Safety Data Sheet

According to Annex II to REACH - Regulation (EU) 2020/878 and to Annex II to UK REACH

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

1.1. Product identifier

Code:	**TC89947**
Product name	**REDOX +475 mV**
UFI :	**NC31-D84D-800T-JNHP**

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

Intended use	**Reagent for laboratory and for process control.**

1.3. Details of the supplier of the safety data sheet

Name	**TITOLCHIMICA SPA**
Full address	**VIA S.PIETRO MARTIRE 1054**
District and Country	**45030 PONTECCHIO POLESINE (RO)** **ITALIA**
	Tel. +39425492644
e-mail address of the competent person	
responsible for the Safety Data Sheet	**utecnico@titolchimica.it**
Supplier:	**TITOLCHIMICA SPA**

1.4. Emergency telephone number

For urgent inquiries refer to	**Poison Control Centers (24/24h):** **Pavia - 038224444;** **Milano - 0266101029;** **Bergamo - 800883300;** **Verona - 800011858;** **Firenze - 0557947819;** **Roma - Gemelli 063054343;** **Roma - Umberto I 0649978000;** **Roma - Bambino Gesù 0668593726;** **Napoli - 0815453333;** **Foggia - 800183459.**

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture

The product is classified as hazardous pursuant to the provisions set forth in (EC) Regulation 1272/2008 (CLP) (and subsequent amendments and supplements). The product thus requires a safety datasheet that complies with the provisions of (EU) Regulation 2020/878.
Any additional information concerning the risks for health and/or the environment are given in sections 11 and 12 of this sheet.

Hazard classification and indication:

Substance or mixture corrosive to metals, category 1	H290	May be corrosive to metals.
Skin corrosion, category 1B	H314	Causes severe skin burns and eye damage.
Serious eye damage, category 1	H318	Causes serious eye damage.

2.2. Label elements

Hazard labelling pursuant to EC Regulation 1272/2008 (CLP) and subsequent amendments and supplements.

Hazard pictograms:

Signal words: Danger

Hazard statements:

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Precautionary statements:

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): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P280	Wear protective gloves/ protective clothing / eye protection / face protection.
P310	Immediately call a POISON CENTER / doctor.
P264	Wash hands thoroughly after use.

Contains: Hydrochloric acid...%

2.3. Other hazards

On the basis of available data, the product does not contain any PBT or vPvB in percentage ≥ than 0,1%.

The product does not contain substances with endocrine disrupting properties in concentration ≥ 0.1%.

SECTION 3. Composition/information on ingredients

3.2. Mixtures

Contains:

Identification	**Conc. %**	**Classification (EC) 1272/2008 (CLP)**
FERRIC CHLORIDE ANHYDROUS		
INDEX -	2 - 4	Acute Tox. 4 H302, Eye Dam. 1 H318, Skin Irrit. 2 H315
EC 231-729-4		LD50 Oral: >300 mg/kg
CAS 7705-08-0		
REACH Reg. 01-2119497998-05-xxxx		
Hydrochloric acid...%		
INDEX 017-002-01-X	0,1 – 1,0	Met. Corr. 1 H290, Skin Corr. 1B H314, Eye Dam. 1 H318, STOT SE 3 H335, Classification note according to Annex VI to the CLP Regulation: B
EC 231-595-7		Met. Corr. 1 H290: ≥ 0,1%, Skin Corr. 1B H314: ≥ 25%, Skin Irrit. 2 H315: ≥ 10%, Eye Dam. 1 H318: ≥ 25%, Eye Irrit. 2 H319: ≥ 10%, STOT SE 3 H335: ≥ 10%
CAS 7647-01-0		
REACH Reg. 01-2119484862-27-XXXX		

The full wording of hazard (H) phrases is given in section 16 of the sheet.

SECTION 4. First aid measures

4.1. Description of first aid measures

EYES: Remove contact lenses, if present. Wash immediately with plenty of water for at least 30-60 minutes, opening the eyelids fully. Get medical advice/attention.
SKIN: Remove contaminated clothing. Rinse skin with a shower immediately. Get medical advice/attention.
INGESTION: Have the subject drink as much water as possible. Get medical advice/attention. Do not induce vomiting unless explicitly authorised by a doctor.
INHALATION: Get medical advice/attention immediately. Remove victim to fresh air, away from the accident scene. If the subject stops breathing, administer artificial respiration. Take suitable precautions for rescue workers.

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

Specific information on symptoms and effects caused by the product are unknown.

Hydrochloric acid...%
Acute dose-dependent effects.

Skin: irritation, burn, ulcer
Eyes: irritation, corneal damage
Nose: irritation
Upper airways: irritation
Lungs: irritation
Digestive system: if ingested, retrosternal and epigastric pain, haematemesis
Chronic effects.
Skin: irritation, depigmentation, dry skin, hair removal
Eyes: irritation
Nose: irritation
Upper airways: irritation
Lungs: irritation.

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

Information not available

SECTION 5. Firefighting measures

The product is not flammable and does not feed the flames.

5.1. Extinguishing media

SUITABLE EXTINGUISHING EQUIPMENT
The extinguishing equipment should be of the conventional kind: carbon dioxide, foam, powder and water spray.
UNSUITABLE EXTINGUISHING EQUIPMENT
None in particular.

5.2. Special hazards arising from the substance or mixture

HAZARDS CAUSED BY EXPOSURE IN THE EVENT OF FIRE
Do not breathe combustion products.
ACIDO CLORIDRICO: Acido cloridrico (HCl) allo stato gassoso.

5.3. Advice for firefighters

GENERAL INFORMATION
Use jets of water to cool the containers to prevent product decomposition and the development of substances potentially hazardous for health. Always wear full fire prevention gear. Collect extinguishing water to prevent it from draining into the sewer system. Dispose of contaminated water used for extinction and the remains of the fire according to applicable regulations.
SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS
Normal fire fighting clothing i.e. fire kit (BS EN 469), gloves (BS EN 659) and boots (HO specification A29 and A30) in combination with self-contained open circuit positive pressure compressed air breathing apparatus (BS EN 137).

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Block the leakage if there is no hazard.
Wear suitable protective equipment (including personal protective equipment referred to under Section 8 of the safety data sheet) to prevent any contamination of skin, eyes and personal clothing. These indications apply for both processing staff and those involved in emergency procedures.

6.2. Environmental precautions

The product must not penetrate into the sewer system or come into contact with surface water or ground water.

6.3. Methods and material for containment and cleaning up

Collect the leaked product into a suitable container. Evaluate the compatibility of the container to be used, by checking section 10. Absorb the remainder with inert absorbent material.
Make sure the leakage site is well aired. Contaminated material should be disposed of in compliance with the provisions set forth in point 13.

6.4. Reference to other sections

Any information on personal protection and disposal is given in sections 8 and 13.

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Before handling the product, consult all the other sections of this material safety data sheet. Avoid leakage of the product into the environment. Do not eat, drink or smoke during use. Remove any contaminated clothes and personal protective equipment before entering places in which people eat.

7.2. Conditions for safe storage, including any incompatibilities

Store only in the original container. Store the containers sealed, in a well ventilated place, away from direct sunlight. Keep containers away from any incompatible materials, see section 10 for details.

7.3. Specific end use(s)

Information not available

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Regulatory references:

ESP	España	Límites de exposición profesional para agentes químicos en España 2021
HRV	Hrvatska	Pravilnik o izmjenama i dopunama Pravilnika o zaštiti radnika od izloženosti opasnimkemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 1/2021)
ITA	Italia	Decreto Legislativo 9 Aprile 2008, n.81
ROU	România	Hotărârea nr. 53/2021 pentru modificarea hotărârii guvernului nr. 1.218/2006, precum și pentru modificarea și completarea hotărârii guvernului nr. 1.093/2006
SVN	Slovenija	Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu (Uradni list RS, št. 100/01, 39/05, 53/07, 102/10, 43/11 – ZVZD-1, 38/15, 78/18 in 78/19)
GBR	United Kingdom	EH40/2005 Workplace exposure limits (Fourth Edition 2020)
EU	OEL EU	Directive (EU) 2022/431; Directive (EU) 2019/1831; Directive (EU) 2019/130; Directive (EU) 2019/983; Directive (EU) 2017/2398; Directive (EU) 2017/164; Directive 2009/161/EU; Directive 2006/15/EC; Directive 2004/37/EC; Directive 2000/39/EC; Directive 98/24/EC; Directive 91/322/EEC.
	TLV-ACGIH	ACGIH 2022

Hydrochloric acid...%

Threshold Limit Value

Type	Country	TWA/8h		STEL/15min		Remarks / Observations
		mg/m3	ppm	mg/m3	ppm	
VLEP	ITA	8	5	15	10	
OEL	EU	8	5	15	10	
TLV-ACGIH		2,98				A4, URT IRR

Health - Derived no-effect level - DNEL / DMEL

	Effects on consumers				Effects on workers			
Route of exposure	Acute local	Acute systemic	Chronic local	Chronic systemic	Acute local	Acute systemic	Chronic local	Chronic systemic
Inhalation	15 mg/m3		8 mg/m3		15 mg/m3		8 mg/m3	

FERRIC CHLORIDE ANHYDROUS

Threshold Limit Value

Type	Country	TWA/8h		STEL/15min		Remarks / Observations
		mg/m3	ppm	mg/m3	ppm	
TLV-ACGIH		1				come Fe

Health - Derived no-effect level - DNEL / DMEL

	Effects on consumers				Effects on workers			
Route of exposure	Acute local	Acute systemic	Chronic local	Chronic systemic	Acute local	Acute systemic	Chronic local	Chronic systemic

Oral	20 mg/kg/d	0,28 mg/kg/d	
Skin		1,4 mg/kg/d	2,8 mg/kg/d

NICKEL DICHLORIDE

Threshold Limit Value

Type	Country	TWA/8h		STEL/15min		Remarks / Observations	
		mg/m3	ppm	mg/m3	ppm		
VLA	ESP	0,1					Como Ni
GVI/KGVI	HRV	0,01					Kao Ni
VLEP	ITA	0,1				INHAL	(Ni)
TLV	ROU	0,1		0,5			în Ni
MV	SVN	0,05		0,2		INHAL	
WEL	GBR	0,1				SKIN	as Ni
TLV-ACGIH		0,1				INHAL	

Legend:
(C) = CEILING ; INHAL = Inhalable Fraction ; RESP = Respirable Fraction ; THORA = Thoracic Fraction.

VND = hazard identified but no DNEL/PNEC available ; NEA = no exposure expected ; NPI = no hazard identified ; LOW = low hazard ; MED = medium hazard ; HIGH = high hazard.

Hydrochloric acid...%
Sampling methods available at the site
https://amcaw.ifa.dguv.de/amcaw/substances/methods/94f4fd91-c47c-4b18-a760-18d976d1437c

8.2. Exposure controls

As the use of adequate technical equipment must always take priority over personal protective equipment, make sure that the workplace is well aired through effective local aspiration.
When choosing personal protective equipment, ask your chemical substance supplier for advice.
Personal protective equipment must be CE marked, showing that it complies with applicable standards.

Provide an emergency shower with face and eye wash station.

HAND PROTECTION
Protect hands with category III work gloves.
The following should be considered when choosing work glove material (see standard EN 374): compatibility, degradation, permeability time.
The work gloves' resistance to chemical agents should be checked before use, as it can be unpredictable. The gloves' wear time depends on the duration and type of use.

SKIN PROTECTION
Wear category II professional long-sleeved overalls and safety footwear (see Regulation 2016/425 and standard EN ISO 20344). Wash body with soap and water after removing protective clothing.

EYE PROTECTION
Wear airtight protective goggles (see standard EN ISO 16321).

RESPIRATORY PROTECTION
Respiratory protection devices must be used if the technical measures adopted are not suitable for restricting the worker's exposure to the threshold values considered. Use a mask with a type B filter whose class (1, 2 or 3) must be chosen according to the limit of use concentration. (see standard EN 14387).
If the substance considered is odourless or its olfactory threshold is higher than the corresponding TLV-TWA and in the case of an emergency, wear open-circuit compressed air breathing apparatus (in compliance with standard EN 137) or external air-intake breathing apparatus (in compliance with standard EN 138). For a correct choice of respiratory protection device, see standard EN 529.

ENVIRONMENTAL EXPOSURE CONTROLS
The emissions generated by manufacturing processes, including those generated by ventilation equipment, should be checked to ensure compliance with environmental standards.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Properties	Value	Information
Appearance	liquid	
Colour	yellow	
Odour	not available	
Melting point / freezing point	not available	
Initial boiling point	0 °C	
Flammability	not available	
Lower explosive limit	not applicable	
Upper explosive limit	not applicable	
Flash point	not applicable	
Auto-ignition temperature	not available	
Decomposition temperature	not available	
pH	0-0,5	
Kinematic viscosity	not available	
Solubility	in water	
Partition coefficient: n-octanol/water	not available	
Vapour pressure	not available	
Density and/or relative density	1,035	
Relative vapour density	not available	
Particle characteristics	not applicable	

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Information not available

9.2.2. Other safety characteristics

Risk of explosion	Not applicable

SECTION 10. Stability and reactivity

In the absence of information on the mixture, the literature information on the components is reported. This information is not characteristic of the solution but of the dangerous components.

10.1. Reactivity

There are no particular risks of reaction with other substances in normal conditions of use.

Hydrochloric acid...%
The solution in water is a strong acid (IPCS, 2000).
By decomposition it develops hydrogen.Aqueous solutions are stable.

FERRIC CHLORIDE ANHYDROUS
Corrodes: metals.On contact with: moisture,water.

10.2. Chemical stability

The product is stable in normal conditions of use and storage.

Hydrochloric acid...%
Aqueous solutions are stable.

10.3. Possibility of hazardous reactions

No hazardous reactions are foreseeable in normal conditions of use and storage.

Hydrochloric acid...%
Reacts violently with bases and oxidants, developing toxic chlorine gas (IPCS, 2000). Attacks many metals in the presence of water. This produces flammable / explosive gaseous hydrogen (IPCS, 2000).

FERRIC CHLORIDE ANHYDROUS
On contact with: water.Develops: hydrochloric acid.

10.4. Conditions to avoid

None in particular. However the usual precautions used for chemical products should be respected.

Hydrochloric acid...%
high temperatures.

FERRIC CHLORIDE ANHYDROUS
Avoid exposure to: humidity.

10.5. Incompatible materials

Hydrochloric acid...%
strong oxidising agents,bases,fluorine,amines,reducing agents,metals.

FERRIC CHLORIDE ANHYDROUS
water,strong bases.

10.6. Hazardous decomposition products

Hydrochloric acid...%
hydrochloric acid,chlorine dioxide.

FERRIC CHLORIDE ANHYDROUS
hydrochloric acid,metal compounds,acid gases,chlorides.

SECTION 11. Toxicological information

In the absence of experimental data for the product itself, health hazards are evaluated according to the properties of the substances it contains, using the criteria specified in the applicable regulation for classification.
It is therefore necessary to take into account the concentration of the individual hazardous substances indicated in section 3, to evaluate the toxicological effects of exposure to the product.

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Metabolism, toxicokinetics, mechanism of action and other information

Hydrochloric acid...%
Following inhalation or ingestion, it is rapidly separated into H + and Cl- which, after entering the circulation, is eliminated in the urine.
The activity of hydrogen chloride is associated with its high solubility in water, where it dissociates almost completely. The hydrogen ion forms with water hydronium ion, this becomes a donor of a proton that has catalytic properties and is therefore able to react with organic molecules. This explains the ability of hydrogen chloride to induce cell lesions and necrosis.

Information on likely routes of exposure

Hydrochloric acid...%
In the professional field, the main routes of exposure are inhalation and dermal exposure.
The general population can be exposed to inhalation, ingestion, skin and eye contact.
Exposure to aerosols locally involves chemical burns whose severity is a function of the concentration of the solution, the importance of contamination and the duration of contact.
Hot and painful erythema, flittene or necrosis can be observed at skin level. Evolution can be complicated with superinfections, aesthetic or functional sequelae.
On the ocular level there is immediate pain, tearing, conjunctival hyperemia and often blepharospasm. The sequelae can be: conjunctival adhesions,

corneal opacities, cataracts, glaucoma and even blindness.
Exposure by inhalation to its vapor or aerosol immediately causes irritation of the respiratory system.
In the form of aerosols, the lesions depend on the size of the aerosol particles. You may have runny nose, sneezing, nasal and pharyngeal burning sensation, coughing, wheezing, chest pain. Important complications are laryngeal edema or bronchospasm.
The ingestion of concentrated solutions results in buccal, retrosternal and epigastric pain associated with hyperscialorrhea and frequently bloody vomiting.
There is metabolic acidosis and an increase in tissue enzymes due to necrosis, hyperleukocytosis, haemolysis and hyperchloremia.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Hydrochloric acid...%
Rapid evaporation of the liquid may cause frostbite (IPCS, 2000).
Inhalation of high concentrations of the gas may cause pneumonia and pulmonary edema resulting in a reactive airway syndrome (RADS) (bronchial hyperreactivity). The effects may be delayed (IPCS, 2000).
Exposure to solution aerosols locally involves chemical burns whose severity is a function of the concentration of the solution, the importance of contamination and the duration of contact.
Hot and painful erythema, flittene or necrosis can be observed at skin level. Evolution can be complicated with superinfections, aesthetic or functional sequelae.
On the ocular level there is immediate pain, tearing, conjunctival hyperemia and often blepharospasm. The sequelae can be: conjunctival adhesions, corneal opacities, cataracts, glaucoma and even blindness.
Exposure by inhalation to its vapor or aerosol immediately causes irritation of the respiratory system.
In the form of aerosols, the lesions depend on the size of the aerosol particles. You may have runny nose, sneezing, nasal and pharyngeal burning sensation, coughing, wheezing, chest pain. Important complications are laryngeal edema or bronchospasm.
At the end of exposure the symptomatology almost always regresses, but in some cases there may be delayed pulmonary edema within 48 hours.
Secondary infections are a frequent complication.
At the expense of the respiratory system, in the case of extensive lesions, bronchial hypersecretion and desquamation of the bronchial mucosa determine troncular obstruction and atelectasis. Sequelae for the respiratory system are: asthma (Books syndrome), bronchial stenosis, bronchiectasis and pulmonary fibrosis.
The ingestion of concentrated solutions results in buccal, retrosternal and epigastric pain associated with hyperscialorrhea and frequently bloody vomiting.
There is metabolic acidosis and an increase in tissue enzymes due to necrosis, hyperleukocytosis, haemolysis and hyperchloremia.
Short-term complications are: esophageal or gastric perforation, digestive bleeding, fistulas, breathing difficulties due to laryngeal edema, esophagus-tracheal fistula, shock, disseminated intravascular coagulation.
The long-term complications are: digestive stenoses, in particular esopharyngeal.
Repeated exposure to its vapors or aerosols of aqueous solutions may cause irritative effects: dermatitis and conjunctivitis; ulcerations of the nasal mucosa, buccal, epistaxis and gingivorrhagias; dental erosions, chronic bronchitis (INRS, 2010).

Interactive effects

Information not available

ACUTE TOXICITY

ATE (Inhalation) of the mixture:	Not classified (no significant component)
ATE (Oral) of the mixture:	>2000 mg/kg
ATE (Dermal) of the mixture:	Not classified (no significant component)

FERRIC CHLORIDE ANHYDROUS

LD50 (Dermal):	> 2000 mg/kg (OECD - linea guida 402)
LD50 (Oral):	> 300 mg/kg mouse

Harmful if swallowed.
Inhalation: no study required.
Dermal: no mortality was observed. The product has not been tested. The claims are derived from coposition substances / products or similar structure.

Hydrochloric acid...%
Rat LD50 (oral): 700 mg / kg (INRS, 2010)
Rabbit LD50 (cutaneous):> 5010 mg / kg (INRS, 2010)
Rat LC50-30 minutes (by inhalation): 5.7 - 8.3 mg / l (aerosol) (INRS, 2010).

SKIN CORROSION / IRRITATION

Corrosive for the skin

Classification according to the experimental Ph value

Hydrochloric acid...%
Exposure to aerosols involves local chemical burns whose severity depends on the concentration of the solution, on the importance of the contamination and on the duration of the contact.
At the skin level you can observe hot and painful erythema, flittene or necrosis. Evolution can be complicated by superinfections, aesthetic or functional sequelae.

FERRIC CHLORIDE ANHYDROUS
Irritating to skin.
Irritating to rabbit skin (manufacturer's test). The data refer to a dilute aqueous solution of the substance.

SERIOUS EYE DAMAGE / IRRITATION

Causes serious eye damage

Hydrochloric acid...%
Exposure to aerosols locally involves chemical burns whose severity depends on the concentration of the solution, the importance of contamination and the duration of contact (INRS; 2010).
At the ocular level there is immediate pain, lacrimation, conjunctival hyperaemia and often blepharospasm. The sequelae can be: conjunctival adhesions, corneal opacities, cataracts, glaucoma and even blindness (INRS, 2010).
In animals, concentrations above 3.3% cause serious eye irritation; symptoms can include redness, swelling, pain, and tears. Prolonged exposure or at higher concentrations induces corneal opacity, ulceration and decreased vision with the risk of permanent alteration. The severity of the irritation is related to the duration of the treatment (the tears have a buffer effect and dilute). In rabbits, 0.1 ml of a 10% aqueous solution causes permanent visual impairment; the non-irritating concentration is 0.33% (INRS, 2010).

FERRIC CHLORIDE ANHYDROUS
Risk of serious eye damage.
Irreversible damage was found on the rabbit's eyes (manufacturer's test). The data refer to a dilute aqueous solution of the substance.

RESPIRATORY OR SKIN SENSITISATION

Does not meet the classification criteria for this hazard class

Skin sensitization

Hydrochloric acid...%
Negative results in the guinea pig maximization test (induction and triggering: 1% solution) and in the ear swelling test in the mouse (1% induction, 5% trigger) (INRS, 2010).

GERM CELL MUTAGENICITY

Does not meet the classification criteria for this hazard class

Hydrochloric acid...%
In single studies, hydrochloric acid induced mutations and chromosomic aberrations in mammalian cells.
It has also induced chromosomal aberrations in insects and plants. It did not induce mutations in bacteria (IARC, 1992).

FERRIC CHLORIDE ANHYDROUS
The substance was not mutagenic to bacteria and a mammalian cell culture. It showed no mutagenic effects in mammalian experiments.

CARCINOGENICITY

Does not meet the classification criteria for this hazard class

Hydrochloric acid...%
In a study of steel pickling workers, an excess risk of lung cancer was observed in workers exposed mainly to hydrochloric acid. In the same cohort, an increased risk of laryngeal cancer was observed, however, no analysis was performed on workers exposed to hydrochloric acid. Three case control studies in industrial plants indicate no association between exposure to hydrochloric acid and cancer affecting the lungs, brain or kidneys. A Canadian case control study indicates increased risk for microcytoma in workers exposed to hydrochloric acid; however, no excess risk was observed for other histological types of lung cancer (IARC, 1992).
In a study in rats m. exposed to inhalation for the entire lifetime at a dose level the hydrogen chloride has not been observed increase in treatment in the incidence of tumors (IARC, 1992).
The International Agency for Research on Cancer (IARC) allocates hydrochloric acid in Group 3 (not classifiable as a human carcinogen) based on evidence of inadequate carcinogenicity in both humans and animals (IARC, 1992).
Furthermore, in a recent evaluation the data showed an association between exposure to strong inorganic acid mists and laryngeal cancer in humans while they were limited to affirm a causal association with bronchial cancer. In humans, a positive association was also observed between exposure to strong inorganic acid mists and lung cancer (IARC, 2012)
- The International Agency for Research on Cancer (IARC) allocates the mists of strong inorganic acids in the
group 1 (known carcinogen to humans) based on evidence of sufficient carcinogenicity in humans (laryngeal cancer and positive association between exposure to inorganic strong acid mists and lung cancer) (IARC, 2012).

FERRIC CHLORIDE ANHYDROUS
The available information does not provide any indication of a possible carcinogenic effect.

REPRODUCTIVE TOXICITY

Does not meet the classification criteria for this hazard class

Adverse effects on sexual function and fertility

Hydrochloric acid...%
No human data are available to assess the reproductive effects of hydrogen chloride exposure. These effects do not seem plausible under occupational exposure conditions (INRS, 2010).
In rats (females) exposed to hydrochloric acid at 450 mg / m3 for 1 hour, both 12 days before mating and on the 9th day of gestation, effects were observed only at concentrations toxic to the mothers (INRS, 2010).
There are no reliable studies on reproductive and developmental toxicity in animals following oral, dermal or inhalation exposure to hydrochloric acid. Since protons and chloride ions are normal constituents in the body fluids of animal species, low concentrations of gases / mists or hydrochloric acid solutions do not appear to cause adverse effects in animals. In fact, the gastric gland cells secrete hydrochloric acid into the stomach cavity and even the oral administration of sulfuric acid which causes alteration of the pH, did not cause developmental toxicity in laboratory animals. These facts indicate that hydrochloric acid and hydrogen chloride are not expected to exhibit developmental toxicity. Furthermore, in a good quality 90-day inhaled study, concentrations up to 50 ppm of the substance produced no effect on the gonads (OECD, 2002).

FERRIC CHLORIDE ANHYDROUS
No reliable data on reproductive toxicity are available. The chemical structure does not cause particular suspicions of such an effect.

Adverse effects on development of the offspring

Hydrochloric acid...%
No human data are available to assess the reproductive effects of hydrogen chloride exposure. These effects do not seem plausible under occupational exposure conditions (INRS, 2010).
In rats (females) exposed to hydrochloric acid at 450 mg / m3 for 1 hour, both 12 days earlier
of mating that on the 9th day of gestation, effects were observed only at conc. toxic to mothers (INRS, 2010).
There are no reliable studies on reproductive and developmental toxicity in animals following oral, dermal or inhalation exposure to hydrochloric acid. Since protons and chloride ions are normal constituents in the body fluids of animal species, low conc. of gases / mists or hydrochloric acid solutions do not appear to cause adverse effects in animals. In fact, the gastric gland cells secrete hydrochloric acid into the stomach cavity and even the oral administration of sulfuric acid which causes alteration of the pH, did not cause developmental toxicity in laboratory animals. These facts indicate that hydrochloric acid and hydrogen chloride are not expected to exhibit developmental toxicity. Additionally, in a good quality 90-day inhaled study, conc. up to 50 ppm of the substance did not produce any effect on the gonads (OECD, 2002).

FERRIC CHLORIDE ANHYDROUS
Animal tests did not show fetal damage.

STOT - SINGLE EXPOSURE

Does not meet the classification criteria for this hazard class

Hydrochloric acid...%
Inhalation exposure causes immediate irritation of the respiratory system (INRS, 2010).
In the form of an aerosol, the lesions depend on the size of the aerosol particles. You may have runny nose, sneezing, nasal and pharyngeal burning sensation, cough, wheezing, chest pain. Important complications are laryngeal edema or bronchospasm (INRS, 2010).

STOT - REPEATED EXPOSURE

Does not meet the classification criteria for this hazard class

Hydrochloric acid...%
Repeated exposure to aerosols of aqueous solutions can cause irritative effects: dermatitis and conjunctivitis; ulcerations of the nasal and buccal mucosa, epistaxis and gingivorrhages; dental erosions, chronic bronchitis (INRS, 2010).
In animals, prolonged exposure confirms the irritating effects of hydrochloric acid or its aqueous solutions (INRS, 2010).

Target organs

FERRIC CHLORIDE ANHYDROUS
The substance can damage the liver following repeated ingestion of large quantities, as shown by experiments on animals.

ASPIRATION HAZARD

Does not meet the classification criteria for this hazard class

FERRIC CHLORIDE ANHYDROUS
No study necessary.

11.2. Information on other hazards

Based on the available data, the product does not contain substances listed in the main European lists of potential or suspected endocrine disruptors with human health effects under evaluation.

SECTION 12. Ecological information

Use this product according to good working practices. Avoid littering. Inform the competent authorities, should the product reach waterways or contaminate soil or vegetation.

12.1. Toxicity

Hydrochloric acid...%
Short-term effects
Fish (Cyprinus carpio) LC50-96 hours: 4.92 mg/l at pH 4.3 [OECD 203] (OECD SIDS, 2002).
Fish (Gambusia affinis) LC50-96 hours = 282 mg/l (pH 6.0-8.2) (HSDB, 2015).
Crustaceans (Daphnia magna) EC50-48 hours = 0.492 mg/l (pH 5.3) [OECD 202] (OECD SIDS, 2002).
Algae (Pseudokirchneriella subcapitata) EbC50-72 hours = 0.780 mg/l (pH 5.1); EbC50-72 hours = 0.492 mg/l (pH 5.3) [OECD 201] (OECD SIDS, 2002).
In air it can be phytotoxic.
Tomatoes, sugar beets and some fruit trees are sensitive to hydrogen chloride in the air (HSDB, 2015).
The aqueous solutions of hydrochloric acid have a corrosive action on plant tissues.
Long term effects
Algae (Pseudokirchneriella subcapitata) NOEC = 0,097 mg/l (pH 6,0) [OECD 201] (effect: growth rate and biomass) (OECD SIDS, 2002).
FERRIC CHLORIDE ANHYDROUS
Based on current knowledge, no negative ecological effects are to be expected. The correct introduction of low concentrations into a biological purification plant should not compromise the degradation activity of the activated sludge.
The product can cause pH variations.
Ichthyotoxicity: study scientifically not justified.
Aquatic invertebrates: study scientifically not justified.
Microorganisms/effects on activated sludge:
EC50 (5 min) 500 mg/l (activated sludge).
Chronic fish toxicity: study scientifically not justified.

FERRIC CHLORIDE ANHYDROUS	
LC50 - for Fish	22 mg/l/96h Pimephales promelas (Cavedano americano) - sostanza non idratata - ECOTOX

12.2. Persistence and degradability

Hydrochloric acid...%
It dissociates in water.
The substance is not photodegradable.

FERRIC CHLORIDE ANHYDROUS
Not applicable to inorganic substances.
Evaluation of stability in water: hydrolyses rapidly in contact with water. t 1/2 15-34 min (calculated, pH 7).

12.3. Bioaccumulative potential

Hydrochloric acid...%
The bioconcentration is not significant.
BCF data not available.

FERRIC CHLORIDE ANHYDROUS
Accumulation in organisms is modest.
Bioconcentration factor < 20 (28 d), Cyprinus carpio (OECD 305 method)
The product has not been tested. The indications are derived from substances/products of similar composition or structure.

12.4. Mobility in soil

Hydrochloric acid...%
It is mobile on the ground.

FERRIC CHLORIDE ANHYDROUS
The substance does not evaporate into the water surface atmosphere.

12.5. Results of PBT and vPvB assessment

On the basis of available data, the product does not contain any PBT or vPvB in percentage ≥ than 0,1%.

12.6. Endocrine disrupting properties

Based on the available data, the product does not contain substances listed in the main European lists of potential or suspected endocrine disruptors with environmental effects under evaluation.

12.7. Other adverse effects

No information available.

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Reuse, when possible. Product residues should be considered special hazardous waste. The hazard level of waste containing this product should be evaluated according to applicable regulations.
Disposal must be performed through an authorised waste management firm, in compliance with national and local regulations.
Waste transportation may be subject to ADR restrictions.
CONTAMINATED PACKAGING
Contaminated packaging must be recovered or disposed of in compliance with national waste management regulations.

SECTION 14. Transport information

14.1. UN number or ID number

ADR / RID, IMDG, IATA: 1760

14.2. UN proper shipping name

ADR / RID: CORROSIVE LIQUID, N.O.S. (hydrochloric acid)
IMDG: CORROSIVE LIQUID, N.O.S. (hydrochloric acid)
IATA: CORROSIVE LIQUID, N.O.S. (hydrochloric acid)

14.3. Transport hazard class(es)

ADR / RID: Class: 8 Label: 8
IMDG: Class: 8 Label: 8
IATA: Class: 8 Label: 8

14.4. Packing group

ADR / RID, IMDG, IATA: III

14.5. Environmental hazards

ADR / RID: NO
IMDG: NO
IATA: NO

14.6. Special precautions for user

ADR / RID:	HIN - Kemler: 80 Special provision: 274	Limited Quantities: 5 L	Tunnel restriction code: (E)
IMDG:	EMS: F-A, S-B	Limited Quantities: 5 L	
IATA:	Cargo: Passengers:	Maximum quantity: 60 L Maximum quantity: 5 L	Packaging instructions: 856 Packaging instructions: 852
	Special provision:	A3, A803	

14.7. Maritime transport in bulk according to IMO instruments

Information not relevant

SECTION 15. Regulatory information

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

Seveso Category - Directive 2012/18/EU: 16

Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006

Product

Point	3	

Contained substance

Point	75	
Point	27	NICKEL DICHLORIDE

Regulation (EU) 2019/1148 - on the marketing and use of explosives precursors

not applicable

Substances in Candidate List (Art. 59 REACH)

On the basis of available data, the product does not contain any SVHC in percentage ≥ than 0,1%.

Substances subject to authorisation (Annex XIV REACH)

None

Substances subject to exportation reporting pursuant to Regulation (EU) 649/2012:

None

Substances subject to the Rotterdam Convention:

None

Substances subject to the Stockholm Convention:

None

Healthcare controls

Workers exposed to this chemical agent must not undergo health checks, provided that available risk-assessment data prove that the risks related to the workers' health and safety are modest and that the 98/24/EC directive is respected.

15.2. Chemical safety assessment

A chemical safety assessment has been performed for the following contained substances: Hydrochloric acid...%

SECTION 16. Other information

Text of hazard (H) indications mentioned in section 2-3 of the sheet:

Met. Corr. 1	Substance or mixture corrosive to metals, category 1
Acute Tox. 4	Acute toxicity, category 4
Skin Corr. 1B	Skin corrosion, category 1B
Eye Dam. 1	Serious eye damage, category 1
Skin Irrit. 2	Skin irritation, category 2
STOT SE 3	Specific target organ toxicity - single exposure, category 3
H290	May be corrosive to metals.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H315	Causes skin irritation.
H335	May cause respiratory irritation.

LEGEND:
- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- ATE: Acute Toxicity Estimate
- CAS: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE: Identifier in ESIS (European archive of existing substances)
- CLP: Regulation (EC) 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization
- INDEX: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent bioaccumulative and toxic as REACH Regulation
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PNEC: Predicted no effect concentration
- REACH: Regulation (EC) 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value
- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA: Time-weighted average exposure limit
- TWA STEL: Short-term exposure limit
- VOC: Volatile organic Compounds
- vPvB: Very Persistent and very Bioaccumulative as for REACH Regulation
- WGK: Water hazard classes (German).

GENERAL BIBLIOGRAPHY
1. Regulation (EC) 1907/2006 (REACH) of the European Parliament
2. Regulation (EC) 1272/2008 (CLP) of the European Parliament
3. Regulation (EU) 2020/878 (II Annex of REACH Regulation)
4. Regulation (EC) 790/2009 (I Atp. CLP) of the European Parliament
5. Regulation (EU) 286/2011 (II Atp. CLP) of the European Parliament
6. Regulation (EU) 618/2012 (III Atp. CLP) of the European Parliament
7. Regulation (EU) 487/2013 (IV Atp. CLP) of the European Parliament
8. Regulation (EU) 944/2013 (V Atp. CLP) of the European Parliament
9. Regulation (EU) 605/2014 (VI Atp. CLP) of the European Parliament
10. Regulation (EU) 2015/1221 (VII Atp. CLP) of the European Parliament
11. Regulation (EU) 2016/918 (VIII Atp. CLP) of the European Parliament
12. Regulation (EU) 2016/1179 (IX Atp. CLP)
13. Regulation (EU) 2017/776 (X Atp. CLP)
14. Regulation (EU) 2018/669 (XI Atp. CLP)
15. Regulation (EU) 2019/521 (XII Atp. CLP)
16. Delegated Regulation (UE) 2018/1480 (XIII Atp. CLP)
17. Regulation (EU) 2019/1148
18. Delegated Regulation (UE) 2020/217 (XIV Atp. CLP)
19. Delegated Regulation (UE) 2020/1182 (XV Atp. CLP)
20. Delegated Regulation (UE) 2021/643 (XVI Atp. CLP)

21. Delegated Regulation (UE) 2021/849 (XVII Atp. CLP)
22. Delegated Regulation (UE) 2022/692 (XVIII Atp. CLP)
23. Delegated Regulation (UE) 2023/707
- The Merck Index. - 10th Edition
- Handling Chemical Safety
- INRS - Fiche Toxicologique (toxicological sheet)
- Patty - Industrial Hygiene and Toxicology
- N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
- IFA GESTIS website
- ECHA website
- Database of SDS models for chemicals - Ministry of Health and ISS (Istituto Superiore di Sanità) - Italy

Note for users:
The information contained in the present sheet are based on our own knowledge on the date of the last version. Users must verify the suitability and thoroughness of provided information according to each specific use of the product.
This document must not be regarded as a guarantee on any specific product property.
The use of this product is not subject to our direct control; therefore, users must, under their own responsibility, comply with the current health and safety laws and regulations. The producer is relieved from any liability arising from improper uses.
Provide appointed staff with adequate training on how to use chemical products.
CALCULATION METHODS FOR CLASSIFICATION
Chemical and physical hazards: Product classification derives from criteria established by the CLP Regulation, Annex I, Part 2. The data for evaluation of chemical-physical properties are reported in section 9.
Health hazards: Product classification is based on calculation methods as per Annex I of CLP, Part 3, unless determined otherwise in Section 11.
Environmental hazards: Product classification is based on calculation methods as per Annex I of CLP, Part 4, unless determined otherwise in Section 12.
Safety Data Sheet n.8 of 21/11/23. Complete revision of version n.7 of 26/01/23.