SAFETY DATA SHEET

FERROUS CHLORIDE SOLUTION

SDS 009/R4
2021-10-01

Reg. No. 2003/017152/07

Safety Data Sheet (SDS) According to ISO/SANS 11014:2009/2010, UN Transport of Dangerous Goods, UN Globally Harmonized System of Classification & Labelling and EC Directive 1272/2008

SECTION 1. Identification – Chemical Product and Company

Trade Name	:	Ferrous Chloride
Proper Shipping Name	:	CORROSIVE LIQUID, N.O.S.
UN Number	:	1760
CAS Number	:	7758-94-3
GHS product identifier	:	Iron Dichloride
Chemical Family	:	Inorganic mono constituent substance
EC Number	:	231-843-4
IUPAC Name	:	Iron (II) chloride
Other means of identification	:	Clear greenish Liquid
Recommended use of the chemical	:	Coagulation of raw and effluent waters, precipitation of phosphate in sewage treatment, precipitation of heavy metals and chrome (VI) reduction.
Restrictions on use	:	Not for retail or domestic use, nor use by untrained persons
Supplier's details	:	NCP Chlorchem (Pty) Ltd
Address	:	Cnr. Allandale Road and Chloor Road Chloorkop, Gauteng South Africa:
Telephone No.	:	+27 (0) 11 921 3111
24hour Emergency phone number	:	+27 (0) 11 976 2115

SECTION 2. Hazards Identification

GHS classification of the substance: corrosive liquid, irritating to skin and eyes, and harmful to aquatic life

Hazard classes/Hazard categories **Transport - Class 8** Corrosive substance		**GHS Hazard Statement**
Acute Toxicity Oral:	Category 4	H302: Harmful if swallowed
Skin Irritation:	Category 2	H315 Causes skin irritation
Skin Sensitizer:	Category 1	H317: May cause an allergic skin reaction
Serious eye damage:	Category 1	H318: Causes serious eye damage
Corrosive to metals:	Category 1	H290: May be corrosive to metals
Aquatic Hazard, Chronic:	Category 3	H412:Harmful to aquatic life with long lasting effects

GHS classification of the substance: Corrosive liquid, acidic, inorganic, n.o.s.
The most important adverse effects to know in emergency are – harmful if swallowed, causes serious eye damage, skin irritation and may cause an allergic skin reaction + corrosive to metals and harmful to the aquatic environment.

GHS label elements:
Signal word: Danger

GHS05 Corrosive to metals & serious eye damage
GHS 07 Exclamation Mark -

- Skin Irritation and sensitizer
- Oral Acute toxicity 4

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Hazard Statements - this substance is harmful if swallowed, causes serious eye damage, may be corrosive to metals, causes skin irritation, may cause an allergic skin reaction and sensitization, and harmful to aquatic life.

Precautionary statements:
P280: Wear protective gloves/clothing/eye protection/face protection.
P261: Avoid breathing mist/spray.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P272: Contaminated work clothing should not be allowed out of the workplace.
P301+P330+P312: IF SWALLOWED, rinse mouth, do not induce vomiting, call a doctor/get medical help
P302+P352: IF ON SKIN: Wash with plenty of water
P305+P354+P338: IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P317: Get medical help
P332+P317: If skin irritation occurs, get medical help
P362+P364: Take off contaminated clothing and wash it before reuse.

Response:
Refer Sections 5, 6 and 8
Storage:
Refer Section 7

Special Labelling requirements – refer Section 14 for transport labels

SECTION 3. Composition/information on ingredients

Chemical identity	:	Inorganic Substance
Other means of identity	:	Clear greenish liquid
Common name, synonyms, etc.	:	Iron Dichloride
IUPAC names	:	Iron (II) chloride
Impurities and stabilizing additives	:	Hydrochloric Acid < 1% residual from manufacturing process, prevents formation of insoluble metal hydroxides

Ingredient name	UN Number	CAS number	%	Classification EC1272/2008
Ferrous Chloride	1760	7758-94-3	20 – 30	231-843-4
Hydrochloric acid	1789	7647-01-0	<1%	231-595-7
Water		7732-18-5	Max 80	231-791-2

SECTION 4. First-aid measures

Product in eye
Flush eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling for medical assistance, check the victim for contact lenses and remove if present and safe to do so. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician, and get medical assistance and, or advice, even if no symptoms (such as redness or irritation) develop.

Product on skin
IMMEDIATELY flush the affected skin with water while removing all contaminated clothing. Gently wash all affected skin areas thoroughly. Get medical assistance / advice after washing the affected areas even if no symptoms (such as redness or irritation) develop in case of delayed effects.

Product ingested
DO NOT INDUCE VOMITING. If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call for medical assistance/ transport the victim to a hospital or medical facility.
If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. Transport the victim IMMEDIATELY to a hospital or other medical facility for attention

Product inhaled
Remove patient to fresh air and get medical attention should shortness of breath, burning in the mouth, throat, or chest develop, or transport the victim to a hospital or other medical facility for attention.

SECTION 5. Fire-fighting measures - Not flammable under normal circumstances .

Suitable extinguishing media if involved in a fire
Use dry chemical, CO_2, dry sand, water spray or alcohol-resistant foam as appropriate to the circumstances. . Direct water stream should be avoided as could scatter and spread flames.

ERG 2020 - Emergency Response Guide 154 Corrosive, non-combustible liquid
Caution - exposure to high temperatures can result in release of hydrogen chloride gas.

Small Fire – immediate response action should quickly prevent or extinguish a fire.

Large fires – eliminate all sources of ignition, move containers out and away from fire if can be done safely without increasing risk or keep containers cool with water spray to prevent bursting.
Isolate and contain fire as much as possible, and dike or use inert material to contain run-off water for later disposal. Avoid getting water into containers, use dry chemical, CO_2, alcohol-resistant foam or water spray.

Special hazards:
- Non-combustible substance, does not burn but may decompose upon heating to produce corrosive and/or toxic fumes
- Reaction with water may generate heat and release corrosive, irritating and/or flammable gases.
- Caution as runoff from contaminated fire water may be corrosive and/or toxic and cause pollution.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.

Protective clothing - Use full fire-resistant protective clothing and self-contained, positive breathing apparatus for large fires.
NB: Prompt actions can stop small fires but large fires involving chemicals require professional Emergency Response teams.

SECTION 6. Accidental release measures – stop leak or spills if safe to do so.

Personal precautions – use personal protective equipment before commencing response actions.
Avoid any skin contact, as highly corrosive and can cause severe eye damage and skin burns, avoid breathing fumes from burning material, as health effects from contact and inhalation could be delayed.
Do not touch or handle broken containers unless wearing appropriate personal protective equipment.
Wash away any material which may have contacted the body with copious amounts of water or soap and water.

Environmental precautions
Stop leak if safe to do so without posing any risks.
Cover the drains to prevent the product from entering waterways, sewers, basement or confined areas.
If the product contaminates any waterways – rivers, dams or drains inform respective authorities without delay.
Neutralize with agricultural lime (CaO), crushed limestone (CaCO3) or sodium bicarbonate (NaHCO3) and stop surface flow. Dyke and absorb using commercial sorbants, sandbags or other non-combustible material such as dry sand or soil, and transfer to containers for safe disposal.

Clean-up methods
Small Spills:
Do not touch damaged containers or spilled material unless wearing appropriate protective clothing as highly acidic. Cover with DRY earth, sand or sorbent to collect material and place into plastic containers for disposal.

Large Spills:
Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop the leakage e.g. by shutting valves, if this can be done safely. Collect leaking product in suitable acid-proof

containers. Avoid allowing water runoff to contact spilled material - DO NOT GET WATER INTO the containers to prevent any hazardous reaction and noxious fumes.
GHS Disposal Precautionary Statement - P501 dispose of product and containers in accordance with SA National or Regional Regulations -refer National Environmental Management: Waste Act, and SECTION 13

SECTION 7. Handling and storage

Storage requirements
Store in a cool well-ventilated area that is out of direct sunlight and away from fire hazards to avoid high temperatures, and avoid freezing / very low temperatures.
Store away from incompatible products.

Handling precautions
The workplace and work methods shall be organized to prevent or minimize direct contact with the product. Wear gloves made of a suitable material such as PVC, Neoprene or Natural rubber - observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves.
Consider the specific local conditions under which the product is used, to minimise any potential danger of cuts, abrasion and contact time.
Tightly fitting safety goggles or safety glasses must be worn.
Eating, drinking and smoking shall be prohibited in areas where chemicals are handled, stored or processed, and workers must wash hands before eating, drinking or smoking to remove any chemicals that could be ingested or inhaled. Remove contaminated clothing and protective equipment before entering eating areas. Use handling equipment (pumps, hoses, etc.) compatible with product, i.e., polyethylene, polypropylene, PVC, Teflon, rubber, FRP, and titanium. Avoid contact with metals other than titanium.

Conditions for Safe Storage - refer SANS 10263: The Warehousing of dangerous goods, and
10263 - Part 8 The storage and handling of corrosive substances, for more specific information, applicable regulations and recognised practices for safe compliant storage, warehousing and handling.

GHS Precautionary Statement P406 store in corrosion resistant containers.

Suitable materials
Packaging material - Plastic (PE, PP, PVC), Fiberglass-reinforced polyester, Epoxy-coated concrete, Titanium, Acid-proof or rubber-coated steel.

To be avoided:
Non-acid-proof metals such as aluminium, copper and iron,
Do not store together with incompatible materials.

Unsuitable materials
Mild steel, iron, copper, aluminium and alloys, base metals, unalloyed steel and galvanized surfaces.

SECTION 8. Exposure controls/personal protection

Control parameters e.g. occupational exposure limit values or biological limit values

Ingredient name		Recommended Exposure limits – (NIOSH)
Ferrous Chloride		TWA = 1 mg/m3 - Iron salts, soluble, as Fe

NIOSH = National Institute for Occupational Safety and Health
American Conference of Governmental Industrial Hygienists (ACGIH): TLV (TWA) =1 mg/m3, as soluble salts.

Engineering control measures: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

Respiratory protection: In the event of exposure to fumes or mist use filter masks with type E filter.
Check the filter capacity and the use-time limitation. When exposed to high concentrations or unknown exposure or prolonged activity, self-contained breathing apparatus may be required.

Hand protection:
- Protective gloves should conform to EN 374 requirements.
- Suited glove material: butyl rubber, chloroprene rubber. neoprene. polyethylene. PVC.
- The suitability of a specific glove of a supplier should be determined considering the conditions of use i.e. chemical, mechanical, thermal stress, and use/contact time.

Eye and face protection:
- Tightly fitting safety goggles or safety glasses with side protection shield that conform to EN 166.
- Full face mask.

Skin and body protection:
- Acid-resistant safety shoes with high tops and clothing that covers the whole body.

General protective and hygiene measures: Use PPE appropriate to work to be done
- Avoid contact with skin and eyes.
- Do not inhale gas or aerosol (mist).
- Remove contaminated clothing immediately.
- Wash hands immediately after handling chemicals and before breaks.
- Do not eat, drink and smoke at work, keep away foodstuffs and beverages.

SECTION 9. Physical and chemical properties

Appearance	Clear greenish liquid
Odour	Faint hydrochloric acid odour
Boiling point/range	104 - 105 °C @ 101.3kPa
Melting point/range	Not Applicable
Flammability	Not flammable
Flash point	Not applicable
Auto-ignition temperature	Not applicable
Decomposition temperature	No information
pH	<2
Viscosity	Not applicable
Solubility - water	Complete
Oxidising properties	None
Vapour pressure	Not applicable
Specific Gravity	1.18 – 1.42 @ 20°C

SECTION 10. Stability and reactivity

Stability: Stable under normal storage and handling conditions.

Conditions to avoid:
Contact with metals as corrosive to all common metals.
Excessive heat or cold - containers may explode when heated.
Heat, flames, sparks and other sources of ignition
Reaction with acids could result in dangerous decomposition reaction.

Incompatible materials:
- Alkalis, strong oxidizing agents, ethylene oxide
- Reacts with alkali and organic bases with violent evolution of heat
- Reacts with strong oxidizing agents (bleaching agents, nitic acid, chromates, permanganates) with the evolution of toxic chlorine gas.
- May react with potassium and sodium.
- Reacts violently with alcohols, strong oxidizers and reducing agents.
- Attacks many metals in the presence of water, and corrosive to metals.

Hazardous decomposition products: Ferric chloride and ferric oxide and thermal decomposition can result in corrosive and toxic hydrogen chloride and chlorine gas or fumes.

SECTION 11. Toxicological information

Acute toxicity	Result	Species	Dose/ Exposure	Caution
Oral	Abdominal pain, vomiting or diarrhea.	Rat	LD50 220 - 2000 mg/kg	Do not ingest the product
		Mouse	LD50 440-1300 mg/kg	Avoid skin contact

GHS – EU Group Classification, and C & L Inventory:

- **Acute Toxicity Oral**: H302: Harmful if swallowed.
- **Skin Corrosion Irritation:** H315 Causes skin irritation
- **Skin Sensitizer:** H317: May cause an allergic skin reaction.
- **Eye damage:** H318: Causes serious eye damage.

Potential Acute Health Effects:

- Eye contact: irritation or burns can occur.,
- Skin contact: Corrosive – irritates or burns the skin.
- Inhalation can irritate the nose and throat.
- Ingestion: burns to the oesophagus and stomach

Delayed Effects:
Eye contact observe for several days, skin contact or inhalation, observe for at least 48hours

Potential Long-Term Effects:

- **Eye Contact**: Prolonged contact may cause brown discoloration of the eyes.
- **Ingestion**: Repeated or high-level exposures may lead to too much Iron build-up in the body causing nausea, stomach pain, vomiting, constipation, and black bowel movements. May damage the liver.

Other Potential Health:

- **Germ Cell Mutagenicity**: No data available
- **Carcinogenicity**: Not considered to be carcinogenic by IARC, ACGIH, NTP or OSHA
- **Reproductive Toxicity**: Not data available
- **Aspiration Hazard:** Not available data but inhalation of mist may irritate the respiratory tract

SECTION 12. Ecological information

Iron speciates readily once released and rapidly transforms into naturally occurring forms causing humans and environmental organisms to be exposed via the media - water, sediment, suspended matter, soil and air.

GHS – EU Group Classification, and C & L Inventory:
Hazardous to the Aquatic Environment: No evidence- Not Classified
Hazardous to the Ozone layer: No evidence - not Classified
Biodegradability: No data available
Bio-accumulation: No Bioaccumulation Potential
Mobility in soil: No data available

SECTION 13. Disposal considerations

Disposal methods
Neutralise prior to disposal (pH between 5.5 and 8.5 inclusive). Must undergo physico-chemical treatment prior to disposal. Take all necessary precautions when disposing of this product.
Hazardous Decomposition Products - None under normal use.
Hazardous Reactions Attacks many metals and gives off a highly flammable gas (hydrogen), which creates fire and explosion hazards.
Disposal must be made in accordance with the applicable National and Regional Government regulations at approved and permitted chemical disposal sites – refer to the SA National Environmental Management Waste Act - NEM: WA, its Regulations, and local by-laws. See the South African Waste Information Centre sawic.environment.gov.za for information on permitted Waste Facilities and Service providers

Disposal of packaging
Contaminated Packaging - Wash with water and consider reuse, recycle of material options
Dispose in compliance with Regulations – see above and Industry Best Practice
Always observe and comply with hazard warnings.

SECTION 14. Transport information

	UN & SANS 10228	IMDG	IATA
UN Number	1760	UN 1760	UN 1760
UN proper shipping name – PSN	CORROSIVE LIQUID, N.OS. (Ferrous Chloride)	CORROSIVE LIQUID, N.O.S. (Ferrous Chloride)	CORROSIVE LIQUID, N.O.S. (Ferrous Chloride)
Transport Class 8 and hazard - Corrosive			
Packing group	II	II	II
Environmental hazards	Not a marine pollutant	IMDG Supplement EmS: F-A & S-B	Refer ICAO & IATA 2021
Additional information			
Emergency Response Guide - ERG 2020	Guide 154 Corrosive liquid/Noncombustible	Refer IMDG Amdt 40-20 2020, Supplement & MARPOL	Refer ICAO & IATA 2021/22

SECTION 15. Regulatory information

OHS Act - Occupational Health and Safety Act 85 of 1993:
Hazardous Chemical Agents Regulations – HCA, March 2021: Regulation 14 requires GHS Classification, GHS Compliant SDS – Safety Data Sheets and Labelling, and Regulation 5 Operational Site Risk Assessment to identify chemical exposure levels to inform requirements for personnel Health and Biological Monitoring.
MHI – Major Hazards Installations Regulations - OHS Act: require site Risk Assessment to ascertain potential impacts outside of the site and potential impacts on the public or neighbours. Copy to be lodged with the Dept Labour, and local Emergency Services.
NEMA – National Environmental Management Act 107 of 1998: Duty of Care and Producer Responsibility for products and packaging on a Life Cycle basis. Environmental Impact Assessment Regulations for new installations or proposed increase in capacity over 25%
NEM: WA – National Environmental Waste Act 59 of 2008: Extended Producer Responsibility, requirements and regulations for waste management, classification and disposal
NEM: AQA – National Environmental Air Quality Act 39 of 2004: AQA Licenses and Emissions
National Department of Health – Hazardous Substances Act
EU Directive EC 1272/2008 (EU GHS /CLP) – Safety Data Sheets and Labelling
ECHA – European Chemical Agency Website, Chemical information, C&L Inventory, Chemicals of High Concern (SVHCs) and Chemicals for Community Rolling Action Plan (CoRAP)
ERG 2020 Transport Canada and US Dept Transportation PHMSA - Pipeline and Hazardous Materials Safety Administration

SECTION 16. Other information:

Training - Persons handling and working with this product should be Trained in the hazards and safe handling as required in the Chapter 1.3 of the UN Model Regulations for Transport of Dangerous Goods before commencing work with chemicals.

ECHA – European Chemical Agency Website, Chemical information, C&L Inventory, Chemicals of High Concern (SVHCs) and Chemicals for Community Rolling Action Plan (CoRAP)
ERG 2020 Transport Canada and US Dept Transportation PHMSA - Pipeline and Hazardous Materials Safety Administration

Other relevant information including information on preparation and revision of the SDS –
ISO 11014:2009 Safety Data Sheets for Chemical Products – content and order of sections adopted as SANS 11014:2010

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UN Recommendations for Transport of Dangerous Goods Model Regulations commonly known as the **TDG "Orange Books" 21st**h revision 2021 currently in effect, 22nd revision published June 2021
UN Globally Harmonized System of Classification and Labelling of Chemicals – GHS commonly known as **the GHS "Purple Book" 8th** revision in effect, 9th revision published July 2021
IMDG – International Maritime Dangerous Goods Code, 2020 edition, amendment 40-20
IATA Technical Regulations 62nd edition, January 2021

Date of original MSDS	**: 2003-08-19**	**Compiled by DD Liebenberg**
Date of Revision 1	**: 2009-07-06**	**Compiled by HH Maringa**
Date of Revision 2	**: 2012-02-23**	**Compiled by HH Maringa**
Date of Revision 3	**: 2018-11-30**	**Compiled by P Govender**
Date of Revision 4	**: 2021-10-01**	**Reviewed by E Anderson**

Approved as per Management of Change no. 3-12-2021-254

EXCLUSION OF LIABILITY

All information and instructions provided in this Safety Data Sheet (SDS) in respect of the substance is given in terms of the provisions of the Occupational Health and Safety Act No 85 of 1993 and its Regulations. Information is based on best available scientific and technical knowledge as at the date indicated on this SDS, and is presented in good faith to be correct.

The information provided in this SDS apply only to the product in its present form and not to any formulation or mix. It should be used only as directed, and any formulations or other use is at the responsibility of the user of the product as formulated and/or mixed, to investigate and establish any hazards or risks which may arise out of its use, wherever such user may be situated.
It is the legal responsibility of the person in receipt of this SDS, wherever such may be situated, to ensure that the information provided is communicated to, and understood by any person who may come in contact with the product in any place and in any manner whatsoever. If such recipient produces formulations or mixtures using the product, then it is the recipient's sole responsibility to comply with the provisions of the Act in respect of the provision of the necessary SDS, and/or to comply with any other applicable legislation.