

RX475 - Standard REDOX + 475mV

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: RX475
Product name: Standard REDOX + 475mV

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

Intended use: Standard solution for process verification and control. Applies to codes 32383153, 51100313, 51100323, EE51100313, EE51100323

Identified Uses	Industrial	Professional	Consumer
Standard solution for the verification and quality control of redox potential measurement systems.	✓	✓	-

1.3. Details of the supplier of the safety data sheet

Name: GIORGIO BORMAC srl
Full address: via della meccanica, 25
District and Country: 41012 Carpi Italia (MO)

Tel. +39 059 653274
Fax +39 059 653282

e-mail address of the competent person responsible for the Safety Data Sheet: sds@giorgiobormac.com

Supplier: GIORGIO BORMAC srl

1.4. Emergency telephone number

For urgent inquiries refer to: +44 121 507 4123

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

<div> <div>GIORGIO BORMAC srl</div> <div>RX475 - Standard REDOX + 475mV</div> </div>		<div> Revision nr.12 Dated 21/11/2024 Printed on 21/11/2024 Page n. 2 / 15 Replaced revision:11 (Dated 27/12/2023) </div> <div>EN</div>
SECTION 2. Hazards identification ... / >>		
<div> <div>Hazard statements:</div> <div> <div>H290</div> <div>H314</div> </div> <div> <div>May be corrosive to metals.</div> <div>Causes severe skin burns and eye damage.</div> </div> </div>		
<div> <div>Precautionary statements:</div> <div> <div>P305+P351+P338</div> <div>P303+P361+P353</div> <div>P260</div> <div>P280</div> <div>P310</div> <div>P264</div> </div> <div> <div>IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</div> <div>IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].</div> <div>Do not breathe dust / fume / gas / mist / vapours / spray.</div> <div>Wear protective gloves/ protective clothing / eye protection / face protection.</div> <div>Immediately call a POISON CENTER / doctor / . . .</div> <div>Wash . . . thoroughly after handling.</div> </div> </div>		
<div> <div>Contains:</div> <div>HYDROCHLORIC ACID</div> </div>		
2.3. Other hazards		
<div>On the basis of available data, the product does not contain any PBT or vPvB in percentage $\geq$ than 0,1%.</div> <div>The product does not contain substances with endocrine disrupting properties in concentration $\geq$ 0.1%.</div>		
SECTION 3. Composition/information on ingredients		
3.2. Mixtures		
Contains:		
Identification	x = Conc. %	Classification (EC) 1272/2008 (CLP)
<div> <div>Iron chloride ICO Anhydro</div> <div>INDEX</div> <div>EC</div> <div>CAS</div> <div>REACH Reg.</div> <div>HYDROCHLORIC ACID</div> <div>INDEX</div> <div>EC</div> <div>CAS</div> <div>REACH Reg.</div> <div>Nickel dicloruro</div> <div>INDEX</div> <div>EC</div> <div>CAS</div> </div>		
<div> <div>231-729-4</div> <div>7705-08-0</div> <div>01-2119497998-05-xxxx</div> <div>017-002-01-X</div> <div>231-595-7</div> <div>7647-01-0</div> <div>01-2119484862-27-xxxx</div> <div>028-011-00-6</div> <div>231-743-0</div> <div>7718-54-9</div> </div>		
<div> <div>2 $\leq$ x < 4</div> <div>0,1 $\leq$ x < 1</div> <div>0 < x < 0,001</div> </div>		
<div> <div>Acute Tox. 4 H302, Eye Dam. 1 H318, Skin Irrit. 2 H315</div> <div>ATE Oral: 500 mg/kg</div> <div>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</div> <div>Met. Corr. 1 H290: $\geq$ 0,1%, Skin Corr. 1B H314: $\geq$ 25%, Skin Irrit. 2 H315: $\geq$ 10%, Eye Dam. 1 H318: $\geq$ 25%, Eye Irrit. 2 H319: $\geq$ 10%, STOT SE 3 H335: $\geq$ 10%</div> <div>Carc. 1A H350i, Muta. 2 H341, Repr. 1B H360D, Acute Tox. 3 H301, Acute Tox. 3 H331, STOT RE 1 H372, Skin Irrit. 2 H315, Resp. Sens. 1 H334, Skin Sens. 1 H317, Aquatic Acute 1 H400 M=1, Aquatic Chronic 1 H410 M=1</div> <div>SKIN Irrit. 2 H315: $\geq$ 20%, Skin Sens. 1 H317: $\geq$ 0,01%, STOT RE 1 H372: $\geq$ 1%, STOT RE 2 H373: $\geq$ 0,1% - < 1%</div> <div>ATE Oral: 100 mg/kg, ATE Inhalation mists/powders: 0,501 mg/l</div> </div>		
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		
<div> <div>In case of doubt or in the presence of symptoms contact a doctor and show him this document.</div> <div>In case of more severe symptoms, ask for immediate medical aid.</div> <div>EYES: Remove, if present, contact lenses if the situation allows you to do so easily. Wash immediately with plenty of water for at least 15 minutes, opening the eyelids fully. Get medical advice/attention.</div> <div>SKIN: Take off immediately all contaminated clothing. Wash immediately and thoroughly with running water (and soap if possible). Get medical advice/attention. Avoid further contact with contaminated clothing.</div> <div>INGESTION: Do not induce vomiting unless explicitly authorised by a doctor. Rinse your mouth with running water. Do not give anything by mouth to an unconscious person. Get medical advice/attention.</div> <div>INHALATION: Remove victim to fresh air, away from the accident scene. In the event of respiratory symptoms (coughing, wheezing,</div> </div>		
<div> <div>EPY 11.7.2 - SDS 1004.14</div> </div>		

RX475 - Standard REDOX + 475mV**SECTION 4. First aid measures ... / >>**

breathing difficulty, asthma) keep the victim in a comfortable position for breathing. If necessary administer oxygen. If the subject stops breathing, administer artificial respiration. Get medical advice/attention.

Rescuer protection

It is good practice for rescuers lending support to a person who has been exposed to a chemical substance or to a mixture to wear personal protective equipment. The nature of such protection depends on the hazard level of the substance or mixture, on the type of exposure and on the extent of the contamination. In the absence of other more specific indications, use of disposable gloves in the event of possible contact with body fluids is recommended. For the type of PPE suitable for the characteristics of the substance or mixture, see section 8.

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

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

DELAYED EFFECTS: Based on the information currently available, there are no known cases of delayed effects following exposure to this product.

HYDROCHLORIC ACID

Acute effects-dependent effects.

Cute: irritation, burns, ulcer

Eyes: irritation, corneal damage

Nose: irritation

First airways: irritation

Lungs: irritation

Digerent apparatus: if ingested retrostern and epigastric pain, hematemesis

Chronic effects.

Cute: irritation, depigmentation, dry skin, epilation

Eyes: irritation

Nose: irritation

First airways: irritation

Lungs: irritation

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

Immediately call a POISON CENTER / doctor / . . .

Consult a doctor immediately in case of contact with the product.

Means to have available in the workplace for specific and immediate treatment

Running water for skin and eye wash.

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.

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).

RX475 - Standard REDOX + 475mV**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**

Avoid contact with eyes and skin. Do not inhale any dust or vapors or mists. Do not eat, nor drink, nor smoking during use. Wash your hands after use. Avoid the dispersion of the product in the environment.

7.2. Conditions for safe storage, including any incompatibilities

Keep only in the original container. Keep in a ventilated place, far from trigger sources. Keep the containers hermetically closed. Keep the product in clearly labeled containers. Avoid overheating. Avoid violent impacts. Store the containers away from any incompatible materials, checking section 10.

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 2023
ITA	Italia	Decreto Legislativo 9 Aprile 2008, n.81
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 2023

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SECTION 8. Exposure controls/personal protection ... / >>

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

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

Iron chloride ICO Anhydro

Threshold Limit Value

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

Health - Derived no-effect level - DNEL / DMEL

Route of exposure	Effects on consumers		Chronic	Chronic	Effects on workers			
	Acute	Acute			Acute local	Acute	Chronic	Chronic
	local	systemic	local	systemic		systemic	local	systemic
Oral		20		0,28				
		mg/kg/d		mg/kg/d				
Skin				1,4				2,8
				mg/kg/d				mg/kg/d

Nickel dicloruro

Threshold Limit Value

Type	Country	TWA/8h		STEL/15min		Remarks / Observations		
		mg/m3	ppm	mg/m3	ppm			
VLA	ESP	0,1				Como Ni		
VLEP	ITA	0,1				INHAL (Ni)		
WEL	GBR	0,1				SKIN as Ni		
OEL	EU	0,1				INHAL 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

The following sampling methods for the substances mentioned in the previous tables are suggested.

http://amcaw.ifa.dguv.de/substance/methoden/093-Hydrogen_chloride_2016.pdf.

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

RX475 - Standard REDOX + 475mV**SECTION 8. Exposure controls/personal protection ... / >>**

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	clear liquid	
Colour	yellow	
Odour	not available	
Melting point / freezing point	not available	
Initial boiling point	0 °C	
Flammability	not available	
Lower explosive limit	not available	
Upper explosive limit	not available	
Flash point	not available	
Auto-ignition temperature	not available	
Decomposition temperature	not available	
pH	0-0,5	
Kinematic viscosity	not available	
Solubility	soluble 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

Danger of explosion Not applicable

SECTION 10. Stability and reactivity

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

10.1. Reactivity

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

HYDROCHLORIC ACID

The water solution is a strong acid (IPCS, 2000).

By decomposition it develops hydrogen.

Iron chloride ICO Anhydro

Corrodes: metals. On contact with: moisture, water.

10.2. Chemical stability

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

RX475 - Standard REDOX + 475mV**SECTION 10. Stability and reactivity ... / >>****HYDROCHLORIC ACID**

The aqueous solutions are stable

10.3. Possibility of hazardous reactions

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

HYDROCHLORIC ACID

It reacts violently with bases and oxidants, developing toxic gaseous chlorine (IPCS, 2000). Attack many metals in the presence of water. This produces flammable/explosive gaseous hydrogen (IPCS, 2000).

Iron chloride ICO Anhydro

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 temperature

Iron chloride ICO Anhydro

Avoid exposure to: moisture.

10.5. Incompatible materials**HYDROCHLORIC ACID**

Strong oxidant agents, bases, fluorine, amines, reducing agents, metals.

Iron chloride ICO Anhydro

.water,strong bases.

10.6. Hazardous decomposition products**HYDROCHLORIC ACID**

Hydrochloric acid, chlorine dioxide.

For thermal decomposition or in the event of a fire you can free gases and vapors potentially harmful to health (gaseous hydrochloric acid)

Iron chloride ICO Anhydro

.hydrochloric acid,metal compounds,acid gases,chloride.

SECTION 11. Toxicological information

In the absence of experimental toxicological data on the product itself, any health hazards of the product were assessed based on the properties of the substances contained, according to the criteria established by the reference legislation for classification.

Therefore, consider the concentration of the individual dangerous substances possibly mentioned in section. 3, to evaluate the toxicological effects resulting from exposure to the product.

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008Metabolism, toxicokinetics, mechanism of action and other information**HYDROCHLORIC ACID**

Following inhalation or ingestion it is quickly separated in H⁺ and Cl⁻ which after entering the circle is eliminated with 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 the water ion hydronio, this becomes a donor of a proton that has catalytic properties and is therefore capable of reacting with organic molecules. This explains the ability of hydrogen chloride to induce cellular lesions and necrosis.

Information on likely routes of exposure**HYDROCHLORIC ACID**

In the professional field, the main exposure routes are the inhalation and the skin.

The general population can be exposed to inhalation, ingestion, skin and eye contact.

Exposure to aerosols locally involves chemical burns whose gravity is according to the concentration of the solution, the importance of contamination and the duration of contact.

At the skin level, warm and painful erythema can be observed, fops or necrosis. Evolution can be complicated with overinfections, aesthetic or functional sequences.

At the eye level there is immediate pain, tearing, conjunctival hyperemia and often blepharospasm. Sequel can be: conjunctival adhesions, corneal opacity, cataracts, glaucoma and even blindness.

The exposure by inhalation to its vapors or aerosols immediately causes irritation of the respiratory system.

In the form of aerosol, the lesions depend on the sizes of the Airosol particles. You can have ricorrhea, sneezing, sensation of nasal and pharyngeal burning, cough, dyspnea, chest pain. Important complications are laryngeal or bronchospasm edema.

The ingestion of concentrated solutions determines buccal, retrostern and epigastric pain associated with hypersciarlorrhea and frequently bloody vomiting. There is metabolic acidosis and an increase in tissue enzymes due to necrosis, hyperleucocytosis, emolis

RX475 - Standard REDOX + 475mV**SECTION 11. Toxicological information ... / >>**

and hypercloremia.

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

A quick evaporation of the liquid can cause freezing (IPCS, 2000).

The inhalation of high gas concentrations can cause pneumonia and pulmonary edema with consequent reactive airway syndrome (Rads) (bronchial hyperreactivity). The effects can be delayed (IPCS, 2000).

Exposure to aerosols of solutions leads locally chemical burns whose gravity is according to the concentration of the solution, the importance of contamination and the duration of contact.

At the skin level, warm and painful erythema can be observed, flops or necrosis. Evolution can be complicated with overinfections, aesthetic or functional sequences.

At the eye level there is immediate pain, tearing, conjunctival hyperemia and often blepharospasm. Sequel can be: conjunctival adhesions, corneal opacity, cataracts, glaucoma and even blindness.

The exposure by inhalation to its vapors or aerosols immediately causes irritation of the respiratory system.

In the form of aerosol, the lesions depend on the sizes of the Aerosol particles. You can have ricorrhea, sneezing, sensation of nasal and pharyngeal burning, cough, dyspnea, chest pain. Important complications are laryngeal or bronchospasm edema.

Upon cessation of exposure, the symptoms almost always regress, but in some cases you can have delayed pulmonary edema within 48 hours.

Secondary infections are a frequent complication.

At the expense of the respiratory system, in the event of extensive injuries, bronchial hypersecretion and the desquamation of the bronchial mucosa determine truncular obstruction and atheighting. Sequence for the respiratory system are: asthma (books of books), bronchial stenosis, bronchiectasias and pulmonary fibrosis.

The ingestion of concentrated solutions determines buccal, retrostern and epigastric pain associated with hypersciaralorrhea and frequently bloody vomiting. There is metabolic acidosis and an increase in tissue enzymes due to necrosis, hyperleucocytosis, emolis and hypercloremia.

The short-term complications are: esophageal or gastric perforation or digestive bleeding, fistulas, breathing difficulties for laryngeal edema, esophagus-tracheal fistula, shock, disseminated intravascular coagulation.

Long -term complications are: digestive stenosis, in particular esopharyngeal.

The exposure repeated to its vapors or aerosols of aqueous solutions can cause irritative effects: dermatitis and conjunctivitis; ulcerations of the nasal mucosa, buccal, epistaxis and gingivorragias; 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)

Iron chloride ICO Anhydro

LD50 (Dermal): > 2000 mg/kg Rat

LD50 (Oral): > 300 mg/kg Rat

ATE (Oral): 500 mg/kg estimate from table 3.1.2 of Annex I of the CLP
(figure used for calculation of the acute toxicity estimate of the mixture)

Nickel dicloruro

LD50 (Oral): 500 mg/kg Rat

HYDROCHLORIC ACID

RATTO DL50 (oral): 700 mg/kg (inrs, 2010)

Rabbit DL50 (skin):> 5010 mg/kg (on, 2010)

Ratto CL50-30 minutes (inhalation): 5.7 - 8.3 mg/l (aerosol) (in, 2010).

Iron chloride ICO Anhydro

Harmful to ingestion.

Inhalation: Study not necessary.

Dermaal: no mortality has been observed. The product has not been tested. The indications are derived from substances/composition or similar structure products.

SKIN CORROSION / IRRITATION

Corrosive for the skin

Classification based on the experimental value of the pH

RX475 - Standard REDOX + 475mV**SECTION 11. Toxicological information ... / >>****HYDROCHLORIC ACID**

Exposure to aerosols locally involves chemical burns whose gravity is according to the concentration of the solution, the importance of contamination and the duration of contact (in, 2010).

At the skin level, warm and painful erythema can be observed, flocs or necrosis. Evolution can be complicated with superinfections, aesthetic or functional sequences (inrs, 2010).

In animals concentrations between 3.3% and 17% are irritating for the skin; higher concentrations become corrosive (inrs, 2010).

Iron chloride ICO Anhydro

Irritating for the skin.

Irritating for rabbit skin (manufacturer's test). The data refer to an diluted aqueous solution of the substance.

SERIOUS EYE DAMAGE / IRRITATION

Causes serious eye damage

HYDROCHLORIC ACID

Exposure to aerosols locally involves chemical burns whose gravity is according to the concentration of the solution, the importance of contamination and the duration of contact (in 2010).

At the eye level there is immediate pain, tearing, conjunctival hyperemia and often blepharospasm. The sequels can be: conjunctival adhesions, corneal opacity, cataracts, glaucoma and even blindness (on, 2010).

In animals, concentrations above 3.3% cause serious eye irritation; Symptoms can include redness, swelling, pain and tears.

A prolonged exposure or at higher concentrations induces opacity of the cornea, ulceration and decrease in view with the risk of permanent alteration. The severity of irritation is linked to the duration of the treatment (tears have buffer effect and dilute). In the rabbit, 0.1 ml of an aqueous solution at 10% causes permanent alteration of the vision; The non -irritating concentration is 0.33% (inrs, 2010).

Iron chloride ICO Anhydro

Risk of serious eye damage.

Irreversible damage were found on the eyes of the rabbit (manufacturer's test). The data refer to an diluted 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 maximization test in the guinea pig (induction and unleashing: solution to 1 %) and in the test of the swelling of the ear in the mouse (induction at 1 %, 5 %unleashing) (inrs, 2010).

GERM CELL MUTAGENICITY

Does not meet the classification criteria for this hazard class

HYDROCHLORIC ACID

In single studies, hydrochloric acid has induced chromium-somic mutual changes and aberrations in mammal cells.

He also induced chromosomal aberrations in insects and plants. He did not induce bacteria mutations (Iarc, 1992).

Iron chloride ICO Anhydro

The substance did not prove to be mutagen on bacteria and for a culture of mammal cells. He did not show mutagenic effects in mammal experiments.

CARCINOGENICITY

Does not meet the classification criteria for this hazard class

HYDROCHLORIC ACID

In a study on deduction workers of the steel, an excess risk of pulmonary cancer in workers exposed mainly to hydrochloric acid was observed. In the same cohort, a increased risk of lady cancer was observed, however, no analysis was conducted on workers exposed to hydrochloric acid. Three studies control in industrial plants do not indicate any association between exposure to hydrochloric acid and cancer against lungs, brain or kidneys. A Canadian control case 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 for inhalation for the entire life of life at a dose level, hydrogen chloride has not been observed related 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 carcinogen for humans) on the basis of evidence of inadequate carcinogenicity both in man and animals (Iarc, 1992).

In addition, in a recent evaluation, the data showed association between exposure to mists of strong inorganic acids and laryngeal cancer in the man while they were limited to affirm a causal association with bronchial cancer. The man was also observed in the positive association between exposure to mists of strong inorganic acids and lung cancer (Iarc, 2012)

RX475 - Standard REDOX + 475mV**SECTION 11. Toxicological information ... / >>**

- The International Agency for Research on Cancer (IARC) allocates the mists of strong inorganic acids in group 1 (carcinogen ascertained for humans) on the basis of evidence of sufficient carcinogenicity in humans (cancer against the larynx and positive association between exposure to mists of strong inorganic acids and lung cancer) (Iarc, 2012).

Iron chloride ICO Anhydro

The information available 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**

There are no data on humans that allow to evaluate the effects for reproduction of hydrogen chloride exposure. These effects do not seem plausible in professional exposure conditions (in, 2010).

In rats (females) exposed to hydrochloric acid at 450 mg/m³ for 1 hour, both 12 days before the mating and on the 9th day of gestation, effects were observed only at toxic concentrations for mothers (in the, 2010).

Reliable studies on toxicity for reproduction and development in animals are not available after oral, skin or inhalation exposure to hydrochloric acid. Since protons and chloride ions are normal constituents in the body fluids of animal species, low concentrations of gas/mists or of hydrochloric acid solutions do not seem to cause adverse effects in animals. In fact, the cells of gastric glands secrete hydrochloric acid in the cavity of the stomach and also the oral administration of sulfuric acid which determines alteration of the pH, have not caused toxicity on the development in laboratory animals. These facts indicate that the hydrogen chloride and hydrogen chloride present toxicity for development is not expected. Furthermore, in a 90 -day inhalation study of good quality, concentrations up to 50 ppm of the substance did not produce any effect on the Gonadi (Oecd, 2002).

Iron chloride ICO Anhydro

Attense data on reproductive toxicity are not available. The chemical structure does not determine particular suspicions of such an effect.

Adverse effects on development of the offspring**HYDROCHLORIC ACID**

There are no data on humans that allow to evaluate the effects for reproduction of hydrogen chloride exposure. These effects do not seem plausible in professional exposure conditions (in, 2010).

In rats (females) exposed to hydrochloric acid at 450 mg/m³ for 1 hour, both 12 days before the mating and on the 9th day of gestation, effects were observed only at conc. Toxic for mothers (inrs, 2010).

Reliable studies on toxicity for reproduction and development in animals are not available after oral, skin or inhalation exposure to hydrochloric acid. Since protons and chloride ions are normal constituents in the body fluids of animal species, low conc. of gas/mists or hydrochloric acid solutions do not seem to cause adverse effects in animals. In fact, the cells of gastric glands secrete hydrochloric acid in the cavity of the stomach and also the oral administration of sulfuric acid which determines alteration of the pH, have not caused toxicity on the development in laboratory animals.

These facts indicate that the hydrogen chloride and hydrogen chloride present toxicity for development is not expected. Furthermore, in a 90 -day inhalation study of good quality, conc. Up to 50 ppm of the substance did not produce any effect on the Gonadi (Oecd, 2002).

Iron chloride ICO Anhydro

Animal tests have not highlighted fetal damage.

STOT - SINGLE EXPOSURE

Does not meet the classification criteria for this hazard class

HYDROCHLORIC ACID

The exposure by inhalation immediately causes irritation of the respiratory system (inrs, 2010).

In the form of aerosol, the lesions depend on the sizes of the Airosol particles. You can have ricorrhea, sneezing, sensation of nasal and pharyngeal burning, cough, dyspnea, chest pain. Important complications are laryngeal or bronchospasm edema (inrs, 2010).

STOT - REPEATED EXPOSURE

Does not meet the classification criteria for this hazard class

HYDROCHLORIC ACID

The exposure by inhalation immediately causes irritation of the respiratory system (inrs, 2010).

In the form of aerosol, the lesions depend on the sizes of the Airosol particles. You can have ricorrhea, sneezing, sensation of nasal and pharyngeal burning, cough, dyspnea, chest pain. Important complications are laryngeal or bronchospasm edema (inrs, 2010).

Target organs

RX475 - Standard REDOX + 475mV**SECTION 11. Toxicological information ... / >>**

Iron chloride ICO Anhydro

The substance can damage the liver following the repeated ingestion of large quantities, as evidenced by animal experiments.

ASPIRATION HAZARD

Does not meet the classification criteria for this hazard class

Iron chloride ICO Anhydro

Study not 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.

Use according to good working practices, avoiding dispersing the product in the environment. Notify the competent authorities if the product has reached waterways or if it has contaminated the soil or vegetation.

12.1. Toxicity

HYDROCHLORIC ACID

Short -term effects

Fish (Cyprinus Carpio) CL50-96 hours: 4.92 mg/l a pH 4.3 [OECD 203] (Oecd Sids, 2002).

Fish (Gambusia Affinis) CL50-96 hours = 282 mg/l (pH 6.0-8,2) (HSDB, 2015).

Crustaceans (Daphnia Magna) Ce50-48 hours = 0.492 mg/l (Ph 5,3) [Oecd 202] (Oecd Sids, 2002).

Alga (pseudokirkincheriella subcapitata) cbe50-72 hours = 0.780 mg/l (pH 5.1); Cbe50-72 hours = 0.492 mg/l (Ph 5,3) [Oecd 201] (Oecd Sids, 2002).

In the 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 (pseudokirkincheriella subcapitata) Noec = 0.097 mg/l (Ph 6.0) [Oecd 201] (effect: growth rate and biomass) (Oecd Sids, 2002).

Iron chloride ICO Anhydro

LC50 - for Fish

22 mg/l/96h Pimephales promelas (Cavedano americano) - sostanza non idratata - ECOTOX

12.2. Persistence and degradability

HYDROCHLORIC ACID

In the water it dissociates.

The substance is not photo -degradable.

Iron chloride ICO Anhydro

Not applicable to inorganic substances.

Evaluation of stability in water: in contact with water it is quickly hydrolyses. t 1/2 15-34 min (calculated, pH 7).

12.3. Bioaccumulative potential

HYDROCHLORIC ACID

Bioconcentration is not significant.

BCF given not available.

Iron chloride ICO Anhydro

The 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/composition or similar structure products.

12.4. Mobility in soil

RX475 - Standard REDOX + 475mV**SECTION 12. Ecological information ... / >>**

HYDROCHLORIC ACID
It is mobile on the ground

Iron chloride ICO Anhydro
The substance does not evaporate in the atmosphere of the surface of the water.

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 $\geq$ 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

Information not 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: UN 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: not marine pollutant
IATA: NO

RX475 - Standard REDOX + 475mV**SECTION 14. Transport information ... / >>****14.6. Special precautions for user**

ADR / RID:	HIN - Kemler: 80	Limited Quantities: 5 L	Tunnel restriction code: (E)
IMDG:	Special provision: 274		
IATA:	EMS: F-A, S-B	Limited Quantities: 5 L	
	Cargo:	Maximum quantity: 60 L	Packaging instructions: 856
	Passengers:	Maximum quantity: 5 L	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: 16Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006Product

Point 3

Contained substance

Point 75

Point 27 Nickel dicloruro

Regulation (EU) 2019/1148 - on the marketing and use of explosives precursors
not applicableSubstances in Candidate List (Art. 59 REACH)On the basis of available data, the product does not contain any SVHC in percentage $\geq$ 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 assessmentA 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
Carc. 1A	Carcinogenicity, category 1A
Muta. 2	Germ cell mutagenicity, category 2
Repr. 1B	Reproductive toxicity, category 1B
Acute Tox. 3	Acute toxicity, category 3
Acute Tox. 4	Acute toxicity, category 4
STOT RE 1	Specific target organ toxicity - repeated exposure, category 1
STOT RE 2	Specific target organ toxicity - repeated exposure, category 2
Skin Corr. 1B	Skin corrosion, category 1B
Skin Corr. 1C	Skin corrosion, category 1C
Skin Corr. 1	Skin corrosion, category 1
Eye Dam. 1	Serious eye damage, category 1

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SECTION 16. Other information ... / >>

Eye Irrit. 2	Eye irritation, category 2
Skin Irrit. 2	Skin irritation, category 2
STOT SE 3	Specific target organ toxicity - single exposure, category 3
Resp. Sens. 1	Respiratory sensitization, category 1
Skin Sens. 1	Skin sensitization, category 1
Aquatic Acute 1	Hazardous to the aquatic environment, acute toxicity, category 1
Aquatic Chronic 1	Hazardous to the aquatic environment, chronic toxicity, category 1
H290	May be corrosive to metals.
H350i	May cause cancer by inhalation.
H341	Suspected of causing genetic defects.
H360D	May damage the unborn child.
H301	Toxic if swallowed.
H331	Toxic if inhaled.
H302	Harmful if swallowed.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H315	Causes skin irritation.
H335	May cause respiratory irritation.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

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
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PMT: Persistent, mobile and toxic
- 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
- vPvM: Very persistent and very mobile
- 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

RX475 - Standard REDOX + 475mV**SECTION 16. Other information ... / >>**

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
24. Delegated Regulation (UE) 2023/1434 (XIX Atp. CLP)
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- 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.

Changes to previous review:

The following sections were modified:

03 / 04 / 11 / 12 / 14 / 16.