Marchi Industriale S.p.A.

SAFETY DATA SHEET
In accordance with Regulation (EC) 1907/2006 (REACH), Annex II

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY	
1.1 Product identifier	
Trade name:	HYDROCHLORIC ACID
Other names:	HYDROCHLORIC ACID
Chemical name:	Hydro chloric acid (aqueous Hydrogen chloride).
INDEX number as listed in Annex VI of CLP:	017-002-01-X
EC number:	231-595-7
CAS number:	7647-01-0
REACH registration n:	01-2119484862-27-0083
1.2 Relevant identified uses of the substance or mixture and uses advised against	
Uses: **(see corresponding ES as attachement to this SDS)**	Use in industrial- and professional settings: - Manufacture of HCl (ES1). - Recycling of HCl (ES1). - Distribution of the substance loading and repacking (ES1). - Industrial use as intermediates (ES2). - Formulation & (re)packing (ES3). - Use as: pH-regulator, flocculant, precipitant, neutralization agent in the production of formulations like washing & cleaning products, water treatment- or laboratory chemical (Industrial setting: ES4, professional worker/public domain ES5). Use by consumer: - Use for water treatment; for swimming pools, as cleaning agent (e.g.sanitary cleaner or reagent in experimental kits) and in welding and soldering products (ES6).
Uses advised against:	Any use involving aerosol formation, vapor release (>10 ppm) or risk of splashes to eyes / skin where workers are exposed without respiratory, eye or skin protection
1.3 Details of the supplier of the safety data sheet	
Manufacturer/Importer/Supplier:	Marchi Industriale Spa – Via Trento, 16 – 50139 Firenze (FI) Tel +39 055475547, fax +39 055496626
Person responsible for the Safety Data Sheet (with e-mail address)	laboratorio@marchi-industriale.it
1.4 Emergency telephone number	
Emergency phone number (Poison centre H24)	Milano – 0266101029 / Napoli – 0817472870 Pavia – 038224444 / Bergamo - 035269469 Roma – 063054343 opp. 06490663
2. HAZARDS IDENTIFICATION	
2.1 Classification of the substance	
Classification in accordance with Regulation 1272/2008 (CLP)	
Hazard statement(s): H314: Causes severe skin burns and eye damage H335: May cause respiratory irritation H290: May be	Skin Corr. 1B STOT Single Exp. 3a Met. Corr. 1

	corrosive to metals	
2.1.3 Additional information	Risk advice to man and the environment Concentrated hydrochloric acid (fuming hydrochloric acid) forms acidic mists. Both the mist and the solution have a corrosive effect on human tissue, with the potential to damage respiratory organs, eyes, skin, and intestines. Upon mixing hydrochloric acid with common oxidizing chemicals, such as sodium hypochlorite (bleach, NaClO) or potassium permanganate ($KMnO_4$), the toxic gas chlorine is produced. Environmental effects might occur on a local scale by pH effects.	

2.2 Label elements

Labelling in accordance with Regulation 1272/2008 (CLP)

Hazard pictogram(s):		
Signal word		Danger
Hazard statement(s):	H314 H335 H290	Causes severe skin burns and eye damage. May cause respiratory irritation. May be corrosive to metals.
Precautionary statement(s):	P234: Keep only in original container. P260: Do not breathe dust/fume/gas/mist/vapours/spray. 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): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P309+P311: IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician. P501: Dispose of contents/container to... (permited recycling or waste destruction company)	

2.3 Other hazards

PBT/vPvB criteria:	According to Annex XIII of Regulation (EC) No 1907/2006, no PBT and vPvB assessment has been conducted since the substance is inorganic.
Other hazards:	None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances

According to the REACH Regulation the product is a mono-constituent.

Chemical name	CAS no.	EC no.	IUPAC name	Purity
Hydrogen chloride	7647-01-0	231-595-7	Hydrogen chloride	>25%

4. FIRST-AID MEASURES

4.1 Description of first aid measures

Eye contact:	Immediately wash eyes with plenty of running water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Remove contact lenses, if present and easy to do. Seek medical advice if irritation develops and persists.
Skin contact:	Wash affected skin area with plenty of water and soap for at least 15 minutes thoroughly while removing contaminated clothing and shoes. Seek medical advice if irritation develops and persists.
Ingestion:	Seek medical advice if the victim feels unwell. Wash out mouth with plenty of water and give plenty of water to drink. Do not induce vomiting. Never give anything by mouth to an unconscious person.

Inhalation:	Remove the victim from exposure into fresh air immediately if adverse effects (e.g. dizziness, drowsiness or respiratory irritation) occur. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Also seek medical advice if cough or other symptoms appear. Do not use mouth-to-mouth respiration. Seek medical advice immediately when vapors are intensively inhaled.

4.2 Most important symptoms and effects

Symptoms	corrosive to the eyes, mucous membranes and exposed areas of skin.
Risks	Causes severe skin burns and eye damage. May cause respiratory irritation. May be corrosive to metals.

4.3 Indication of any immediate medical attention and special treatment needed

Remove/Take off immediately all contaminated clothing. Rinse skin/eyes with water/shower. Move out of dangerous area

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable:	All media
Not suitable:	No unsuitable extinguishing media known

5.2 Special hazards arising from the substance or mixture

Product is nonflammable and does not support combustion.
Move away from container and cool with water from a protected position.
The product reacts with most metals producing explosive hydrogen gas and hydrogen chloride.
Hydrogen chloride is readily dissociated in water into hydrated protons and chloride ion

5.3 Advice for firefighters

In case of insufficient ventilation wear suitable respiratory equipment
Spillages or uncontrolled discharges into watercourses must be IMMEDIATELY alerted to the Environmental Agency or other appropriate regulatory body.
Absorb with inert, damp, non-combustible material, then flush area with water. Collect spillage in containers, seal securely and deliver for disposal according to local regulations.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For personal protection see section 8.
Use personal protective equipment.
Ensure adequate ventilation

6.2 Environmental precautions

Spillages or uncontrolled discharges into watercourses must be IMMEDIATELY alerted to the Environmental Agency or other appropriate regulatory body.
Absorb with inert, damp, non-combustible material, then flush area with water. Collect spillage in containers, seal securely and deliver for disposal according to local regulations

6.3 Methods and material for containment and cleaning up

Neutralize large spillages with lime or soda ash. Rinse remnant with plenty of water.
Refer to section 13 for disposal of spilled material.

6.4 Reference to other sections

See section 8 for personal protective equipment and section 13 for waste disposal

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Technical measures/ Precautions:	For personal protection see section 8. The usual precautions for handling chemicals should be observed. Avoid any direct contact with the material and formation of aerosol. Do not breathe gas/fumes/ vapor/spray and avoid contact with skin and eyes. Smoking, eating and drinking should be prohibited in the application area. Product is nonflammable and does not support combustion.
General occupation hygiene:	Do not to eat, drink and smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.
7.2 Conditions for safe storage, including any incompatibilities	
Technical measures/ Storage conditions:	No smoking. Keep in a well-ventilated place. Do not store together with alkalies and oxidants. Keep container tightly closed. Store in plastic tanks Eye wash facilities and emergency shower must be available when handling this product For safety, store below: 35 °C
Incompatible products:	Use only metal containers with acid resistand innerlayers, product may be corrosive to metals.
7.3 Specific end use	
It is recommended to refer to the identified uses and exposure scenarios	

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Regulated occupational exposure limit values:

Components	CAS-No.	Value	Control parameters	Update	Form of exposure
Hydrogen chloride	7647-01-0	STEL TWA	10 ppm 15 mg/m³ 5 ppm 8 mg/m³	2010-10-09	aerosols mist and gas
Further information	A STEL (15 min) and TWA (8 hours) for Hydrogen chloride are derived and are EU Indicative Occupational Exposure Limits (SCOEL/SEG/SUM/49, 1994)				

Recommended occupational and consumer exposure limit values (following from the performed CSA):	DNEL: Acute inhalation exposure: the SCOEL recommends a STEL (15 min) of 10 ppm (15 mg/m3). long term inhalation exposure: the SCOEL recommends a TWA 8 hour of 5 ppm (8 mg/m3) PNEC: PNEC aqua (marine water): 36 µg/L PNEC aqua (freshwater): 36 µg/L PNEC aqua (intermittent releases): 45 µg/L
8.2 Exposure controls	
Appropriate engineering controls:	Effective exhaust ventilation system Ensure that eyewash stations and safety showers are close to the workstation location.
Environmental exposure controls:	Dispose of rinse water in accordance with local and national regulations.
Individual protection measures, such as personal protective equipment	
Respiratory protection:	Provide extract ventilation to material transfer points and other openings. Carry out in a vented booth provided with laminar airflow. Automate activity where possible. Wear acid vapour mask
Hand protection:	Wear suitable gloves tested to EN374 (e.g. PVC or rubber gloves)
Eye protection:	Use safety eyewear designed to protect against splash of liquids. Tightly fitting safety goggles.
Skin and body protection:	Protective suit, apron and boots. Choose body protection according to the amount and concentration of substance at the work place
Hygiene measures:	Handle in accordance with good industrial hygiene and safety practice. When using do not eat or drink.

	When using do not smoke. Wash hands before breaks and at the end of workday. Plan first aid action before beginning work with this product.
General advice Air Soil Water	Do not flush into surface water or sanitary sewer system. Do not flush into surface water or sanitary sewer system. Hose down gases, fumes and/or dust with water. Avoid subsoil penetration. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance:	Colourless to light yellow, liquid
Odour:	Pungent, irritant
pH	< 1 (5% in water) (acidic)
Melting/Freezing temperature:	ca – 20°C
Boiling temperature:	ca 50°C
Flash-point:	Not relevant as the substance is an inorganic solid.
Flammability:	Non flammable (based on molecular structure)
Explosive properties:	Not explosive
Oxidizing properties:	Not oxidising
Vapour pressure:	21 mBar
Relative density (D4 (20)):	>1123 kg/m³ (20 °C)
Solubility in water:	Completely miscible at ca. 20 °C
Partition coefficient n-octanol/water:	Not relevant as the substance is inorganic, but considered to be low (based on high water solubility)
Viscosity:	Damic: ca. 600 - 1 000 mPa.s at ca. 20 °C Kinematic: >1.5 mPa.s at ca. 20 °C

9.2 Other information

10. STABILITY AND REACTIVITY

10.1 Reactivity

Stable under recommended storage and handling conditions (see section 7, handling and storage).

10.2 Chemical stability

Reaction with strong oxidising agents. Reaction with alkaline substances (bases).

10.3 Possibility of hazardous reactions

The product reacts with metals with evolution of highly flammable hydrogen. The acid reacts violent with alkalies with evolution of heat.

10.4 Conditions to avoid

Any use involving aerosol formation or vapor release in excess of 10 ppm where workers are exposed without respiratory protection
Any use carrying a risk of splashes to eyes / skin where workers are exposed without eye/skin protection

10.5 Incompatible materials

Metals

10.6 Hazardous decomposition products

Hydrogen chloride / Chlorine / Hydrogen.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects	
Hydrochloric acid is a strong, highly corrosive acid. The substance only causes local effects and no systemic effects. Hydrochloric acid rapidly dissociates almost completely in contact with water, releasing the chloride ion and the hydrogen ion which combines with water to form the hydronium ion. Both chlorine and hydronium ions are normally present in the body.	
ACUTE TOXICITY	
Acute oral toxicity:	No data available, data waived based on properties HCl, see summary toxicology. OECD SIDS Hydrogen Chloride UNEP PUB US, Oct 2002 Rat Oral LD50 238-277 mg/kg
Acute dermal toxicity:	No data available, data waived based on properties HCl, see summary toxicology. OECD SIDS Hydrogen Chloride UNEP PUB US, Oct 2002 Rabbit Dermal LD50 >5010 mg/kg
Acute inhalation toxicity:	Toxic signs in rat 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 LC50 (rat - 5 min exposure): 40989 ppm (34803-48272) LC50 (rat - 30 min exposure): 4701 ppm (4129-5352) HCl aerosol LC50 (rat - 5 min exposure): 45.6 mg/L (39.5-52.8) equivalent to 31008 ppm (26824-35845) LC50 (rat - 30 min exposure): 8.3 mg/L (7.2-9.7) equivalent to 5666 ppm (4855-6614)
LOCAL EFFECTS	
Skin irritation:	Corrosive. Studies with results indicating corrosivity to the skin: Rabbit: 0.5 ml 37%, exposure 1 and 4 hours, occlusive/semi-occlusive. (Method: OECD 404, pre-GLP) Rabbit 37% hydrochloric acid aq. (1h, 4h) caused severe damage. Rabbit 0.5 mL of 17% hydrochloric acid aq. Was applied for 4h. Not irritating (< 10% HCl solutions): Human patch test data on a 10% solution of HCl suggesting that 10% solutions of HCl should not be classified as “Irritant to the skin”. OECD SIDS Hydrogen Chloride UNEP PUB US, Oct 2002 Moderately irritating: Rabbit 0.5 mL of 3.3% hydrochloric acid aq. applications for 5 days Not irritating:Rabbit 0.5 mL of 1% hydrochloric acid aq. applications for 5 days was not irritating.
Eye irritation:	Risk of serious damage to eyes (not reversible), Corrosive based on skin corrosivity data. Corrosive: Rabbit 0.1 ml ,10%. (Method: OECD 405, not GLP) Eye corr. 1a Highly irritating: Rabbit (OECD 405) 0.1 mL of 10% hydrochloric acid aq. severe irritation with corneal injury which may result in permanent impairment of vision. OECD SIDS Hydrogen Chloride UNEP PUB US, Oct 2002 Corrosive: Rabbit 0.03 mL or more of 5% hydrochloric acid aq. was severely irritating or corrosive. Slightly irritating: Rabbit 0.1 mL of 3.3% hydrochloric acid aq. Was applied into the conjunctival sac; 48h observation period. Not irritating: Rabbit 0.1 mL of 0.33% hydrochloric acid aq. Was applied into the conjunctival sac; 48h observation period.
Skin sensitization:	Not sensitizing (OECD 406)
OTHER	
Repeated dose toxicity	**Oral:** No data available from repeated dose oral studies with hydrogen chloride. **Dermal:** No data available from repeated dose dermal studies with hydrogen chloride. **Inhalation:** Sub-chronic inhalation

	NOAEC is 15 mg/m3 for rats/mice, 90-days, 6 hours/days, 5 days/week. Signs: Clinical signs observed were mainly related to the irritant/corrosive properties of HCl . Similar to OECD 413. GLP. Chronic inhalation NOAEL is <10 ppm for rats/mice, 128-weeks, 6 hours/days, 5 days/week. Signs: Clinical signs observed were mainly related to theirritant/corrosive properties of HCl . No guideline followed, not GLP.
Aspiration toxicity	Corrosive to the respiratory tract.
Mutagenicity:	Not mutagenic, not clastogenic S. cerevisiae, mitotic recombination: Negative. No guideline followed, not GLP. Effects on the pH of the medium precludes the possibility of testing in other in vitro non-bacterial systems. Negative results have been obtained in the bacterial systems, positive results have been obtained in the non-bacterial systems. The positive results were observed at high concentration and should considered to be artifacts due to low pH. Mammalian chromosome aberration test (CHO): positive. No guideline followed, not GLP. Mammalian cell gene mutation assay: Mouse lymphoma: positive. No guideline followed, not GLP. In vivo data waived based on properties HCl, see summary toxicology. There are no mammalian studies on *in vivo* mutagenicity with hydrogen chloride
Carcinogenicity:	Hydrochloric acid did not evoke a carcinogenic response in treated rats. Method: OECD Test Guideline 451, 1981.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

For hydrochloric acid, it is not relevant to determine toxicity in terms of mg/L due to the varying buffering capacity of different test systems and different aquatic ecosystems. Aquatic studies are carried out using buffered media and therefore as discussed for the acute aquatic studies, standard aquatic chronic test methods would lead to differing results based on the different buffering capacity of the specific test systems. Additionally, maintaining exact pH values over time in chronic studies could be problematic.
It is accepted that the aquatic toxicity of hydrochloric acid results if sufficient acid is present to produce a very low pH (i. e. pH 3-5). Given that the environmental exposure assessment shows insignificant perturbation of aquatic pH levels from the formulation of the product and its proposed use, it is considered that there is no long-term risk to aquatic organisms and therefore chronic fish effects data are not required.

Fish (short-term):	Acute toxicity Lepomis macrochirus, freshwater, semi-static: 96h-LC50 = 20.5 mg/l (pH 3.25 - 3.5)
Fish (long-term):	No data
Daphnia magna (short-term):	EC50/LC50 for freshwater invertebrates: 0.45 mg/L Immobilisation Test, 4-hours OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
Daphnia magna (long-term):	No data
Algae:	Chlorella vulgaris, freshwater: 72h-ErC50 = 0.76 (pH 4.7) mg/l, 72h-NOErC = 0.364 mg/l (pH 5.0) (OECD 201) EC50/LC50 for freshwater algae: 0.73 mg/L Growth inhibition Analytical monitoring: no OECD Guideline 201 (Alga, Growth Inhibition Test)
Inhibition of microbial activity:	EC50 (3 h, freshwater, respiration rate): pH 5.0 -5.5 Inhibitory effect on respiration rates of activated sewage sludge. OECD Guideline 209 (Activated Sludge, Respiration Inhibition Test).

12.2 Persistence and degradability

Biodegradation:	As the active substance, hydrochloric acid, is an inorganic compound, which is not biologically degradable, the ready biodegradability, inherent biodegradability and biodegradation in seawater are scientifically impossible to perform. In addition, the proposed use of HCl is not expected to lead to significant releases to marine water.

Hydrolysis:	Due to its intrinsic properties, it is scientifically impossible to perform a hydrolysis test. In addition, since the behaviour of HCl in water is known, it is also not scientifically necessary
12.3 Bioaccumulative potential	
Bioconcentration factor (BCF):	No bioaccumulation expected.
12.4 Mobility in soil	
Adsorption coefficient:	Terrestrial compartment is not expected to be relevant. If emitted to soil, adsorption to soil particles will be negligible. Depending on the buffer capacity of the soil, H^+ will be neutralized in the soil pore water by natural organic or inorganic matter or the pH may decrease.

12.5 Results of PBT and vPvB assessment
HCl does not fulfil all criteria to be classified as a PBT or vPvB substance
Persistence Assessment
HCl can be regarded as non biodegradable in the aquatic and terrestrial environment. The test results suggest that the substance is persistent. Therefore the criteria for the P classification are met.
Bioaccumulation Assessment
The substance is considered cationic at environmental pH levels, the log Kow was calculated to a value of -2.65. Following the Annex VIII Guidance this value does not impose any bioaccumulation potential

13. DISPOSAL CONSIDERATIONS

Waste from residues:	Do not dispose of waste into sewer. Do not contaminate ponds, waterways or ditches with chemical or used container. Hazardous waste Do not dispose of waste into sewer. Do not contaminate ponds, waterways or ditches with chemical or used container. All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments Site should have a spill plan to ensure that adequate safeguards are in place to minimize the impact of episodic released.
Container:	Empty remaining contents. Contaminated packaging According to local regulations

14. TRANSPORT INFORMATION

ADR	**IATA**	**IMDG**	**RID**
UN Number: 1789 UN proper shipping name: Hydrochloric acid Transport hazard class: 8 Classification Code: C1 Packing group: II Label: 8 Tunnel restriction code: (E) Hazard identification n. : 80 Environmentally hazardous: no	UN number: 1789 UN proper shipping name: Hydrochloric acid Transport hazard class:8 Packing group: II Labels: 8 Packing instruction (cargo aircraft): no Packing instruction (passenger aircraft): no Packing instruction (LQ): no Environmentally hazardous: no	UN number: 1789 UN proper shipping name: Hydrochloric acid Transport hazard class: 8 Packing group: II Labels: 8 EmS Number 1: F-A,S-B Marine pollutant: no	UN Number: 1789 UN proper shipping name: Hydrochloric acid Transport hazard class: 8 Classification Code: C1 Packing group: II Label: 8 Hazard identification n. : 80 Environmentally hazardous: no
			

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulation/legislation specific for the substance or mixture:	
15.2 Chemical safety assessment:	Chemical Safety Assessments have been carried out for these substances.

16. OTHER INFORMATION	
The information provided in this safety data sheet is correct to the best of our knowledge, information, and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any proceed, unless specified in the text.	
≥25% 1B, STOT 3a, 1 ≥10 <25% 2, STOT 3a, 2, 1 ≥0,1 <10% 1	
Version:	**2.0**
Creation date:	June 15, 2011
Revision date:	June 15, 2015
Release info:	This version replaces all previous documents
Created/Revised by:	SILC FERTILIZZANTI SRL – Via delle Acque, 43 – 48124 Ravenna

ANNEX

1 Exposure Scenario 1 of 6:

Manufacture, Recycling and Distribution of Hydrochloric acid
Eposure scenario

Worker – ES1 – Hydrochloric acid	
Section 1	**Exposure Scenario Title**
Title	**ES1 – Manufacture of Hydrochloric acid;** **CAS: 7647-01-0**
Use Descriptor	Sector of Use: Industrial (SU8, SU9)
	Process Categories: PROC1: Use in a closed process, no likelihood of exposure *(PROC1 is also applicable to the manufacture of HCl gas for the production of hydrochloric acid by absorption into water under SCC.)* 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
	Environmental Release Categories: ERC1: Manufacture of substances ERC2: Formulation of preparations (mixtures)
Processes, tasks, activities covered	Manufacture of Substance. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
ES Exposure Criteria	SCOEL: - 8 mg/m³ - 8 hr. TWA - 15 mg/m³ – 15 min. TWA
Section 2	**Operational conditions and risk management measures**
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 – 10 kPa [OC4].
Concentration of substance in product	Covers percentage substance in the product up to 40% (unless stated differently) [G13].
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].
Other Operational Conditions affecting worker exposure	Assumes use at not >20 °C above ambient [G15] It should be noted that the process temperature may be higher, but the substance temperature is down to ambient at worker contact points. Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [EI119]
Contributing Scenarios	**Risk Management Measures**
Due to the corrosive properties of the substance, always wear suitable protective clothing, eye and skin protection	
PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	Handle substance within a closed system [E47]. Clear transfer lines prior to de-coupling [E39]
PROC2: General exposures [CS1]. Process sampling [CS2] Continuous process [CS54].	Handle substance within a closed system [E47].Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39]

PROC3: General exposures [CS1]. Remanufacture of reject articles [CS19]. Cleaning [CS47]. Use in contained batch processes [CS37]. With sample collection [CS56].	Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39] Wear suitable gloves tested to EN374 [PPE15].
PROC4: Drum/batch transfers [CS8] Bulk transfers [CS14]. General exposures (open systems) [CS16]. Cleaning [CS47]. Remanufacture of reject articles [CS19]. With sample collection [CS56].	Use bulk or semi-bulk handling systems [E43]. Or Use drum pumps [E53]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Provide extract ventilation to points where emissions occur (90% efficiency) [E54].
PROC8a: Bulk transfers [CS14]. Process sampling [CS2]. Drum/batch transfers [CS8]. General exposures (open systems) [CS16]. Equipment cleaning and maintenance [CS39] Transport [CS58]. Internal [CS59].	Handle substance within a predominantly closed system provided with extract ventilation (90% efficiency) [E49]. Or Provide extract ventilation to points where emissions occur (90% efficiency) [E54]
PROC8b: Bulk transfers [CS14]. Process sampling [CS2]. Equipment cleaning and maintenance [CS39]. Transport [CS58]. Internal [CS59]. Drum/batch transfers [CS8] General exposures (open systems) [CS16].	Handle substance within a predominantly closed system provided with extract ventilation (90% efficiency) [E49]. Or Provide extract ventilation to points where emissions occur (90% efficiency) [E54]
PROC9: Drum and small package filling [CS6]. Drum/batch transfers [CS8]. Equipment cleaning and maintenance [CS39].	Handle substance within a predominantly closed system provided with extract ventilation (90% efficiency) [E49]. Fill containers/cans at dedicated fill points supplied with local extract ventilation (90% efficiency) [E51]
PROC15: Laboratory activities [CS36].	Handle in a fume cupboard or under extract ventilation (80% efficiency) [E83]. Or Carry out in a vented booth or extracted enclosure (80% efficiency) [E57] Avoid carrying out operation for more than 4 hours [OC12]
Or: **PROC15:** Laboratory activities [CS36]	Avoid carrying out operation for more than 1 hour [OC11]
Section 2.2	**Control of environmental exposure**
Product characteristics	Liquid, vapor pressure 0.5 – 10 kPa [OC4].

Amounts used	*NR*
Frequency and duration of use	360 days per year
Other Operational Conditions of use affecting environmental exposure	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	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	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
Conditions and measures related to external treatment of waste for disposal	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
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

PROC1: Safe use for exposures >4 hours is safe, also without the use of LEV or personal breathing protection.
PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9: Exposure safe for >4 hrs, provided that LEV (90% efficiency) is used.
PROC15: exposures during 15 min-1 hr are safe, also without the use of LEV; For exposures >1 hr, LEV (80% efficiency) must be used.

3.2. 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.

Section 4	**Guidance to check compliance with the Exposure Scenario**

4.1. Health

Worker exposure has been evaluated using ECETOC TRA V2.0

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
- Any use carrying a risk of splashes to eyes / skin where workers are exposed without eye / skin 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**

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.

Control of Worker Exposure

Process sampling [CS2].	Wear suitable gloves tested to EN374 [PPE15]
Equipment cleaning and maintenance [CS39]	Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear spills immediately [C&H13].

Control of environmental exposure	
Equipment cleaning and maintenance [CS39]	Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].

Exposure estimation

1 Workers exposure
Worker exposure for this scenario has been assessed using ECETOC TRA V2.0. In Chapter 10 the relationships between the Operational Conditions and safe uses (RCRs (inhalation) <1) are given.

In Section 3.1 of the scenario above, the Safe Uses, and conditions under which, are given.

2 Consumer exposure
Not relevant

3 Indirect exposure of humans via the environment
Not relevant.

Exposure Scenario 2 of 6: Use as Intermediate by Industry

Exposure scenario

WORKER – ES2 – Hydrochloric acid	
Section 1	**Exposure Scenario Title**
Title	**ES2 - Industrial use of Hydrochloric acid as Intermediate; CAS: 7647-01-0**
Use Descriptor	Sector of Use: Industrial (SU3, SU4, SU8, SU9, SU11, SU12, SU13, SU19)
	Process Categories: PROC1: Use in a closed process, no likelihood of exposure *(PROC1 is also applicable to the use of HCl gas as intermediate under SCC.)* 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
	Environmental Release Categories: ERC6A: Industrial use, resulting in manufacture of another substance (use of intermediates)
Processes, tasks, activities covered	Use as Intermediate by Industry; -Sampling -Material transfers
ES Exposure Criteria	SCOEL: - 8 mg/m³ - 8 hr. TWA - 15 mg/m³ – 15 min. TWA
Section 2	**Operational conditions and risk management measures**
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 – 10 kPa [OC4].
Concentration of substance in product	Covers percentage substance in the product up to 40 % (unless stated differently) [G13].
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]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]; It should be noted that the process temperature may be higher, but the substance temperature is down to ambient at worker contact points. Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [EI119]
Contributing Scenarios	**Risk Management Measures**
Due to the corrosive properties of the substance, always wear suitable protective clothing, eye and skin protection	
PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	Handle substance within a closed system [E47]. Clear transfer lines prior to decoupling [E39]

PROC2: General exposures [CS1]. Process sampling [CS2] Continuous process [CS54].	Handle substance within a closed system [E47]. Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39]
PROC3: General exposures [CS1]. Remanufacture of reject articles [CS19]. Cleaning [CS47]. Use in contained batch processes [CS37]. With sample collection [CS56].	Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39] Wear suitable gloves tested to EN374 [PPE15].
PROC4: Drum/batch transfers [CS8] Bulk transfers [CS14]. General exposures (open systems) [CS16]. Cleaning [CS47]. Remanufacture of reject articles [CS19]. With sample collection [CS56].	Use bulk or semi-bulk handling systems [E43]. or Use drum pumps [E53]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Provide extract ventilation to points where emissions occur (90% efficiency) [E54].
PROC9: Drum and small package filling [CS6]. Drum/batch transfers [CS8]. Equipment cleaning and maintenance [CS39].	Handle substance within a predominantly closed system provided with extract ventilation (90% efficiency) [E49]. or Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51].
PROC15: Laboratory activities [CS36].	Handle in a fume cupboard or under extract ventilation (80% efficiency) [E83]. Or Carry out in a vented booth or extracted enclosure (80% efficiency) [E57] Avoid carrying out operation for more than 4 hours [OC12]
Or: PROC15: Laboratory activities [CS36]	Avoid carrying out operation for more than 1 hour [OC11]
Section 2.2	**Control of environmental exposure**
Product characteristics	Liquid, vapor pressure 0.5 - 10 kPa [OC4].
Amounts used	*NR*
Frequency and duration of use	360 days per year
Other Operational Conditions of use affecting environmental exposure	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	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	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]

Conditions and measures related to external treatment of waste for disposal	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
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	
PROC1: safe use for activities >4 hrs, also without the use of LEV or breathing equipment. **PROC2, PROC3, PROC4, PROC9:** safe use for activities >4 hrs, provided that LEV (90% efficiency) is used. **PROC15:** safe use for activities 15 min – 1 hr, also without LEV; For activities >1 hr, LEV (80% efficiency) must be used.	
3.2. 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	
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	
Worker exposure has been evaluated using ECETOC TRA V2.0 **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 - Any use carrying a risk of splashes to eyes / skin where workers are exposed without eye / skin 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**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Process sampling [CS2]	Wear suitable gloves tested to EN374 [PPE15]
Equipment cleaning and maintenance [CS39]	Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear spills immediately [C&H13].
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

1 Exposure estimation

1 Workers exposure

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0. In Chapter 10 the relationships between the Operational Conditions and safe uses (RCRs (inhalation) <1) are given.

In Section 3.1 of the scenario above, the Safe Uses, and conditions under which, are given.

2 Consumer exposure
Not relevant
3 Indirect exposure of humans via the environment
Not relevant.

Exposure Scenario 3 of 6: Formulation and (re-)packing of Hydrochloric acid and its formulations by Industry and by Professionals

Exposure Scenario

Worker – ES3 – Hydrochloric acid	
Section 1	**Exposure Scenario Title**
Title	**Formulation & (Re)Packaging of Hydrochloric acid and its formulations by Industry & by Professionals; CAS: 7647-01-0**
Use Descriptor	Sector of Use: SU10
	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)
	Environmental Release Categories: ERC2: Formulation of preparations (mixtures)
Processes, tasks, activities covered	Formulation, blending, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing, maintenance and associated laboratory activities.
ES Exposure Criteria	SCOEL: - 8 mg/m³ - 8 hr. TWA - 15 mg/m³ – 15 min. TWA
Section 2	**Operational conditions and risk management measures**
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure 0.5 – 10 kPa [OC4] for 40% HCl For activities under PROC5 : Liquid, *partial vapour pressures* (cf. ELECNRTL in Aspenplus (vs 2004.1)) : 20 °C : 22.1 Pa 30 °C : 51 Pa 40 °C : 112 Pa
Concentration of substance in product	Covers percentage substance in the product up to 20 % (unless stated differently) [G13].
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]
Other Operational Conditions affecting worker exposure	Some operations are carried out at elevated temperature (> 20°C above ambient temperature) [OC7].; Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [EI119]
Risk Management Measures [GT7]	

Due to the corrosive properties of the substance, always wear suitable protective clothing, eye and skin protection	
PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	Handle substance within a closed system [E47]. Clear transfer lines prior to decoupling [E39]
PROC2: General exposures [CS1]. Process sampling [CS2] Continuous process [CS54].	Handle substance within a closed system [E47]. Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39]
PROC3: General exposures [CS1]. Remanufacture of reject articles [CS19]. Cleaning [CS47]. Use in contained batch processes [CS37]. With sample collection [CS56].	Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39] Wear suitable gloves tested to EN374 [PPE15].
PROC4: Drum/batch transfers [CS8] Bulk transfers [CS14]. General exposures (open systems) [CS16]. Cleaning [CS47]. Remanufacture of reject articles [CS19]. With sample collection [CS56].	Use bulk or semi-bulk handling systems [E43]. or Use drum pumps [E53]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Provide extract ventilation to points where emissions occur (90% efficiency) [E54].
PROC5: Drum/batch transfers [CS8]. Bulk transfers [CS14]. General exposures (open systems) [CS16]. Mixing operations (open systems) [CS30]. Cleaning [CS47].	Transfer materials directly to mixing vessels [E45]. Use drum pumps [E53]. If not available and pouring from container is necessary, use extra safeguards: spill containment, splash protection for skin and eyes, use respirator to prevent inhalation of vapors/aerosols. Drain down and flush system prior to equipment break-in or maintenance [E55].
PROC8a: Bulk transfers [CS14]. Process sampling [CS2]. Drum/batch transfers [CS8]. General exposures (open systems) [CS16]. Equipment cleaning and maintenance [CS39] Transport [CS58]. Internal [CS59].	Handle substance within a predominantly closed system provided with extract ventilation (90% efficiency) [E49]. or Provide extract ventilation to points where emissions occur (90% efficiency) [E54]

PROC8b: Bulk transfers [CS14]. Process sampling [CS2]. Equipment cleaning and maintenance [CS39]. Transport [CS58]. Internal [CS59]. Drum/batch transfers [CS8] General exposures (open systems) [CS16].	Handle substance within a predominantly closed system provided with extract ventilation (90% efficiency) [E49]. or Provide extract ventilation to points where emissions occur (90% efficiency) [E54]
PROC9: Drum and small package filling [CS6]. Drum/batch transfers [CS8]. Equipment cleaning and maintenance [CS39].	Handle substance within a predominantly closed system provided with extract ventilation (90% efficiency) [E49]. Fill containers/cans at dedicated fill points supplied with local extract ventilation (90% efficiency) [E51]
Section 2.2	**Control of environmental exposure**
Product characteristics	Liquid, vapor pressure 0.5 - 10 kPa [OC4].
Amounts used	*NR*
Frequency and duration of use	360 days per year
Other Operational Conditions of use affecting environmental exposure	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	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	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
Conditions and measures related to external treatment of waste for disposal	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
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	
PROC1: Safe use for activities >4 hrs, also without LEV or without breathing equipment. **PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9:** safe use for activities >4 hrs, provided that LEV (90% efficiency) is used. **PROC5:** uses are safe for activities >4 hrs, at operating temperatures of 20, 30 or 40 °C, without the use of LEV or breathing protection.	
3.2. Environment	
Standard phrases. Ability to Include a web link.	

Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	
Worker exposure has been evaluated using ECETOC TRA V2.0	
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	
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Process sampling [CS2].	Wear suitable gloves tested to EN374 [PPE15]
Equipment cleaning and maintenance [CS39]	Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear spills immediately [C&H13].
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

Exposure estimation

1 Workers exposure

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0. In Chapter 10 the relationships between the Operational Conditions and safe uses (RCRs (inhalation) <1) are given.

In Section 3.1 of the scenario above, the Safe Uses, and conditions under which, are given.

2 Consumer exposure

Not relevant

3 Indirect exposure of humans via the environment

Not relevant.

Exposure Scenario 4 of 6: Industrial use of Hydrochloric acid and formulations

Exposure Scenario

Worker – ES4 – Hydrochloric acid	
Section 1	**Exposure Scenario Title**
Title	**ES4 – Industrial Use of Hydrochloric acid and Formulations; CAS: 7647-01-0**
Use Descriptor	Sector of Use: Industrial (SU2a, SU2b, SU3, SU5, SU14, SU15, SU16)
	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:Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids
Processes, tasks, activities covered	Use of HCl & its Formulations by Industry
ES Exposure Criteria	SCOEL: - 8 mg/m³ - 8 hr. TWA - 15 mg/m³ – 15 min. TWA
Section 2	**Operational conditions and risk management measures**
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapor pressure 0.5 - 10 kPa [OC4]. PROC13: Partial vapor pressures over the bath with a 15% HCl solution are : T °C pHCl Pa 20 1.89 30 4.93 40 12.2 50 28.6 60 64.5 70 139 80 290 90 584 100 1140 (Cf. ELECNRTL in Aspenplus (vs. 2004.1))
Concentration of substance in product	Covers percentage substance in the product up to 40 % (unless stated differently) [G13].
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]

Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [EI119] Under PROC13, operating temperatures may differ from 20 – 30 – 40 – 50 – 60 – 70 – 80 – 90 – 100 °C
Contributing Scenarios	**Risk Management Measures**
Due to the corrosive properties of the substance, always wear suitable protective clothing, eye and skin protection	
PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	Handle substance within a closed system [E47]. Clear transfer lines prior to decoupling [E39]
PROC2: General exposures [CS1]. Process sampling [CS2] Continuous process [CS54].	Handle substance within a closed system [E47]. Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39]
PROC3: General exposures [CS1]. Remanufacture of reject articles [CS19]. Cleaning [CS47]. Use in contained batch processes [CS37]. With sample collection [CS56].	Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39] Wear suitable gloves tested to EN374 [PPE15].
PROC4: Drum/batch transfers [CS8] Bulk transfers [CS14]. General exposures (open systems) [CS16]. Cleaning [CS47]. Remanufacture of reject articles [CS19]. With sample collection [CS56].	Use bulk or semi-bulk handling systems [E43]. or Use drum pumps [E53]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Provide extract ventilation to points where emissions occur (90% efficiency) [E54].
PROC9: Drum and small package filling [CS6]. Drum/batch transfers [CS8]. Equipment cleaning and maintenance [CS39].	Handle substance within a predominantly closed system provided with extract ventilation (90% efficiency) [E49]. Fill containers/cans at dedicated fill points supplied with local extract ventilation (90% efficiency) [E51]
PROC10: Rolling, Brushing [CS51]. Equipment cleaning and maintenance [CS39].	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) (90% efficiency) [E40]. Wear suitable gloves (tested to EN374) [PPE15]
PROC13: Dipping, immersion and pouring [CS4]. Treatment by dipping and pouring [CS35].	Provide extract ventilation to material transfer points and other openings (90% efficiency) [E82] Carry out in a vented booth provided with laminar airflow [E59]. Automate activity where possible [AP16]. Allow time for product to drain from workpiece [EI21]. Wear suitable gloves (tested to EN374) [PPE15].
PROC15: Laboratory activities [CS36].	Handle in a fume cupboard or under extract ventilation (80% efficiency) [E83]. Or Carry out in a vented booth or extracted enclosure (80% efficiency) [E57] Avoid carrying out operation for more than 4 hours [OC12]
Or: PROC15: Laboratory activities [CS36]	Avoid carrying out operation for more than 1 hour [OC11]

PROC19: Mixing operations (open systems) [CS30]. Additive premixing [CS92] Or:	Wear suitable gloves tested to EN374 [PPE15]. Wear a respirator conforming to EN140 Type A filter or better [PPE22]
	Wear suitable gloves tested to EN374 [PPE15]. Avoid carrying out operation for more than 15 minutes [OC10]
Section 2.2	**Control of environmental exposure**
Product characteristics	Liquid, vapor pressure 0.5 - 10 kPa [OC4].
Amounts used	*NR*
Frequency and duration of use	360 days per year
Other Operational Conditions of use affecting environmental exposure	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	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	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
Conditions and measures related to external treatment of waste for disposal	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
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	
PROC1: Safe use for activities >4 hrs, also without LEV or breathing protection. **PROC2, PROC3, PROC4, PROC9, PROC10:** Safe use for activities >4 hrs, provided that LEV (90% efficiency) is used. **PROC13**: Safe use at all temperatures as mentioned above (2.1) provided that LEV (90% efficiency) is used. **PROC15:** Safe use for 1`5 min. – 1 hrs; if used >1 hr, LEV (80% efficiency) must be used. **PROC19:** safe use for >4 hrs: provided that breathing equipment (half mask) is used; or limit exposure to <15 min.	
3.2. 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	
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	
Worker exposure has been evaluated using ECETOC TRA V2.0	
4.2. Environment	*Standard phrases*
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Process sampling [CS2].	Wear suitable gloves tested to EN374 [PPE15]
Equipment cleaning and maintenance [CS39]	Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear spills immediately [C&H13].
Control of environmental exposure	

Exposure estimation

1 Workers exposure

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0. In Chapter 10 the relationships between the Operational Conditions and safe uses (RCRs (inhalation) <1) are given.

In Section 3.1 of the scenario above, the Safe Uses, and conditions under which, are given.

2 Consumer exposure

Not relevant

3 Indirect exposure of humans via the environment

Not relevant.

Exposure Scenario 5 of 6: Professional use of Hydrochloric acid and Formularions

Exposure Scenario

Worker – ES5 – Hydrochloric acid	
Section 1	**Exposure Scenario Title**
Title	**ES5 – Professional Use of Hydrochloric acid and Formulations**
Use Descriptor	Sector of Use: Industrial (SU20, SU22, SU23)
	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: ERC4 Industrial use of processing aids in processes and products, not becoming part of articles ERC6b Industrial use of reactive processing aids ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems
Processes, tasks, activities covered	Professional Use of Hydrochloric acid and Formulations
ES Exposure Criteria	SCOEL: - 8 mg/m³ - 8 hr. TWA - 15 mg/m³ – 15 min. TWA
Section 2	**Operational conditions and risk management measures**
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapor pressure 0.5 - 10 kPa [OC4]. PROC13: Partial vapor pressures over the bath with a 15% HCl solution are : T °C pHCl Pa 20 1.89 30 4.93 40 12.2 50 28.6 60 64.5 70 139 80 290 90 584 100 1140 (Cf. ELECNRTL in Aspenplus (vs. 2004.1))
Concentration of substance in product	Covers percentage substance in the product up to 40 % (unless stated differently) [G13].
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]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1]. Ensure operatives are trained to minimize exposures [EI119]
Contributing Scenarios	**Risk Management Measures**
Due to the corrosive properties of the substance, always wear suitable protective clothing, eye and skin protection	
PROC1: General exposures (closed systems) [CS15]. Continuous process [CS54].	Handle substance within a closed system [E47]. Clear transfer lines prior to decoupling [E39]
PROC2: General exposures [CS1]. Process sampling [CS2] Continuous process [CS54].	Handle substance within a closed system [E47]. Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39]
PROC3: General exposures [CS1]. Remanufacture of reject articles [CS19]. Cleaning [CS47]. Use in contained batch processes [CS37]. With sample collection [CS56].	Handle substance within a closed system [E47]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Ensure material transfers are under containment or extract ventilation (90% efficiency) [E66]. Clear transfer lines prior to decoupling [E39] Wear suitable gloves tested to EN374 [PPE15].
PROC4: Drum/batch transfers [CS8] Bulk transfers [CS14]. General exposures (open systems) [CS16]. Cleaning [CS47]. Remanufacture of reject articles [CS19]. With sample collection [CS56].	Use bulk or semi-bulk handling systems [E43]. or Use drum pumps [E53]. Drain down and flush system prior to equipment break-in or maintenance [E55]. Provide extract ventilation to points where emissions occur (90% efficiency) [E54].
PROC8a: Bulk transfers [CS14]. Process sampling [CS2]. Drum/batch transfers [CS8]. General exposures (open systems) [CS16]. Equipment cleaning and maintenance [CS39] Transport [CS58]. Internal [CS59].	Handle substance within a predominantly closed system provided with extract ventilation (90% efficiency) [E49]. or Provide extract ventilation to points where emissions occur (90% efficiency) [E54]
PROC10: Rolling, Brushing [CS51]. Equipment cleaning and maintenance [CS39].	Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour) (90% efficiency) [E40]. Wear suitable gloves (tested to EN374) [PPE15]
PROC11: Spraying/fogging by manual application [CS24]. Spraying/fogging by machine application [CS25]. Spray Bottle [CS49]. **Or:**	Provide extract ventilation to points where emissions occur (90% efficiency) [E54]. and Wear a respirator conforming to EN140 with Type A filter or better. [PPE22] Provide extract ventilation to points where emissions occur (90% efficiency) [E54]. Avoid carrying out operation for more than 15 minutes [OC10]
PROC13: Dipping, immersion and pouring [CS4]. Treatment by dipping and pouring [CS35].	Provide extract ventilation to material transfer points and other openings (90% efficiency) [E82] Carry out in a vented booth provided with laminar airflow [E59]. Automate activity where possible [AP16].

	Allow time for product to drain from workpiece [EI21]. Wear suitable gloves (tested to EN374) [PPE15].
PROC15: Laboratory activities [CS36].	Handle in a fume cupboard or under extract ventilation (80% efficiency) [E83]. Or Carry out in a vented booth or extracted enclosure (80% efficiency) [E57] Avoid carrying out operation for more than 4 hours [OC12]
Or: PROC15: Laboratory activities [CS36]	Avoid carrying out operation for more than 1 hour [OC11]
PROC19: Mixing operations (open systems) [CS30]. Additive premixing [CS92]	Wear suitable gloves tested to EN374 [PPE15]. Wear a respirator conforming to EN140 Type A filter or better [PPE22]
Or:	Wear suitable gloves tested to EN374 [PPE15]. Avoid carrying out operation for more than 15 minutes [OC10]
Section 2.2	**Control of environmental exposure**
Product characteristics	Liquid, vapor pressure 0.5 - 10 kPa [OC4]. PROC13: Partial vapor pressures over the bath with a 15% HCl solution are : T °C pHCl Pa 20 1.89 30 4.93 40 12.2 50 28.6 60 64.5 70 139 80 290 90 584 100 1140 (Cf. ELECNRTL in Aspenplus (vs. 2004.1))
Amounts used	*NR*
Frequency and duration of use	8 h/d for 360 days per year
Other Operational Conditions of use affecting environmental exposure	Ensure all waste water is collected and treated via a WWTP [W6]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Ensure all waste water is collected and treated via a WWTP [W6]
Organisation measures to prevent/limit release from site	Prevent leaks and prevent soil / water pollution caused by leaks [S4]
Conditions and measures related to municipal sewage treatment plant	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
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	
PROC1: Safe use for activities >4 hrs, without the use of LEV or without breathing protection. **PROC2, PROC3, PROC4, PROC8a, PROC10, PROC19: S**afe uses for activities >4 hrs, provided that LEV (90% efficiency) is used. **PROC11:** Safe use for activities >4 hrs. ONLY if LEV (90% efficiency) **plus** breathing equipment (half mask) is used; **or** limit exposure to <15 min., plus use LEV (90% efficiency). **PROC13**: Safe use at all temperatures as mentioned above (2.1) provided that LEV (90% efficiency) is used. **PROC15: S**afe use for activities 15 min – 1 hr, also without LEV; For activities >1 hr, LEV (80% efficiency) must be used. **PROC19:** safe use for >4 hrs: provided that breathing equipment (half mask) is used; or limit exposure to <15 min.	
3.2. Environment	
Standard phrases. Ability to Include a web link.	
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	
Worker exposure has been evaluated using ECETOC TRA V2.0	
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	
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Process sampling [CS2].	Wear suitable gloves tested to EN374 [PPE15]
Equipment cleaning and maintenance [CS39]	Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear spills immediately [C&H13].
Control of environmental exposure	

Exposure estimation

1 Workers exposure

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0. In Chapter 10 the relationships between the Operational Conditions and safe uses (RCRs (inhalation) <1) are given.
In Section 3.1 of the scenario above, the Safe Uses, and conditions under which, are given.

2 Consumer exposure

Not relevant

3 Indirect exposure of humans via the environment

Not relevant.

Exposure Scenario 6 of 6: Use of Hydrochloric acid and Formulations by Consumers

Exposure Scenario

Consumer – ES6 – Hydrochloric acid	
Section 1	**Exposure Scenario Title**
Title	**ES6 – Use of Hydrochloric acid and Formulations by Consumers**
Use Descriptor	Sector of Use: Consumer Uses: Private Households (SU21)
	Process Categories: (PROC) N.A.
	Environmental Release Categories: ERC8b: Wide dispersive indoor use of processing aids in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems
	Product categories: PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents PC21: Laboratory chemicals PC35: Washing and cleaning products (including solvent based products) PC37: Water treatment chemicals PC38: Welding and soldering products
Processes, tasks, activities covered	Use of HCl solution at a maximum concentration of 20% for purposes as mentioned under the PCs above.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapor pressure 0.5 - 10 kPa [OC4].
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]; up to 5 times/year
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
Risk Management Measures related to Consumer uses	
The substance may cause local irritating effects; no systemic effects. For that reason: always use protective gloves during the handling and application activities mentioned under the Product Categories above.	
Section 2.2	**Control of environmental exposure**
Product characteristics	Liquid, vapor pressure 0.5 - 10 kPa [OC4].
Amounts used	*NR*
Frequency and duration of use	360 days per year
Other Operational Conditions of use affecting environmental exposure	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	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	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
Conditions and measures related to external treatment of waste for disposal	All contaminated waste water must be processed in an industrial or municipal wastewater treatment plant that incorporates both primary and secondary treatments [W1]
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

Exposures have not been estimated as the substance only causes local dermal and/or inhalatory effects and no systemic effects.

However, one worst case application has been calculated. Assuming the following application conditions:
- use for removal of cement rests from bricks, tiles, etc.
- use of a 20% HCl solution in water
- duration 8 hrs.
- room volume 50 m^3
- ventilation rate 2x/hr

Results:
Inhalation – mean event concentration: 15 mg/m^3
Inhalation – mean concentration on day of exposure: 5 mg/m^3
Inhalation – year average: 0.03 mg/m^3/day

This inhalatory uptake is very unlikely to happen, as the substance will immediately start to irritate when it enters the inhalatory tract.

Dermal – load: 465 mg/cm^2
Dermal – acute (internal) dose: 0.016 mg/kg
Dermal – chronic (internal) dose: 0.00008 mg/kg/day

Such an unrealistic high dermal load is unlikely, but assuming that it occurs the user will have reacted on the burning/itching skin sensation and will automatically start using gloves.

3.2. 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

Section 4	**Guidance to check compliance with the Exposure Scenario**

4.1. Health

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

Exposure estimation

1 Workers exposure
Not relevant

2 Consumer exposure
Exposures have not been estimated as the substance only causes local dermal and/or inhalatory effects and no systemic effects.
Inhalatory uptake is very unlikely to happen, as the substance will immediately start to irritate when it enters the inhalatory tract.
Dermal load is unlikely, but assuming that it would occur, the user will have reacted on the burning/itching skin sensation and will automatically start using gloves.

3 Indirect exposure of humans via the environment
Not relevant.