOT Single Exp. Cat. 3 (H335)

Not classified as 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)

Environmental PNECs

No PNEC values are calculated for HCl for the following reasons:

It is accepted that the toxic effects of hydrochloric acid result from the presence of the H⁺ ion and the resultant lowered pH. A full suite of standard core aquatic toxicity studies showing the effects of lowered pH with hydrochloric acid are available. The aquatic toxicity data show that a distinct acidic pH is detrimental to aquatic organisms (pH < 3-5). To get to that pH level in weakly buffered natural waters (= worst case) however, at least 10 mg/L HCl would be required, see OECD SIDS on Hydrogen Chloride, 2002, chapter 2.2.2 with Table 2-1 (based on Groot de W.A. and Dijk van N.R.M., 2002, Addition of hydrochloric acid to a solution with sodium bicarbonate to a fixed pH., Solvay Pharmaceuticals; Study No. A SOL.S.027). Thus, since the resultant pH in the environment will be dependent on the buffering capacity of the water body, it is considered that toxicity end-points in terms of mg/L hydrochloric acid are meaningless. Similarly, it is not considered useful to calculate PNECs for hydrochloric acid because factors such as the buffer capacity, the natural pH and the fluctuation of the pH are very specific for a certain ecosystem.

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2 Operational conditions and risk management measures

Basic:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc.
 Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1 Control of worker exposure

Product characteristics

Physical form of product

Aqueous solution.
 Partial vapour pressure > 35-40% HCl: > 10 kPa
 Vapour pressure class: high at ambient temperature

Concentration of substance in product

35% Up to 40%

Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

Processed by computer
 FS-84-002

Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

Amounts used	Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2].
Human factors not influenced by risk management	<i>Not applicable</i>
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [EI119]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Indoor [OC8]. Outdoor [OC9]
Contributing Scenarios	Risk Management Measures <i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.</i>
<p><u>Due to eye and skin corrosive properties of the substance:</u></p> <p>Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];</p> <p>Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.</p> <p>Use always a filter type E for your respirator. A full-face respirator can be used instead of a half mask and goggles.</p>	
PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	<p><u>Indoor/Outdoor</u></p> <p>No specific measures identified [EI18].</p> <p><u>Recommendation:</u></p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
PROC2 (Industrial): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].	<p><u>Indoor</u></p> <ul style="list-style-type: none"> Avoid carrying out operation for more than 4 hours [OC12] <u>Plus:</u> <ul style="list-style-type: none"> Provide extract ventilation to material transfer points and other openings [E82] (efficiency: 90%). Or: Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). <p><u>Outdoor</u></p> <p>Avoid carrying out operation for more than 4 hours [OC12] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency:</p>

Hydrochloric Acid

	<p>90%; APF=10).</p> <p><i>Recommendation:</i></p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
<p>PROC3 (Industrial): General exposures [CS1]. Use in contained batch processes [CS37].</p>	<p>Indoor</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) And Avoid carrying out operation for more than 1 hour [OC11] Or: <ul style="list-style-type: none"> Avoid carrying out operation for more than 4 hours [OC12] And Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20) <p>Outdoor</p> <p>Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i></p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
<p>PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108]</p>	<p>Indoor</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11] Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 1 hour [OC11] And Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <p>Outdoor</p> <p>Avoid carrying out operation for more than 4 hours [OC12] And Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p>

Hydrochloric Acid

		Recommendation: Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC8a (Industrial): General exposures [CS1]. Non-dedicated facility [CS82]; Material transfers [CS3]. Equipment cleaning and maintenance [CS39]		Indoor Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) And Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Outdoor Avoid carrying out operation for more than 1 hour [OC11] And Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Recommendation: Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC8b (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Material transfers [CS3]. Equipment cleaning and maintenance [CS39]		Indoor <ul style="list-style-type: none"> Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20 [E70] (efficiency: 95%) <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11] Or: Avoid carrying out operation for more than 4 hours [OC12] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Outdoor Avoid carrying out operation for more than 1 hour [OC11] And Wear a

Hydrochloric Acid

full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].

Indoor

- Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) **And** Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)
- Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a

full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Outdoor

Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC15 (Industrial): General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]. Manual [CS34].

Indoor

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) **And** Avoid carrying out operation for more than 1 hour [OC11].

Recommendation:

Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

Hydrochloric Acid

Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Substance will disassociate 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. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2]. Prevent leaks and prevent soil / water pollution caused by leaks [S4].
Organizational measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released. [W2]
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site-specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0	

Hydrochloric Acid

4.1.1 Health – Uses advised against

- Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection

4.2. Environment

4.2.1 Environment – Uses advised against

Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.

Section 5

Additional good practice advice beyond the REACH Chemical Safety Assessment

Control of Worker Exposure

Cleaning [CS47]	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26]
Use of PPE	<p>Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition:</p> <p><u>Skin protection:</u></p> <p>Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task.</p> <p><u>Respiratory protection:</u></p> <p>Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity.</p> <p>Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.</p>

Control of environmental exposure

Selection of relevant RMM Core Phrases	Not applicable
---	----------------

Hydrochloric Acid

ANNEX 2

Exposure Scenario 2 - Use as intermediate by Industry

ES2.1: Industrial use of ≤25% HCl in aqueous solution as an Intermediate at ambient Temperature	
Section 1	Exposure Scenario Title
Title	Use as an intermediate of HCl; CAS: 7647-01-0
Use Descriptor	<p>Sector of Use: Industrial</p> <p>SU4: Manufacture of food products</p> <p>SU8: Manufacture of bulk, large scale chemicals (including petroleum products)</p> <p>SU9: Manufacture of fine chemicals</p> <p>SU11: Manufacture of rubber products</p> <p>SU12: Manufacture of plastics products, including compounding and conversion</p> <p>SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement</p> <p>SU19: Building and construction work</p> <p>SU0: other SU3: Industrial uses</p> <p>Product Category:</p> <p>Intermediate for the production of bulk, large scale chemicals, fine chemicals, soaps & detergents; pharmaceuticals; food and feed products; cosmetics; plant protection products, etc.</p> <p>Process Categories:</p> <p>PROC1: Use in a closed process, no likelihood of exposure</p> <p>PROC2: Use in a closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in a closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC15: Use as a laboratory reagent</p> <p>Environmental Release Categories:</p> <p>ERC6a: Use of intermediate</p>
Processes, tasks, activities covered	Use of HCl as an intermediate or process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, sampling and associated laboratory activities.
Exposure Criteria	<p>Worker</p> <p><u>Quantitative risk assessment:</u></p> <p>DNEL (inhalation, local long term): 5 ppm (8 mg/m³)</p> <p>DNEL (inhalation, local short term): 10 ppm (15 mg/m³)</p> <p>DNEL (dermal systemic): n.a. (skin corrosive)</p>

Hydrochloric Acid

Qualitative risk assessment:

≥10% - < 25%: Skin corrosive Cat 1B and Eye damage 1 (H314)

STOT Single Exp. Cat 3 (H335)

≥1% - <10%: Eye damage 1 (H318)

Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)

Environmental PNECs

No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS)

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2

Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan [E1].

Section 2.1

Control of worker exposure

Product characteristics

Physical form of product

Aqueous solution.

Partial vapour pressure up to 25% HCl: < 0.5 kPa

Vapour pressure class: Low at ambient temperature.

Concentration of substance in product

Covers percentage substance in the product up to up to 25 % [G12].

Amounts used

Varies between millilitres (sampling) and cubic meters (material transfers) [OC13]

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently) [G2].

Human factors not influenced by risk management

Not applicable

Other Operational Conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented [G1].

Ensure operatives are trained to minimize exposures [E119].

Assumes activities are at ambient temperature (unless stated differently) [G17].

Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk Management Measures

Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Hydrochloric Acid

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];

Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.

Use always a filter type E for your respirator. A full-face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC2 (Industrial): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].

Indoor/Outdoor

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC3: General exposures [CS1]. Use in contained batch processes [CS37].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%). **Or:**
 Avoid carrying out operation for more than 4 hours [OC12];

Outdoor:

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108]

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) **Or:**
 Avoid carrying out operation for more than 1 hour [OC11].

Outdoor:

Avoid carrying out operation for more than 4 hours [OC12]

Hydrochloric Acid

	Recommendation: Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or Avoid carrying out operation for more than 1 hour [OC11]. Outdoor: Avoid carrying out operation for more than 4 hours [OC12]. Recommendation: Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC15: General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]; Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) Or Avoid carrying out operation for more than 1 hour [OC11] Recommendation: Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Waste water emissions generated from equipment cleaning with water [OOC22].

Hydrochloric Acid

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	<p>Substance will disassociate 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.</p> <p>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2].</p> <p>Prevent leaks and prevent soil / water pollution caused by leaks [S4].</p>
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released. [W2]
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	
3.2. Environment	
<p>Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site-specific information.</p> <p>Substance will disassociate 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.</p>	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0.	
4.1.1 Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection.	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	

Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

Processed by computer
 FS-84-002

Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

Cleaning [CS47]	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	<p>Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition:</p> <p><u>Skin protection:</u></p> <p>Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task.</p> <p><u>Respiratory protection:</u></p> <p>Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity.</p> <p>Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.</p>
Control of environmental exposure	
Selection of relevant RMM Core Phrases	Not applicable

Hydrochloric Acid

ES2.2: Industrial use of > 25% up to 35% HCl in aqueous solution as an Intermediate at ambient Temperature

Section 1	Exposure Scenario Title
Title	Use as an intermediate of HCl; CAS: 7647-01-0
Use Descriptor	<p>Sector of Use: Industrial SU4: Manufacture of food products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU11: Manufacture of rubber products SU12: Manufacture of plastics products, including compounding and conversion SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU19: Building and construction work SU0: other SU3: Industrial uses</p> <p>Product Categories: Intermediate for the production of bulk, large scale chemicals, fine chemicals, soaps & detergents; pharmaceuticals; food and feed products; cosmetics; plant protection products, etc.</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as a laboratory reagent</p> <p>Environmental Release Categories: ERC6a: Use of intermediate</p>
Processes, tasks, activities covered	Use of HCl as an intermediate or process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, sampling and associated laboratory activities.
Exposure Criteria	<p>Worker</p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p>

Hydrochloric Acid

Qualitative risk assessment:

Skin corrosive Cat. 1A and Eye damage 1 (H314)

STOT Single Exp. Cat 3 (H335)

Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)

Environmental PNECs

No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS).

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2

Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc.

Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1

Control of worker exposure

Product characteristics

Physical form of product

Aqueous solution.

Partial vapour pressure >25% - 35% HCl: 0.5 - 10 kPa

Vapour pressure class: moderate at ambient temperature.

Concentration of substance in product

>25% Up to 35%

Amounts used

Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently) [G2].

Human factors not influenced by risk management

Not applicable

Other Operational Conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented [G1].

Ensure operatives are trained to minimize exposures [EI119].

Assumes activities are at ambient temperature (unless stated differently) [G17].

Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk Management Measures

Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];

Hydrochloric Acid

Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.

Use always a filter type E for your respirator. A full-face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [E18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC2 (Industrial): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].

Indoor:

Provide extract ventilation to material transfer points and other openings [E82]. (efficiency: 90%). **Or**

Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).

Outdoor:

Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC3: General exposures [CS1]. Use in contained batch processes [CS37].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%). **Or**

Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)

Outdoor:

Avoid carrying out operation for more than 1 hour [OC11]. **Or**

Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

Hydrochloric Acid

PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108]	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Outdoor: Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].	Indoor: <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%). <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11]; Or: Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 4 hours [OC12] And Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Outdoor: Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20) <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC15: General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]; Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%).

Hydrochloric Acid

	Recommendation: Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Waste water emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Substance will disassociate 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. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2]. Prevent leaks and prevent soil / water pollution caused by leaks [S4].
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released. [W2]
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site-specific information. Substance will disassociate 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.	

Hydrochloric Acid

Section 4		Guidance to check compliance with the Exposure Scenario
4.1. Health		
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0.		
4.1.1 Health – Uses advised against		
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection.		
4.2. Environment		
Substance will disassociate 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.		
4.2.1 Environment – Uses advised against		
Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.		
Section 5		Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure		
Cleaning [CS47]	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].	
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task. <u>Respiratory protection:</u> Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.	
Control of environmental exposure		
Selection of relevant RMM Core Phrases	Not applicable	

Safety Data Sheet

 according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

 Processed by computer
 FS-84-002

 Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

ES2.3: Industrial use of > 35% - 40% HCl in aqueous solution as an Intermediate at ambient temperature

Section 1	Exposure Scenario Title
Title	Use as an intermediate of HCl; CAS: 7647-01-0
Use Descriptor	<p>Sector of Use: Industrial SU4: Manufacture of food products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU11: Manufacture of rubber products SU12: Manufacture of plastics products, including compounding and conversion SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU19: Building and construction work SU0: other SU3: Industrial uses</p> <p>Product Category: Intermediate for the production of bulk, large scale chemicals, fine chemicals, soaps & detergents; pharmaceuticals; food and feed products; cosmetics; plant protection products, etc.</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as a laboratory reagent</p> <p>Environmental Release Categories: ERC6a: Use of intermediate</p>
Processes, tasks, activities covered	Use of HCl as an intermediate or process chemical or extraction agent. Includes recycling/recovery, material transfers, storage, sampling and associated laboratory activities.
Exposure Criteria	<p>Worker</p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p> <p><u>Qualitative risk assessment:</u> Skin corrosive Cat. 1A and Eye damage 1 (H314); STOT Single Exp. Cat 3 (H335) Not classified as category 1 or 2 Carcinogenic Mutagenic and/or</p>

Hydrochloric Acid

Reproduction toxic (CMR).

Environmental PNECs

No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS).

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2

Operational conditions and risk management measures

Basic:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1

Control of worker exposure

Product characteristics

Physical form of product

 Aqueous solution.
 Partial vapour pressure >35% - 40% HCl: > 10 kPa
 Vapour pressure class: high at ambient temperature.

Concentration of substance in product

35% Up to 40%

Amounts used

Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently) [G2].

Human factors not influenced by risk management

Not applicable

Other Operational Conditions affecting worker exposure

 Assumes a good basic standard of occupational hygiene is implemented [G1].
 Ensure operatives are trained to minimize exposures [E119].
 Assumes activities are at ambient temperature (unless stated differently) [G17].
 Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk Management Measures

Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];

Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.

Use always a filter type E for your respirator. A full-face respirator can be used instead of a half mask and goggles.

Hydrochloric Acid

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	Indoor/Outdoor No specific measures identified [E18]. <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].
PROC2 (Industrial): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].	Indoor: Avoid carrying out operation for more than 4 hours [OC12] <i>Plus:</i> <ul style="list-style-type: none"> • Provide extract ventilation to material transfer points and other openings [E82]. (efficiency: 90%). Or: • Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). Outdoor: Avoid carrying out operation for more than 4 hours [OC12] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].
PROC3 (Industrial): General exposures [CS1]. Use in contained batch processes [CS37].	Indoor: <ul style="list-style-type: none"> • Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%). And Avoid carrying out operation for more than 1 hour [OC11] Or: • Avoid carrying out operation for more than 4 hours [OC12] And Wear a full-face respirator conforming to EN140 with Type E filter or better. efficiency: 95%; APF=20) Outdoor: Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20) <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

Hydrochloric Acid

<p>PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108]</p>	<p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11] Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 1 hour [OC11] And Wear a full-face respirator conforming to EN140 with Type E filter or better. efficiency: 95%; APF=20) <p>Outdoor:</p> <p>Avoid carrying out operation for more than 4 hours [OC12] And Wear a full-face respirator conforming to EN140 with Type E filter or better. efficiency: 95%; APF=20)</p> <p><i>Recommendation:</i></p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
<p>PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].</p>	<p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%). And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 1 hour [OC11] And Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11] And Wear a full-face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i></p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area</p>

Hydrochloric Acid

	every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].
PROC15: General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]; Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) And Avoid carrying out operation for more than 1 hour [OC11]. <i>Recommendation:</i> Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Waste water emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Substance will disassociate 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. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2]. Prevent leaks and prevent soil / water pollution caused by leaks [S4].
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released. [W2]
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	

Hydrochloric Acid

3.2. Environment

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site-specific information.

Substance will disassociate 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

Section 4

Guidance to check compliance with the Exposure Scenario

4.1. Health

The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0.

4.1.1 Health – Uses advised against

Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection.

4.2. Environment

Substance will disassociate 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.

4.2.1 Environment – Uses advised against

Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.

Section 5

Additional good practice advice beyond the REACH Chemical Safety Assessment

Control of Worker Exposure

Cleaning [CS47]

Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].

Use of PPE

Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition:

Skin protection:

Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task.

Respiratory protection:

Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity.
 Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.

Control of environmental exposure

Selection of relevant RMM Core Phrases

Not applicable

Hydrochloric Acid

Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)

Environmental PNECs

No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS).

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2 Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1 Control of worker exposure

Product characteristics

Physical form of product	Aqueous solution. Partial vapour pressure up to 25% HCl: < 0.5 kPa Vapour pressure class: Low at ambient temperature
Concentration of substance in product	Covers percentage substance in the product up to 25 % [G12].
Amounts used	Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	<i>Not applicable</i>
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [EI119]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk Management Measures

Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];

Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.

Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

Hydrochloric Acid

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	<u>Indoor/Outdoor</u> No specific measures identified [EI18]. <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC2 (Industrial): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].	<u>Indoor/Outdoor</u> No specific measures identified [EI18]. <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC3: General exposures [CS1]. Use in contained batch processes [CS37].	<u>Indoor:</u> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%). Or: Avoid carrying out operation for more than 4 hours [OC12]; <u>Outdoor:</u> No specific measures identified [EI18]. <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108].	<u>Indoor:</u> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or: Avoid carrying out operation for more than 1 hour [OC11] <u>Outdoor:</u> Avoid carrying out operation for more than 4 hours [OC12]. <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC5 (Industrial): General exposures [CS1]. Mixing operations (open systems) [CS30]. Batch process [CS55].	<u>Indoor:</u> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or: Avoid carrying out operation for more than 1 hour [OC11]

Hydrochloric Acid

	<p>Outdoor:</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p><i>Recommendation:</i></p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
PROC8a (Industrial): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82];	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or:</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p><i>Recommendation:</i></p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
PROC8b (Industrial): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Dedicated facility [CS81];	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or</p> <p>Avoid carrying out operation for more than 1 hour [OC11] Or</p> <p>Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10)</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p><i>Recommendation:</i></p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency:</p>

Hydrochloric Acid

package filling [CS6]. Material transfers [CS3].	<p>90%) Or Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Outdoor: Avoid carrying out operation for more than 4 hours [OC12].</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	<p>Substance will disassociate 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.</p> <p>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2].</p> <p>Prevent leaks and prevent soil / water pollution caused by leaks [S4].</p>
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released [W2].
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR

Hydrochloric Acid

Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0.	
4.1. Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	
Cleaning [CS47].	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task. <u>Respiratory protection:</u> Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.
Control of environmental exposure	
<i>Selection of relevant RMM Core Phrases</i>	<i>Not applicable</i>

Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

Processed by computer
 FS-84-002

Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

ES3a.2: Industrial Formulation and repacking of > 25% - ≤ 35% HCl in aqueous solution at ambient temperature

Section 1	Exposure Scenario Title
Title	Formulation & Repackaging of HCl; CAS: 7647-01-0
Use Descriptor	<p>Product Categories: PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents; PC 35: Washing and cleaning products (including solvent based products); PC 37: Water treatment chemicals;</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations (mixtures) and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>Environmental Release Categories: ERC2: Formulation into mixture</p>
Processes, tasks, activities covered	Formulation, packing and re-packing (including drums and small packs) of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing and sampling.
Exposure Criteria	<p>Worker</p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p> <p><u>Qualitative risk assessment:</u> Skin corrosive Cat 1A and Eye damage 1 (H314) STOT Single Exp. Cat 3 (H335) Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)</p> <p><u>Environmental PNECs</u> No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of</p>

Hydrochloric Acid

the SDS).

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2 Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1 Control of worker exposure

Product characteristics

Physical form of product	Aqueous solution. Partial vapour pressure > 25% - 35% HCl: 0.5 – 10 kPa Vapour pressure class: moderate at ambient temperature.
Concentration of substance in product	> 25% Up to 35%
Amounts used	Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	<i>Not applicable</i>
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [E119]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk Management Measures

Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

 Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];
 Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.
 Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15].
 Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [E118].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

Hydrochloric Acid

PROC2 (Industrial): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].	Indoor Provide extract ventilation to material transfer points and other openings [E82]. (efficiency: 90%). Or Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). Outdoor Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC3 (Industrial): General exposures [CS1]. Use in contained batch processes [CS37].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%). Or Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Outdoor: Avoid carrying out operation for more than 1 hour [OC11] Or Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Outdoor: Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day

Hydrochloric Acid

<p>PROC5 (Industrial): General exposures [CS1]. Mixing operations (open systems) [CS30]. Batch process [CS55].</p>	<p>[C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p> <p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11] Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <p>Outdoor:</p> <p>Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC8a (Industrial): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82];</p>	<p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11] Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <p>Outdoor:</p> <p>Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day</p>

Hydrochloric Acid

<p>PROC8b (Industrial): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Dedicated facility [CS81];</p>	<p>[C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p> <p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) <u>Plus:</u> <ul style="list-style-type: none"> Avoid carrying out operation for more than 4 hour [OC12] Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 4 hours [OC12] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). <p>Outdoor:</p> <p>Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].</p>	<p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) <u>Plus:</u> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11] Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <p>Outdoor:</p> <p>Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day</p>

Hydrochloric Acid

	[C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Substance will disassociate 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. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2]. Prevent leaks and prevent soil / water pollution caused by leaks [S4].
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released [W2].
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0.	

Hydrochloric Acid

4.1.1 Health – Uses advised against

Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection

4.2. Environment

Substance will disassociate 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.

4.2.1 Environment – Uses advised against

Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.

Section 5

Additional good practice advice beyond the REACH Chemical Safety Assessment

Control of Worker Exposure

Cleaning [CS47].	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	<p>Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition:</p> <p><u>Skin protection:</u></p> <p>Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task.</p> <p><u>Respiratory protection:</u></p> <p>Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.</p>

Control of environmental exposure

Selection of relevant RMM Core Phrases	Not applicable
--	----------------

Hydrochloric Acid

ES3a.3: Industrial Formulation and repacking of > 35% - 40% HCl in aqueous solution at ambient temperature

Section 1	Exposure Scenario Title
Title	Formulation & Repackaging of HCl; CAS: 7647-01-0
Use Descriptor	<p>Product Categories: PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents; PC 35: Washing and cleaning products (including solvent based products); PC 37: Water treatment chemicals;</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations (mixtures) and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>Environmental Release Categories: ERC2: Formulation into mixture</p>
Processes, tasks, activities covered	Formulation, packing and re-packing (including drums and small packs) of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing and sampling.
Exposure Criteria	<p><u>Worker</u></p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p> <p><u>Qualitative risk assessment:</u> Skin corrosive Cat 1A and Eye damage 1 (H314) STOT Single Exp. Cat 3 (H335) Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)</p>

Hydrochloric Acid

Environmental PNECs

No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS)

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2 Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1 Control of worker exposure

Product characteristics

Physical form of product

Aqueous solution.
 Partial vapour pressure > 35% - 40% HCl: > 10 kPa
 Vapour pressure class: high at ambient temperature.

Concentration of substance in product

35% Up to 40%

Amounts used

Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently) [G2]

Human factors not influenced by risk management

Not applicable

Other Operational Conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented [G1].
 Ensure operatives are trained to minimize exposures [E119].
 Assumes activities are at ambient temperature (unless stated differently) [G17].
 Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk Management Measures

Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];
 Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.
 Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15].
 Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [E118].

Hydrochloric Acid

	<p>Recommendation:</p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
<p>PROC2 (Industrial): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].</p>	<p>Indoor</p> <p>Avoid carrying out operation for more than 4 hours [OC12] <u>Plus:</u></p> <ul style="list-style-type: none"> • Provide extract ventilation to material transfer points and other openings [E82] (efficiency: 90%). Or: • Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). <p>Outdoor</p> <p>Avoid carrying out operation for more than 4 hours [OC12] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).</p> <p>Recommendation:</p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
<p>PROC3 (Industrial): General exposures [CS1]. Use in contained batch processes [CS37].</p>	<p>Indoor:</p> <ul style="list-style-type: none"> • Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%). And Avoid carrying out operation for more than 1 hour [OC11] Or: • Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20) <p>Outdoor:</p> <p>Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Recommendation:</p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
<p>PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108].</p>	<p>Indoor:</p> <ul style="list-style-type: none"> • Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) <u>Plus:</u> <ul style="list-style-type: none"> ○ Avoid carrying out operation for more than 1 hour [OC11] Or: <ul style="list-style-type: none"> ○ Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)

Hydrochloric Acid

- Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Outdoor:

Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC5 (Industrial): General exposures [CS1]. Mixing operations (open systems) [CS30]. Batch process [CS55].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) **And** Avoid carrying out operation for more than 4 hours [OC12] **And** Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)

Outdoor:

Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC8a (Industrial): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82];

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20)

Outdoor:

Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Hydrochloric Acid

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC8b (Industrial): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Dedicated facility [CS81];

Indoor:

- Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of > 20 [E70] (efficiency: 95%) Plus:
 - Avoid carrying out operation for more than 1 hour [OC11]
- Or:**
 - Avoid carrying out operation for more than 4 hour [OC12]
- And** Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)
- Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Outdoor:

Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].

Indoor:

- Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) **And** Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)
- Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20)

Hydrochloric Acid

	<p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i></p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	<p>Substance will disassociate 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.</p> <p>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2].</p> <p>Prevent leaks and prevent soil / water pollution caused by leaks [S4].</p>
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released [W2].
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR

Hydrochloric Acid

Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0.	
4.1.1 Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	
Cleaning [CS47].	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task. <u>Respiratory protection:</u> Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	<i>Not applicable</i>

Hydrochloric Acid

ANNEX 4

Exposure Scenario 3b -Formulation and Repackaging by Professionals

ES3b.1: Professional Formulation and repacking of ≤ 25% HCl in aqueous solution at ambient temperature	
Section 1	Exposure Scenario Title
Title	Formulation & Repackaging of HCl; CAS: 7647-01-0
Use Descriptor	<p>Sector of Use: SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)</p> <p>Products Categories: PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents; PC 35: Washing and cleaning products (including solvent based products); PC 37: Water treatment chemicals;</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations (mixtures) and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>Environmental Release Categories: ERC2: Formulation into mixture (modification)</p>
Processes, tasks, activities covered	Formulation, packing and re-packing (including drums and small packs) of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing and sampling.
Exposure Criteria	<p><u>Worker</u></p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p>

Hydrochloric Acid

Qualitative risk assessment:

≥10% - < 25%: Skin corrosive Cat 1B and Eye damage 1 (H314)
STOT Single Exp. Cat 3 (H335)
≥1% - <10%: Eye damage 1 (H318)

Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)

Environmental PNECs

No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS).

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2 Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1 Control of worker exposure

Product characteristics

Physical form of product	Aqueous solution. Partial vapour pressure up to 25% HCl: < 0.5 kPa Vapour pressure class: Low at ambient temperature
Concentration of substance in product	Covers percentage substance in the product up to 25 % [G12].
Amounts used	Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	<i>Not applicable</i>
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [E119]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk Management Measures

Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination

Hydrochloric Acid

with specific activity training [PPE17];

Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.

Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC2 (Professional): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].

Indoor

Provide extract ventilation to material transfer points and other openings [E82] (efficiency: 80%). **Or:** Avoid carrying out operation for more than 1 hour [OC11]

Outdoor

Avoid carrying out operation for more than 4 hours [OC12].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC3: General exposures [CS1]. Use in contained batch processes [CS37].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%). **Or:** Avoid carrying out operation for more than 4 hours [OC12];

Outdoor:

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC4 (Professional): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) **Or:** Avoid carrying out operation for more than 1 hour [OC11]

Outdoor:

Avoid carrying out operation for more than 1 hour [OC11].

Hydrochloric Acid

	<p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC5 (Professional): General exposures [CS1]. Mixing operations (open systems) [CS30]. Batch process [CS55].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) Or:</p> <p>Avoid carrying out operation for more than 1 hour [OC11]</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC8a (Professional): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82];</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10).</p> <p>Outdoor:</p> <p>Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC8b (Professional): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Dedicated facility [CS81];</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or:</p> <p>Avoid carrying out operation for more than 1 hour [OC11]</p>

Hydrochloric Acid

	<p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p><i>Recommendation:</i></p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
PROC9 (Professional): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) Or</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hours [OC11].</p> <p><i>Recommendation:</i></p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	<p>Substance will disassociate 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.</p> <p>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2].</p> <p>Prevent leaks and prevent soil / water pollution caused by leaks [S4].</p>
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released [W2].
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].

Hydrochloric Acid

Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0.	
4.1. Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	
Cleaning [CS47].	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of

Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

Processed by computer
 FS-84-002

Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

the glove for the relevant task.

Respiratory protection:

Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.

Control of environmental exposure

Selection of relevant RMM Core Phrases

Not applicable

Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

Processed by computer
 FS-84-002

Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

ES3.2b: Professional Formulation and repacking of > 25% - ≤ 35% HCl in aqueous solution at ambient temperature

Section 1	Exposure Scenario Title
Title	Formulation & Repackaging of HCl; CAS: 7647-01-0
Use Descriptor	<p>Sector of use: SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)</p> <p>Products Categories: PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents; PC 35: Washing and cleaning products (including solvent based products); PC 37: Water treatment chemicals;</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations (mixtures) and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>Environmental Release Categories: ERC2: Formulation into mixture (modification)</p>
Processes, tasks, activities covered	Formulation, packing and re-packing (including drums and small packs) of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing and sampling.
Exposure Criteria	<p>Worker</p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p> <p><u>Qualitative risk assessment:</u> Skin corrosive Cat 1A and Eye damage 1 (H314) STOT Single Exp. Cat 3 (H335) Not classified as category 1 or 2 Carcinogenic Mutagenic and/or</p>

Hydrochloric Acid

Reproduction toxic (CMR)

Environmental PNECs

No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS)

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2 Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1 Control of worker exposure

Product characteristics

Physical form of product

Aqueous solution.

Partial vapour pressure > 25% - 35% HCl: 0.5 – 10 kPa

Vapour pressure class: moderate at ambient temperature.

Concentration of substance in product

> 25% Up to 35%

Amounts used

Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently) [G2]

Human factors not influenced by risk management

Not applicable

Other Operational Conditions affecting worker exposure

 Assumes a good basic standard of occupational hygiene is implemented [G1].
 Ensure operatives are trained to minimize exposures [EI119].
 Assumes activities are at ambient temperature (unless stated differently) [G17].
 Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk Management Measures

Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];

Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.

Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [EI18].

Hydrochloric Acid

	<p><i>Recommendation:</i></p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
<p>PROC2 (Professional): General exposures [CS1].</p> <p>Continuous process [CS54].</p> <p>Automated process with (semi) closed systems [CS93].</p>	<p>Indoor</p> <p>Provide extract ventilation to material transfer points and other openings [E82]. (efficiency: 80%). And Avoid carrying out operation for more than 1 hour [OC11]</p> <p>Or: Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).</p> <p>Outdoor</p> <p>Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).</p> <p><i>Recommendation:</i></p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
<p>PROC3 (Professional): General exposures [CS1].</p> <p>Use in contained batch processes [CS37].</p>	<p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%). <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11]; Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 4 hours [OC12] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) <p>Outdoor:</p> <p>Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)</p> <p><i>Recommendation:</i></p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
<p>PROC4 (Professional): General exposures [CS1]. Batch process [CS55].</p>	<p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) <i>Plus:</i>

Hydrochloric Acid

(open systems) [CS108].	<ul style="list-style-type: none"> ○ Avoid carrying out operation for more than 1 hour [OC11]; Or: ○ Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) • Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20) <p>Outdoor: Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20)</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
PROC5 (Professional): General exposures [CS1]. Mixing operations (open systems) [CS30]. Batch process [CS55].	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 80%) And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).</p> <p>Or: Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Outdoor: Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
PROC8a (Industrial): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82];	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 80%) And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).</p> <p>Or:</p>

Hydrochloric Acid

Avoid carrying out operation for more than 1 hour [OC11] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Outdoor:

Avoid carrying out operation for more than 4 hours [OC12] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC8b (Professional): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Dedicated facility [CS81];

Indoor:

- Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 80%) *Plus:*
 - Avoid carrying out operation for more than 1 hour [OC11] **Or:**
 - Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)
- Avoid carrying out operation for more than 4 hours [OC12] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Outdoor:

Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC9 (Professional): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 80%) **And** Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)

Or:

Hydrochloric Acid

	<p>Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i></p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	<p>Risk from environmental exposure is driven by freshwater [TCR1a].</p> <p>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2].</p> <p>Prevent leaks and prevent soil / water pollution caused by leaks [S4].</p>
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2].
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR

Hydrochloric Acid

Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0.	
4.1.1 Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	
Cleaning [CS47].	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task. <u>Respiratory protection:</u> Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.
Control of environmental exposure	
<i>Selection of relevant RMM Core Phrases</i>	<i>Not applicable</i>

Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

Processed by computer
 FS-84-002

Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

ES3b.3: Professional Formulation and repacking of > 35% - 40% HCl in aqueous solution at ambient temperature

Section 1	Exposure Scenario Title
Title	Formulation & Repackaging of HCl; CAS: 7647-01-0
Use Descriptor	<p>Sector of use: SU 10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)</p> <p>Products Categories: PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents; PC 35: Washing and cleaning products (including solvent based products); PC 37: Water treatment chemicals;</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations (mixtures) and articles (multistage and/or significant contact) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>Environmental Release Categories: ERC2: Formulation into mixture (modification)</p>
Processes, tasks, activities covered	Formulation, packing and re-packing (including drums and small packs) of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing and sampling.
Exposure Criteria	<p>Worker</p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p> <p><u>Qualitative risk assessment:</u> Skin corrosive Cat 1A and Eye damage 1 (H314) STOT Single Exp. Cat 3 (H335)</p>

Hydrochloric Acid

Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)
Environmental PNECs

No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS)

Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)

Section 2

Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1

Control of worker exposure

Product characteristics

Physical form of product

Aqueous solution.
 Partial vapour pressure > 35% - 40% HCl: > 10 kPa
 Vapour pressure class: high at ambient temperature.

Concentration of substance in product

35% Up to 40%

Amounts used

Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently) [G2]

Human factors not influenced by risk management

Not applicable

Other Operational Conditions affecting worker exposure

Assumes a good basic standard of occupational hygiene is implemented [G1].
 Ensure operatives are trained to minimize exposures [EI119].
 Assumes activities are at ambient temperature (unless stated differently) [G17].
 Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk Management Measures

Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];
 Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.
 Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

Hydrochloric Acid

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	<u>Indoor/Outdoor</u> No specific measures identified [E18]. <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC2 (Professional): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].	<u>Indoor</u> <ul style="list-style-type: none"> Provide extract ventilation to material transfer points and other openings [E82] (efficiency: 80%). And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Or: Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20) <u>Outdoor</u> Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC3 (Professional): General exposures [CS1]. Use in contained batch processes [CS37].	<u>Indoor:</u> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%). And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). Or: Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20) <u>Outdoor:</u> Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

Hydrochloric Acid

PROC4 (Professional): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). Outdoor: Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC5 (Professional): General exposures [CS1]. Mixing operations (open systems) [CS30]. Batch process [CS55].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Outdoor: Unsafe use. <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC8a (Professional): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Non-dedicated facility [CS82];	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20) Outdoor: Unsafe use.

Hydrochloric Acid

	<p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC8b (Professional): General exposures [CS1]. Material transfers [CS3]. Equipment cleaning and maintenance [CS39]. Dedicated facility [CS81];</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 90%) And Avoid carrying out operation for more than 4 hours [OC12] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC9 (Professional): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]. (efficiency: 80%) And Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>

Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

Processed by computer
 FS-84-002

Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Substance will disassociate 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. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2]. Prevent leaks and prevent soil / water pollution caused by leaks [S4].
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released [W2].
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29].	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0.	

Hydrochloric Acid

4.1.1 Health – Uses advised against

Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection

4.2. Environment

Substance will disassociate 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.

4.2.1 Environment – Uses advised against

Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.

Section 5

Additional good practice advice beyond the REACH Chemical Safety Assessment

Control of Worker Exposure

Cleaning [CS47].	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	<p>Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition:</p> <p><u>Skin protection:</u></p> <p>Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task.</p> <p><u>Respiratory protection:</u></p> <p>Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.</p>

Control of environmental exposure

Selection of relevant RMM Core Phrases	Not applicable
--	----------------

Hydrochloric Acid

ANNEX 5

Exposure scenario 4 - Use by Industry

ES4.1: Industrial use of $\leq 25\%$ HCl in aqueous solution at ambient temperature	
Section 1	Exposure Scenario Title
Title	Use of HCl; CAS: 7647-01-0
Use Descriptor	<p>Sector of Use: Industrial SU2a: Mining, (without offshore industries) SU2b: Offshore industries SU4: Manufacture of food products SU5: Manufacture of textiles, leather, fur SU9: Manufacture of fine chemicals SU14: Manufacture of basic metals, including alloys SU15: Manufacture of fabricated metal products, except machinery and equipment SU16: Manufacture of computer, electronic and optical products, electrical equipment SU0: other SU3: Industrial uses</p> <p>Products Categories: PC20: Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents PC21: Laboratory chemicals PC34: Textile dyes, and impregnating products PC35: Washing and cleaning products PC37: Water treatment chemicals</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC15: Use as a laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available</p> <p>Environmental Release Categories: ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) ERC6b: Use of reactive processing aid at industrial site (no inclusion into or onto article)</p>
Processes, tasks, activities covered	Covers the use in all kinds of applications of non-spraying formulations including material receipt, storage, preparation and

Hydrochloric Acid

indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17];

Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.

Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC2 (Industrial): General exposures [CS1].

Continuous process [CS54].
Automated process with (semi) closed systems [CS93].

Indoor/Outdoor

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC3: General exposures [CS1].
Use in contained batch processes [CS37].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%). **Or**

Avoid carrying out operation for more than 4 hours [OC12];

Outdoor:

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108]

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) **Or**

Avoid carrying out operation for more than 1 hour [OC11].

Outdoor:

Avoid carrying out operation for more than 4 hours [OC12].

Hydrochloric Acid

	<p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC10 (Industrial): General exposures (open systems) [CS16]. Rolling, Brushing [CS51]. Equipment cleaning and maintenance [CS39].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use long handled tools where possible [E50]; Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC13: Dipping, immersion and pouring [CS4]. General exposures (open systems) [CS16].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) Or</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Recommendation:</p>

Hydrochloric Acid

	<p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC15: General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]; Manual [CS34].</p>	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) Or Avoid carrying out operation for more than 1 hour [OC11].</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC19 (Industrial): General exposures [CS1]. Mixing operations (open systems) [CS30]. Manual [CS34].</p>	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Or Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Outdoor: Avoid carrying out operation for more than 1 hour [OC11].</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	<p>Substance will disassociate 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.</p> <p>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2].</p> <p>Prevent leaks and prevent soil / water pollution caused by leaks [S4].</p>

Hydrochloric Acid

Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released. [W2]
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3].
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0	
4.1.1 Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	
Cleaning [CS47]	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26]
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and



Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
Integrated Management System

Processed by computer
FS-84-002

Revision: 14-11-2019
Version: 15
(Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task.

Respiratory protection:

Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.

Control of environmental exposure

*Selection of relevant RMM Core
Phrases*

Not applicable

Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
 Integrated Management System

Processed by computer
 FS-84-002

Revision: 14-11-2019
 Version: 15
 (Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

ES4.2: Industrial use of > 25% up to 35% HCl in aqueous solution at ambient temperature

Section 1

Exposure Scenario Title

Title

Use of HCl; CAS: 7647-01-0

Use Descriptor

Sector of Use: Industrial
 SU2a: Mining, (without offshore industries)
 SU2b: Offshore industries
 SU4: Manufacture of food products
 SU5: Manufacture of textiles, leather, fur
 SU9: Manufacture of fine chemicals
 SU14: Manufacture of basic metals, including alloys
 SU15: Manufacture of fabricated metal products, except machinery and equipment
 SU16: Manufacture of computer, electronic and optical products, electrical equipment
 SU0: other SU3: Industrial uses

Products Categories:
 PC20: Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
 PC21: Laboratory chemicals
 PC34: Textile dyes, and impregnating products
 PC35: Washing and cleaning products
 PC37: Water treatment chemicals

Process Categories:
 PROC1: Use in a closed process, no likelihood of exposure
 PROC2: Use in a closed, continuous process with occasional controlled exposure
 PROC3: Use in a closed batch process (synthesis or formulation)
 PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
 PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
 PROC10: Roller application or brushing
 PROC13: Treatment of articles by dipping and pouring
 PROC15: Use as a laboratory reagent
 PROC19: Hand-mixing with intimate contact and only PPE available

Environmental Release Categories:
 ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
 ERC6b: Use of reactive processing aid at industrial site (no inclusion into or onto article)

Processes, tasks, activities covered

Covers the use in all kinds of applications of non-spraying formulations including material receipt, storage, preparation and transfer, application by roller and brush, wiping, dipping, equipment cleaning, maintenance and laboratory activities.

Hydrochloric Acid

Exposure Criteria	<p>Worker</p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p> <p><u>Qualitative risk assessment:</u> Skin corrosive Cat 1A and Eye damage 1 (H314) STOT Single Exp. Cat 3 (H335)</p> <p>Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)</p> <p><u>Environmental PNECs</u> No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS)</p> <p>Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)</p>
Section 2 Operational conditions and risk management measures	
<p><u>Basic Indoors:</u> Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].</p>	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Aqueous solution. Partial vapour pressure >25% - 35% HCL: 0.5 - 10 kPa Vapour pressure class: Moderate at ambient temperature.
Concentration of substance in product	>25% Up to 35%
Amounts used	Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	<i>Not applicable</i>
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [E119]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Indoor [OC8]. Outdoor [OC9].
Contributing Scenarios	<p>Risk Management Measures</p> <p><i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.</i></p>
<p><u>Due to eye and skin corrosive properties of the substance:</u> Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination</p>	

Hydrochloric Acid

with specific activity training [PPE17];

Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.

Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC2 (Industrial): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].

Indoor

Provide extract ventilation to material transfer points and other openings [E82]. (efficiency: 90%). **Or**

Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).

Outdoor

Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC3 (Industrial): General exposures [CS1]. Use in contained batch processes [CS37].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%). **Or**

Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)

Outdoor:

Avoid carrying out operation for more than 1 hour [OC11]. **Or**

Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108]

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) **Or**

Wear a respirator conforming to EN140 with Type E filter or better.

Hydrochloric Acid

(efficiency: 90%; APF=10)

Outdoor:

 Wear a respirator conforming to EN140 with Type E filter or better.
 (efficiency: 90%; APF=10)

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].

Indoor:

- Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Plus:
 - Avoid carrying out operation for more than 1 hour [OC11]; **Or:**
 - Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)
- Avoid carrying out operation for more than 4 hours [OC12] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Outdoor:

Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

PROC10 (Industrial): General exposures (open systems) [CS16]. Rolling, Brushing [CS51]. Equipment cleaning and maintenance [CS39].

Indoor:

- Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) Plus:
 - Avoid carrying out operation for more than 1 hour [OC11]; **Or:**
 - Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)
- Avoid carrying out operation for more than 4 hours [OC12] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Outdoor:

Wear a full face respirator conforming to EN140 with Type E filter or

Hydrochloric Acid

	<p>better. (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use long handled tools where possible [E50]; Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC13: Dipping, immersion and pouring [CS4]. General exposures (open systems) [CS16].</p>	<p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11]; Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <p>Outdoor: Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC15: General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]; Manual [CS34].</p>	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%).</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
<p>PROC19 (Industrial): General exposures [CS1]. Mixing operations (open systems) [CS30]. Manual [CS34].</p>	<p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11]; Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)

Hydrochloric Acid

- Avoid carrying out operation for more than 4 hours [OC12]
And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Outdoor:

Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Recommendation:

Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].

Section 2.2

Control of environmental exposure

Product characteristics

Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],

Amounts used

NR

Frequency and duration of use

360 days per year [FD2]

Other Operational Conditions of use affecting environmental exposure

Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Substance will disassociate 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.
 Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2].
 Prevent leaks and prevent soil / water pollution caused by leaks [S4].

Organisation measures to prevent/limit release from site

Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released. [W2]

Conditions and measures related to municipal sewage treatment plant

Onsite wastewater treatment required [TCR13].

Conditions and measures related to external treatment of waste for disposal

External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3].

Conditions and measures related to external recovery of waste

NR

Other environmental control measures additional to above

NR

Section 3

Exposure Estimation

3.1. Health

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]

3.2. Environment

Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS)

Hydrochloric Acid

when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information.

Substance will disassociate 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.

Section 4 Guidance to check compliance with the Exposure Scenario

4.1. Health

The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0

4.1.1. Health – Uses advised against

Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection

4.2 Environment

Substance will disassociate 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.

4.2.1 Environment – Uses advised against

Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.

Section 5 Additional good practice advice beyond the REACH Chemical Safety Assessment

Control of Worker Exposure

Cleaning [CS47]	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26]
Use of PPE	<p>Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition:</p> <p><u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task.</p> <p><u>Respiratory protection:</u> Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.</p>

Control of environmental exposure

Selection of relevant RMM Core Phrases	Not applicable
--	----------------

Hydrochloric Acid

ES4.3: Industrial use of > 35 - 40% HCl in aqueous solution at ambient temperature

Section 1

Exposure Scenario Title

Title

Use of HCl; CAS: 7647-01-0

Use Descriptor

Sector of Use: Industrial
 SU2a: Mining, (without offshore industries)
 SU2b: Offshore industries
 SU4: Manufacture of food products
 SU5: Manufacture of textiles, leather, fur
 SU9: Manufacture of fine chemicals
 SU14: Manufacture of basic metals, including alloys
 SU15: Manufacture of fabricated metal products, except machinery and equipment
 SU16: Manufacture of computer, electronic and optical products, electrical equipment
 SU0: other SU3: Industrial uses

Products Categories:
 PC20: Processing aids such as pH-regulators, flocculants, precipitants, neutralization agents
 PC21: Laboratory chemicals
 PC34: Textile dyes, and impregnating products
 PC35: Washing and cleaning products
 PC37: Water treatment chemicals

Process Categories:
 PROC1: Use in a closed process, no likelihood of exposure
 PROC2: Use in a closed, continuous process with occasional controlled exposure
 PROC3: Use in a closed batch process (synthesis or formulation)
 PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
 PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
 PROC10: Roller application or brushing
 PROC13: Treatment of articles by dipping and pouring
 PROC15: Use as a laboratory reagent
 PROC19: Hand-mixing with intimate contact and only PPE available

Environmental Release Categories:
 ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
 ERC6b: Use of reactive processing aid at industrial site (no inclusion into or onto article)

Processes, tasks, activities covered

Covers the use in all kinds of applications of non-spraying formulations including material receipt, storage, preparation and transfer, application by roller and brush, wiping, dipping, equipment cleaning, maintenance and laboratory activities.

Hydrochloric Acid

Exposure Criteria	<p>Worker</p> <p><u>Quantitative risk assessment:</u> DNEL (inhalation, local long term): 5 ppm (8 mg/m³) DNEL (inhalation, local short term): 10 ppm (15 mg/m³) DNEL (dermal systemic): n.a. (skin corrosive)</p> <p><u>Qualitative risk assessment:</u> Skin corrosive Cat 1A and Eye damage 1 (H314) STOT Single Exp. Cat 3 (H335)</p> <p>Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR)</p> <p><u>Environmental PNECs</u> No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS)-</p> <p>Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)</p>
Section 2 Operational conditions and risk management measures	
<p><u>Basic Indoors:</u> Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].</p>	
Section 2.1 Control of worker exposure	
Product characteristics	
Physical form of product	Aqueous solution. Partial vapour pressure >35-40% HCl: > 10 kPa Vapour pressure class: High at ambient temperature.
Concentration of substance in product	35% Up to 40%
Amounts used	Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	<i>Not applicable</i>
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [E119]. Assumes activities are at ambient temperature (unless stated differently) [G17]. Indoor [OC8]. Outdoor [OC9].
Contributing Scenarios	<p>Risk Management Measures</p> <p><i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.</i></p>
<p><u>Due to eye and skin corrosive properties of the substance:</u> Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination</p>	

Hydrochloric Acid

with specific activity training [PPE17];

Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5.

Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [E18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC2 (Industrial): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].

Indoor

Avoid carrying out operation for more than 4 hours [OC12] *Plus:*

- Provide extract ventilation to material transfer points and other openings [E82]. (efficiency: 90%). **Or:**
- Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).

Outdoor

Avoid carrying out operation for more than 4 hours [OC12] **And** Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10).

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to decoupling [E39].

PROC3 (Industrial): General exposures [CS1]. Use in contained batch processes [CS37].

Indoor:

- Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%). **And:** Avoid carrying out operation for more than 1 hour [OC11]. **Or:**
- Avoid carrying out operation for more than 4 hours [OC12] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. efficiency: 95%; APF=20).

Outdoor:

Wear a full face respirator conforming to EN140 with Type E filter or better. efficiency: 95%; APF=20).

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

Hydrochloric Acid

PROC4 (Industrial): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108]	Indoor: <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) <u>Plus:</u> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11] Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Outdoor: Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Recommendation: Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC9 (Industrial): General exposures [CS1]. Dedicated facility [CS81]; Drum and small package filling [CS6]. Material transfers [CS3].	Indoor: <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10). Avoid carrying out operation for more than 1 hour [OC11]; And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Outdoor: Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Recommendation: Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC10 (Industrial): General exposures (open systems) [CS16]. Rolling, Brushing [CS51].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) And Wear a respirator conforming to EN140

Hydrochloric Acid

Equipment cleaning and maintenance [CS39].	with Type E filter or better. (efficiency: 90%; APF=10) Outdoor: Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use long handled tools where possible [E50]; Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].
PROC13 (Industrial): Dipping, immersion and pouring [CS4]. General exposures (open systems) [CS16].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Outdoor: Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].
PROC15 (Industrial): General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]; Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%). And Avoid carrying out operation for more than 1 hour [OC11]. <i>Recommendation:</i> Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].
PROC19 (Industrial): General exposures [CS1]. Mixing operations (open systems) [CS30]. Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). Outdoor:

Hydrochloric Acid

	<p>Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].</p>
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	<p>Substance will disassociate 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.</p> <p>Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2].</p> <p>Prevent leaks and prevent soil / water pollution caused by leaks [S4].</p>
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released. [W2]
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3].
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]	
3.2. Environment	
<p>Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information.</p> <p>Substance will disassociate 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.</p>	

Hydrochloric Acid

Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0	
4.1.1. Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	
Cleaning [CS47]	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26]
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task. <u>Respiratory protection:</u> Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	Not applicable

Hydrochloric Acid

ANNEX 6

Exposure scenario 5 – Use by Professionals

ES5.1: Professional use of ≤ 25% HCl in aqueous solution at ambient temperature.	
Section 1	Exposure Scenario Title
Title	PUse of HCl; CAS: 7647-01-0
Use Descriptor	<p>Sector of Use: Professional SU20: Health services SU23: Electricity, steam, gas water supply and sewage treatment SU0: Other: SU22: Professional uses; Public domain</p> <p>Product Categories: PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents PC 21: Laboratory chemicals PC 35: Washing and cleaning products (including solvent based products) PC 37: Water treatment chemicals</p> <p>Process Categories: PROC1: Use in a closed process, no likelihood of exposure PROC2: Use in a closed, continuous process with occasional controlled exposure PROC3: Use in a closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC10: Roller application or brushing. PROC11: Non industrial spraying. PROC13: Treatment of articles by dipping and pouring PROC15: Use as a laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available</p> <p>Environmental Release Categories: ERC8a: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) ERC8b: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)</p>
Processes, tasks, activities covered	<p>Covers the use of formulated spraying product including weighing, transfer operations and automated and manual spraying applications.</p> <p>Covers the use in all kinds of applications including material receipt, storage, preparation and transfer, application by roller and brush, wiping, dipping, spraying, equipment cleaning, maintenance and laboratory activities.</p>

Hydrochloric Acid

Organisational measures, 4. Personal protection.

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17]; Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5. Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC2 (Professional): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].

Indoor:

Provide extract ventilation to material transfer points and other openings [E82] (efficiency: 80%). **Or:** Avoid carrying out operation for more than 1 hour [OC11].

Outdoor:

Avoid carrying out operation for more than 4 hours [OC12].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC3: General exposures [CS1]. Use in contained batch processes [CS37].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%). **Or:** Avoid carrying out operation for more than 4 hours [OC12];

Outdoor:

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC4 (Professional): General exposures [CS1]. Batch process [CS55].

Indoor:

Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]

Hydrochloric Acid

(open systems) [CS108].	(efficiency: 80%) Or Avoid carrying out operation for more than 1 hour [OC11]. <u>Outdoor:</u> Avoid carrying out operation for more than 1 hour [OC11]. <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC8a (Professional): General exposures [CS1]. Non-dedicated facility [CS82]; Material transfers [CS3]. Equipment cleaning and maintenance [CS39].	<u>Indoor:</u> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10). <u>Outdoor:</u> Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10). <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
PROC10 (Professional): General exposures (open systems) [CS16]. Rolling, Brushing [CS51]. Equipment cleaning and maintenance [CS39].	<u>Indoor:</u> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10). <u>Outdoor:</u> Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10). <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use long

Hydrochloric Acid

	<p>handled tools where possible [E50]; Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]}. Avoid splashing [C&H15].</p>
<p>PROC11 (Professional): General exposures (open systems) [CS16]. Spraying [CS10].</p>	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Wear a full face respirator conforming to EN140 with Type E filter or better (efficiency: 95%; APF=20).</p> <p>Outdoor: Avoid carrying out operation for more than 4 hours [OC12]. And Wear a full face respirator conforming to EN140 with Type E filter or better (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]}. Avoid splashing [C&H15].</p>
<p>PROC13: General exposures (open systems) [CS16]. Dipping, immersion and pouring [CS4].</p>	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) Or Avoid carrying out operation for more than 1 hour [OC11].</p> <p>Outdoor: Avoid carrying out operation for more than 1 hour [OC11].</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]}. Avoid splashing [C&H15].</p>
<p>PROC15: General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]; Manual [CS34].</p>	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) Or Avoid carrying out operation for more than 1 hour [OC11].</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]}. Avoid splashing [C&H15].</p>

Hydrochloric Acid

PROC19 (Professional): General exposures [CS1]. Mixing operations (open systems) [CS30]. Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10). Outdoor: Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10). <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Substance will disassociate 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. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2]. Prevent leaks and prevent soil / water pollution caused by leaks [S4].
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released. [W2]
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	NR
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR

Hydrochloric Acid

Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0	
4.1.1 Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection.	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	
Cleaning [CS47]	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task. <u>Respiratory protection:</u> Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	<i>Not applicable</i>

Hydrochloric Acid

ES5.2: Professional use of > 25% up to 35% HCl in aqueous solution at ambient temperature.

Section 1

Exposure Scenario Title

Title

PUse of HCl; CAS: 7647-01-0

Use Descriptor

Sector of Use: Professional
[SU20: Health services](#)
[SU23: Electricity, steam, gas water supply and sewage treatment](#)
[SU0: Other: SU22: Professional uses; Public domain](#)

Product Categories:

PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents
 PC 21: Laboratory chemicals
 PC 35: Washing and cleaning products (including solvent based products)
 PC 37: Water treatment chemicals

Process Categories:

PROC1: Use in a closed process, no likelihood of exposure.
 PROC2: Use in a closed, continuous process with occasional controlled exposure.
 PROC3: Use in a closed batch process (synthesis or formulation).
 PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises.
 PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
 PROC10: Roller application or brushing.
 PROC11: Non-industrial spraying.
 PROC13: Treatment of articles by dipping and pouring.
 PROC15: Use as a laboratory reagent.
 PROC19: Hand-mixing with intimate contact and only PPE available.

Environmental Release Categories:

ERC8a: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
 ERC8b: Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
 ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)

Processes, tasks, activities covered

Covers the use of formulated spraying product including weighing, transfer operations and automated and manual spraying applications.
 Covers the use in all kinds of applications including material receipt, storage, preparation and transfer, application by roller and brush, wiping, dipping, spraying, equipment cleaning, maintenance and laboratory activities.

Exposure Criteria

Worker

Quantitative risk assessment:

DNEL (inhalation, local long term): 5 ppm (8 mg/m³)

Hydrochloric Acid

	DNEL (inhalation, local short term): 10 ppm (15 mg/m ³) DNEL (dermal systemic): n.a. (skin corrosive) <u>Qualitative risk assessment:</u> Skin corrosive Cat 1A and Eye damage 1 (H314) STOT Single Exp. Cat 3 (H335) Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR) <u>Environmental PNECs</u> No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS). Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)
--	--

Section 2 Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1 Control of worker exposure

Product characteristics

Physical form of product	Aqueous solution. Partial vapor pressure >25% - 35% HCl: 0.5 - 10 kPa. Vapor pressure class: Moderate at ambient temperature.
Concentration of substance in product	>25% Up to 35%
Amounts used	Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	<i>Not applicable</i>
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [E119] Assumes activities are at ambient temperature (unless stated differently) [G17]. Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk	Management	Measures
<i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.</i>		

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17]; Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5. Use always a filter type E for your respirator. A full face respirator can be used instead of a half mask and goggles.

Hydrochloric Acid

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	<u>Indoor/Outdoor</u> No specific measures identified [E18]. <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC2 (Professional): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].	<u>Indoor:</u> Provide extract ventilation to material transfer points and other openings [E82] (efficiency: 80%). And: Avoid carrying out operation for more than 1 hour [OC11]. Or: Wear a respirator conforming to EN140 with Type E filter or better.(efficiency: 90%; APF=10). <u>Outdoor:</u> Wear a respirator conforming to EN140 with Type E filter or better.(efficiency: 90%; APF=10). <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC3 (Professional): General exposures [CS1]. Use in contained batch processes [CS37].	<u>Indoor:</u> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%). <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11]; Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 4 hours [OC12] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) <u>Outdoor:</u> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) <i>Recommendation:</i> Ensure the system is closed. Drain down and flush system prior to

Hydrochloric Acid

	equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].
PROC4 (Professional): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108].	<p>Indoor:</p> <ul style="list-style-type: none"> Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 90%) <i>Plus:</i> <ul style="list-style-type: none"> Avoid carrying out operation for more than 1 hour [OC11] Or: <ul style="list-style-type: none"> Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <p>Outdoor:</p> <p>Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
PROC8a (Professional): General exposures [CS1]. Non-dedicated facility [CS82]; Material transfers [CS3]. Equipment cleaning and maintenance [CS39].	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10).</p> <p>Or:</p> <p>Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p>

Hydrochloric Acid

	<p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
<p>PROC10 (Professional): General exposures (open systems) [CS16]. Rolling, Brushing [CS51]. Equipment cleaning and maintenance [CS39].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10).</p> <p>Or:</p> <p>Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use long handled tools where possible [E50]; Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
<p>PROC11 (Professional): General exposures (open systems) [CS16]. Spraying [CS10].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better (efficiency: 95%; APF=20).</p> <p>Outdoor:</p> <p>Unsafe use.</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>

Hydrochloric Acid

PROC13 (Professional): General exposures (open systems) [CS16]. Dipping, immersion and pouring [CS4].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And: Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) Or: Avoid carrying out operation for more than 1 hour [OC11]. And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20) Outdoor: Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20). <i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].
PROC15: General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]; Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) <i>Recommendation:</i> Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]]. Avoid splashing [C&H15].
PROC19 (Professional): General exposures [CS1]. Mixing operations (open systems) [CS30]. Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Wear a respirator conforming to EN140 with Type E filter or better (efficiency: 90%; APF=10). Or: Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).

Hydrochloric Acid

	Outdoor: Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better (efficiency: 95%; APF=20). Recommendation: Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental exposure is driven by freshwater [TCR1a]. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2]. Prevent leaks and prevent soil / water pollution caused by leaks [S4].
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases. [W2]
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].
Conditions and measures related to external treatment of waste for disposal	NR
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	

Hydrochloric Acid

Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0	
4.1.1 Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection.	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	
Cleaning [CS47]	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task. <u>Respiratory protection:</u> Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in time! Do not use a respirator longer than the maximum permitted use-time.
Control of environmental exposure	
Selection of relevant RMM Core Phrases	<i>Not applicable</i>

Hydrochloric Acid

ES5.3: Professional use of > 35-40% HCl in aqueous solution at ambient temperature.

Section 1

Exposure Scenario Title

Title

PUse of HCl; CAS: 7647-01-0

Use Descriptor

Sector of Use: Professional
[SU20: Health services](#)
[SU23: Electricity, steam, gas water supply and sewage treatment](#)
[SU0: Other: SU22: Professional uses; Public domain](#)

Product Categories:

PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents
 PC 21: Laboratory chemicals
 PC 35: Washing and cleaning products (including solvent based products)
 PC 37: Water treatment chemicals

Process Categories:

PROC1: Use in a closed process, no likelihood of exposure.
 PROC2: Use in a closed, continuous process with occasional controlled exposure.
 PROC3: Use in a closed batch process (synthesis or formulation).
 PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises.
 PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
 PROC10: Roller application or brushing.
 PROC11: Non-industrial spraying.
 PROC13: Treatment of articles by dipping and pouring.
 PROC15: Use as a laboratory reagent.
 PROC19: Hand-mixing with intimate contact and only PPE available.

Environmental Release Categories:

ERC8a: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
 ERC8b: Widespread use of reactive processing aid (no inclusion into or onto article, indoor)
 ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)

Processes, tasks, activities covered

Covers the use of formulated spraying product including weighing, transfer operations and automated and manual spraying applications.
 Covers the use in all kinds of applications including material receipt, storage, preparation and transfer, application by roller and brush, wiping, dipping, spraying, equipment cleaning, maintenance and laboratory activities.

Exposure Criteria

Worker

Quantitative risk assessment:

DNEL (inhalation, local long term): 5 ppm (8 mg/m³)

Hydrochloric Acid

	DNEL (inhalation, local short term): 10 ppm (15 mg/m ³) DNEL (dermal systemic): n.a. (skin corrosive) <u>Qualitative risk assessment:</u> Skin corrosive Cat 1A and Eye damage 1 (H314) STOT Single Exp. Cat 3 (H335) Not classified as category 1 or 2 Carcinogenic Mutagenic and/or Reproduction toxic (CMR) <u>Environmental PNECs</u> No PNEC values are calculated for HCl (for more details see chapter 8.1.1 of the SDS) Not classified as Persistent Bio Accumulation and toxic, nor very Persistent and very Bio accumulating (PBT/vPvB)
--	---

Section 2 Operational conditions and risk management measures

Basic Indoors:

Provide a good standard of general ventilation. Natural ventilation is from windows and doors etc.
 Controlled ventilation means air is supplied or removed by a powered fan. [E1].

Section 2.1 Control of worker exposure

Product characteristics

Physical form of product	Aqueous solution. Partial vapor pressure > 35-40% HCl: > 10 kPa. Vapor pressure class: High at ambient temperature.
Concentration of substance in product	35% Up to 40%
Amounts used	Varies between milliliters (sampling) and cubic meters (material transfers) [OC13]
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	<i>Not applicable</i>
Other Operational Conditions affecting worker exposure	Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [E119] Assumes activities are at ambient temperature (unless stated differently) [G17]. Indoor [OC8]. Outdoor [OC9]

Contributing Scenarios

Risk	Management	Measures
<i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection.</i>		

Due to eye and skin corrosive properties of the substance:

Use suitable eye protection [PPE26] and Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17]; Wear respiratory protection where exposure to HCl fumes may occur. Be aware of the filter capacity of the device and the use-time limitation. See also section 5. Use always a filter type

Hydrochloric Acid

E for your respirator. A full face respirator can be used instead of a half mask and goggles.

PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].

Indoor/Outdoor

No specific measures identified [EI18].

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC2 (Professional): General exposures [CS1]. Continuous process [CS54]. Automated process with (semi) closed systems [CS93].

Indoor:

- Provide extract ventilation to material transfer points and other openings [E82] (efficiency: 80%). **And** Wear a respirator conforming to EN140 with Type E filter or better.(efficiency: 90%; APF=10) **Or:**
- Avoid carrying out operation for more than 4 hours [OC12]. **And** Wear a full face respirator conforming to EN140 with Type E filter or better.(efficiency: 95%; APF=20)

Outdoor:

Wear a full face respirator conforming to EN140 with Type E filter or better.(efficiency: 95%; APF=20).

Recommendation:

Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].

PROC3 (Professional): General exposures [CS1]. Use in contained batch processes [CS37].

Indoor:

- Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%). **And** Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10) **Or:**
- Avoid carrying out operation for more than 1 hour [OC11]; **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20)

Outdoor:

Avoid carrying out operation for more than 4 hours [OC12] **And** Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20)

Hydrochloric Acid

	<p>Recommendation:</p> <p>Ensure the system is closed. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear transfer lines prior to de-coupling [E39].</p>
<p>PROC4 (Professional): General exposures [CS1]. Batch process [CS55]. (open systems) [CS108].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11] And Wear a respirator conforming to EN140 with Type E filter or better. (efficiency: 90%; APF=10)</p> <p>Outdoor:</p> <p>Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
<p>PROC8a (Professional): General exposures [CS1]. Non-dedicated facility [CS82]; Material transfers [CS3]. Equipment cleaning and maintenance [CS39].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better (efficiency: 95%; APF=20).</p> <p>Outdoor:</p> <p>Unsafe use.</p> <p>Recommendation:</p> <p>Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
<p>PROC10 (Professional): General exposures (open systems) [CS16]. Rolling, Brushing [CS51].</p>	<p>Indoor:</p> <p>Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54]</p>

Hydrochloric Acid

Equipment cleaning and maintenance [CS39].	<p>(efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better (efficiency: 95%; APF=20).</p> <p>Outdoor: Unsafe use.</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
PROC11 (Professional): General exposures (open systems) [CS16]. Spraying [CS10].	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>
PROC13 (Professional): General exposures (open systems) [CS16]. Dipping, immersion and pouring [CS4].	<p>Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Avoid carrying out operation for more than 4 hours [OC12] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20)</p> <p>Outdoor: Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better. (efficiency: 95%; APF=20).</p> <p><i>Recommendation:</i> Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Use bulk or semi-bulk handling systems [E43]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]. Avoid splashing [C&H15].</p>

Hydrochloric Acid

PROC15: General exposures [CS1]. Laboratory activities [CS36]. Small scale [CS61]; Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11]. <i>Recommendation:</i> Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]}. Avoid splashing [C&H15].
PROC19 (Professional): General exposures [CS1]. Mixing operations (open systems) [CS30]. Manual [CS34].	Indoor: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to points where emissions occur [E54] (efficiency: 80%) And Avoid carrying out operation for more than 1 hour [OC11] And Wear a full face respirator conforming to EN140 with Type E filter or better (efficiency: 95%; APF=20). Outdoor: Unsafe use. <i>Recommendation:</i> Handle substance within a closed system [E47]. Clean equipment and the work area every day [C&H3]. Clear spills immediately [C&H13]}. Avoid splashing [C&H15].
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
Amounts used	NR
Frequency and duration of use	360 days per year [FD2]
Other Operational Conditions of use affecting environmental exposure	Indoor/Outdoor use [OOC3], Water-based process [OOC12], Process optimized for efficient use of raw materials [OOC16], Volatile compounds subject to air emission controls [OOC18], Wastewater emissions generated from equipment cleaning with water [OOC22]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Risk from environmental expose is driven by freshwater [TCR1a]. Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic releases [W2]. Prevent leaks and prevent soil / water pollution caused by leaks [S4].
Organisation measures to prevent/limit release from site	Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released. [W2]
Conditions and measures related to municipal sewage treatment plant	Onsite wastewater treatment required [TCR13].

Hydrochloric Acid

Conditions and measures related to external treatment of waste for disposal	NR
Conditions and measures related to external recovery of waste	NR
Other environmental control measures additional to above	NR
Section 3	Exposure Estimation
3.1. Health	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]	
3.2. Environment	
Predicted exposures are not expected to exceed the applicable exposure limits (given in section 8 of the SDS) when the operational conditions/risk management measures given in section 2 are implemented [G29]. Scaling options are available if necessary to adjust the RCR using more detailed site specific information. Substance will disassociate 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.	
Section 4	Guidance to check compliance with the Exposure Scenario
4.1. Health	
The EcetocTra tool has been used to estimate workplace exposures unless otherwise indicated [G21] version 3.0	
4.1.1 Health – Uses advised against	
Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection.	
4.2. Environment	
Substance will disassociate 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.	
4.2.1 Environment – Uses advised against	
Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.	
Section 5	Additional good practice advice beyond the REACH Chemical Safety Assessment
Control of Worker Exposure	
Cleaning [CS47]	Clear spills immediately [C&H13]: Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17] and Use suitable eye protection [PPE26].
Use of PPE	Train the employees putting on and off the gloves and respirators, and how to use and wear them in a proper way. In addition: <u>Skin protection:</u> Gloves: pay attention to the breakthrough time of the substance and chemical resistance of the glove. Take also into account the mechanical resistance of the glove for the relevant task. <u>Respiratory protection:</u> Respirators: Clean the non-disposable masks after every use and store in a clean box and area. Pay attention to the filter capacity. Change the filter in



Safety Data Sheet

according to EU Regulations 1907/2006 and other amendments
Integrated Management System

Processed by computer
FS-84-002

Revision: 14-11-2019
Version: 15
(Replace: Version 14 from 27-08-2019)

Hydrochloric Acid

time! Do not use a respirator longer than the maximum permitted use-time.

Control of environmental exposure

Selection of relevant RMM Core Phrases	<i>Not applicable</i>
--	-----------------------

Hydrochloric Acid

Section 2 Operational conditions and risk management measures

Basic:

Provide good natural ventilation or outdoor. Natural ventilation is from windows and doors etc.

Section 2.1 Control of worker exposure

Product characteristics

Physical form of product

Aqueous solution.
 Partial vapor pressure up to 20% HCl: <25 Pa
 Vapor pressure class: Low at ambient temperature.

Concentration of substance in product

Covers percentage substance in the product up to 20 % (unless stated differently) [G13].

Amounts used

Max. 500 mL per activity

Frequency and duration of use

Covers daily exposures up to 4 hours (unless stated differently) [G2]

Other Operational Conditions affecting worker exposure

Assumes activities are at ambient temperature (unless stated differently) [G17].

Contributing Scenarios

Risk Management Measures

Follow always the instructions given in the product label prior to use! Apply PPE as prescribed.
 Avoid skin and eye contact. Do not inhale fumes or aerosols that may evolve from using the product.
 Ensure good ventilation. Clean contaminated tools and objects immediately. Clean the work area after use.

Section 2.2

Control of environmental exposure

Product characteristics

Substance is a unique structure [PrC1], Non-hydrophobic [PrC4b],
 Aqueous solution. Partial vapour pressure up to 20% HCl: < 25 Pa

Amounts used

NR

Conditions and measures related to municipal sewage treatment plant

Most wide dispersive uses of the substance by consumers are usually emitted to a municipal Sewage Treatment Plant (STP), at which the substance is neutralised; therefore, after passing through an STP the environmental exposure is considered negligible and with no risk.

Section 3

Exposure Estimation

3.1. Health

Exposure assessment method:

Dermal:

Exposure is not expected because skin and/or eye protection (gloves and/or goggles) have to be worn, depending on the concentration of HCl.

Inhalation:

L.C.H. Prud'homme de Lodder and H.J. Bremer (RIVM report 320104003/2006: Cleaning Products Fact Sheet to assess the risks for the consumer) described default values for 36 product categories of cleaning products to assess the exposure of compounds with ConsExpo, inter alia 'all-purpose liquid cleaners' for 'mixing and loading' plus 'cleaning'. This factsheet is regarded as a 'reasonable worst-case' approach for all consumer applications of HCl.

The exposure risk assessments for HCl gas (by evaporation from aqueous solutions) are based on:

Hydrochloric Acid

- Loading and mixing:
 - partial vapour pressure of the concentrated solution (< 20%)
 - near field exposure (1 m³)
 - 15 min TWA of 15 mg/m³
- Cleaning:
 - partial vapour pressure of the dilution (< 10%)
 - 8h-TWA of 8 mg/m³

Results:

Event	Concentration (%)	Part. vapour Pressure HCl (Pa)	Exposure per event (mg/m ³)	8h- TWA exposure* (mg/m ³)	15-min TWA exposure** (mg/m ³)	RCR# 8h	RCR# 15 min
Loading/ Mixing	10	0.12	1.58		0.22		0.01
	15	1.76	23.2		1.30		0.08
	20	22	290		14.6		0.98
Cleaning	5	0.01	0.15	0.08		< 0.01	
	10	0.12	1.8	1.36		0.17	

*: exposure based on 15 minutes loading and mixing exposure (20%) + 240 minutes cleaning exposure

**: exposure based on 45 seconds event loading/mixing concentration + 855 seconds event 5% cleaning HCl concentration

#: RCR: Risk Characterization Ratio (exposure concentration divided by DNEL 8h (8 mg/m³) or DNEL 15 min (15 mg/m³))

3.2. Environment

Water: The only effect is the pH effect. Most wide dispersive uses of the substance by consumers are usually emitted to a municipal Sewage Treatment Plant (STP), at which the substance is neutralised; therefore, after passing through an STP the environmental exposure is considered negligible and with no risk. For substance that enters the environment without a STP it is assumed that the dilution with effluents and surface water in conjunction with its alkali reserve (pH buffer properties) is sufficient to protect the aquatic ecosystems.

Soil: The substance is neutralised on the spot by natural organic & inorganic compounds in soil, characterised by the alkali reserve therefore exposure is considered negligible and with no risk.

Section 4

Guidance to check compliance with the Exposure Scenario

4.1. Health

ConsExpo 4.1

4.1.1 Health – Uses advised against

Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection

4.2. Environment

Qualitative Risk Assessment

4.2.1 Environment – Uses advised against

Any uses involving direct releases to air / surface water that cannot be buffered by natural systems to maintain pH at the naturally occurring level.