SAFETY DATA SHEET

FERRIC CHLORIDE

SDS 010/R05
2017-02-24

Reg. No. 2003/017152/07

Safety Data Sheet (SDS) According to ISO / SANS 11014:2009/10, UN Transport of Dangerous Goods, UN Globally Harmonised System of Classification & Labelling and EC Directive 1272/2008

SECTION 1. Identification – Chemical Product and Company

Trade Name	:	Ferric Chloride
Chemical Name / Proper Shipping Name:	:	Ferric Chloride Solution
UN Number	:	2582
CAS Number	:	7705-08-0/10025-77-1
GHS Product Identifier	:	Iron Trichloride / Ferric Chloride Hexahydrate
Chemical Family	:	Inorganic mono constituent substance
EC Number	:	231-729-4/ 600-047-2
IUPAC Name	:	Iron (III) chloride
Other means of identification	:	Dark orange to brown liquid
Recommended use of the chemical	:	Used in water treatment as a coagulant of raw and effluent water and the precipitation of phosphate in sewage water
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) 11 976 3111
24hour Emergency phone number	:	+27 (0) 11 976 2115/3333

SECTION 2. Hazards Identification

Hazard classes/Hazard categories **Transport – Class 8** Corrosive substance	**GHS Hazard Statement**
Acute Toxicity 4	H302: Harmful if swallowed.
Skin Irritant 2	H315: Causes skin irritation.
Metal Corrosion Category 1	H290: May be corrosive to metals
Skin Sensitivity 1	H317: May cause an allergic skin reaction. Contains Nickel
Eye Damage 1	H318: Causes serious eye damage.

GHS classification of the substance: May be corrosive to metals. Causes skin irritation or allergic reaction.

The most important adverse effects to know in emergency are – Harmful if swallowed, causes skin irritation and may cause an allergic skin reaction. Causes serious eye damage.

Regn No 2003/071152/07

GHS label elements, including precautionary Statements:

GHS 05 Corrosion
GHS 07 Severe skin burns and eye damage - Exclamation Mark

Signal word: Danger

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

Precautionary statements:
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P264: Wash 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.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+P312: IF SWALLOWED: Call a POISON CENTER/doctor/... if you feel unwell.
P302+P352: IF ON SKIN: Wash with plenty of water/…
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER/doctor/…
P321: Specific treatment (see ... on this label).
P330: Rinse mouth.
P332+P313: If skin irritation occurs: Get medical advice/attention.
P333+P313: If skin irritation or rash occurs: Get medical advice/attention.
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

Main hazards
This substance is harmful if swallowed, causes serious eye damage, may be corrosive to metals, causes skin irritation and may cause an allergic skin reaction.

SECTION 3. Composition/information on ingredients

Chemical identity	:	Substance
Other means of identity	:	Dark orange to greenish brown solution
Common name, synonyms, etc	:	Ferric Chloride
CAS number	:	7705-08-0
EC number	:	231-729-4
IUPAC names	:	Iron (III) chloride
Impurities and stabilizing additives	:	< 1% Hydrochloric Acid

Hazardous components : Ferric Chloride

Ingredient name	UN Number	CAS number	% m/m	EC List number
Ferric Chloride	2582	7705-08-0	42.5 – 44.5	231-729-4

SECTION 4. First Aid Measures

Product in eye
First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

Product on skin
IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. IMMEDIATELY call a hospital or poison control center even if no symptoms (such as redness or irritation) develop. IMMEDIATELY transport the victim to a hospital for treatment after washing the affected areas.

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 a hospital or poison control center. IMMEDIATELY transport the victim to a hospital. 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.

Product inhaled
IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital.

Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.

SECTION 5. Fire Fighting Measures

Suitable extinguishing media if involved in a fire
Use water spray, carbon dioxide or dry chemical to extinguish fires. Product itself is not flammable.

NFPA hazard rating

• **Fire: 0**	Material that will not burn
• **Health: 3**	Material which on exposure could cause serious, temporary or moderate residual injury
• **Reactivity: 0**	Normally stable

ERG - Emergency Response Guide 2016 and SANS 10232 - 3 Guide 154 and 157

Small Fire - immediate response action should quickly put out the fire• Use water spray, fog, foam, dry chemical, CO2 or other agents as appropriate for surrounding fire. Use water to keep fire-exposed containers cool.
Large fires – evacuate area, move containers out and away from fire if can be done safely without increasing risk. Isolate and contain fire as much as possible, and dike or use inert material to contain run-off water for later disposal. Do not scatter the material. Water spray, fog or alcohol-resistant foam. Do not use straight streams. Dry chemical, CO2, alcohol-resistant foam or water spray. Dike fire-control water for later disposal; do not scatter the material.

Special hazards:

- Non-combustible, substance itself but decomposes above 200°C to produce toxic and corrosive gases including chlorine and hydrogen chloride.
- The solution in water is a medium strong acid and reacts violently with alkali metals, allyl chloride, ethylene oxide, styrene and bases. This generates an explosion hazard.
- Fire will produce irritating, corrosive and/or toxic gases.
- Vapors may accumulate in confined areas (basement, tanks, hopper/tank cars, etc.).
- Substance may react with water (some violently), releasing corrosive and/or toxic gases and runoff.
- Containers may explode when heated or if contaminated with water.

Protective clothing - Wear full 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

Personal precautions
Avoid breathing fumes from burning material. Keep upwind and avoid bodily contact with the material. Do not handle broken packages 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
Cover the drains to prevent the product from entering the environment. If the product contaminates rivers and lakes or drains inform respective authorities surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash, cement powder, or commercial sorbents. Neutralize with agricultural lime (CaO), crushed limestone (CaCO3) or sodium bicarbonate (NaHCO3).

Clean-up methods
Small Spills:
All equipment used when handling the product must be grounded. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain. Use clean, non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

Large Spills:
All equipment used when handling the product must be grounded. 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. A vapor-suppressing foam may be used to reduce vapors. DO NOT GET WATER INSIDE CONTAINERS. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Prevent entry into waterways, sewers, basements or confined areas.
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GHS Disposal Precautionary Statement - P501 dispose of product and containers in accordance with SA National and / or regional Regulations refer National Environmental Management: Waste Act.

SECTION 7. Handling and Storage

Storage requirements

Keep away from incompatible products. Solution of ferric chloride should be stored in polyethylene bottles and should be protected from exposure to light and heat. Avoid freezing and high temperatures. Do not store together with incompatible materials such as caustic soda and alkali metals. Keep containers closed and dry. Protect container from physical damage.

Handling precautions

Prevent or minimise direct contact with skin, eyes or clothing. Avoid breathing mist. Wear gloves in a suitable material such as PVC, Neoprene or Natural rubber. Keep drums tightly closed when not in use. Handle as a corrosive liquid, wear rubber gloves if likely to come into skin contact, face shield / safety glasses and acid respirator to protect against splashes and fumes. Eating, drinking and smoking shall be prohibited in areas where chemicals are handled, stored or processed. 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. Also consider the specific local conditions under which the product is used, such as the danger of cuts, abrasion and the contact time. Tightly fitting safety goggles must be worn. Use handling equipment (pumps, hoses, etc.) compatible with product, i.e., polyethylene, polypropylene, PVC, Teflon, rubber, FRP, and titanium. Avoid contact with bare 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 and relevant regulations and recognised practices for storage, warehousing and handling.

GHS Precautionary Statement P 406 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.

Unsuitable materials

Mild steel, iron, copper, aluminum and alloys. Bases, 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)
Ferric 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 Fe 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:

- Low concentrations and short term activity (max 15 min): filter masks with filter type E. Be aware of the filter capacity and the use-time limitation!
- High concentrations or unknown exposure or prolonged activity: self-contained breathing apparatus.

Hand protection:
- Protective gloves have to conform to EN 374.
- Suited glove material: butyl rubber. chloroprene rubber. Chlorosulfonated polyethylene. neoprene. polyethylene. PVC.
- The suitability of a specific glove of a supplier has to be determined depending on the use conditions (chemical, mechanical, thermal stress, and use/contact time)

Eye and face protection:
- Tightly fitting safety goggles or safety glasses with side protection shield that conforms 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:
- Avoid contact with skin and eyes.
- Do not inhale gas or aerosol (mist).
- Apply PPE as required.
- 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	Dark orange to brown
Odour	Faint hydrochloric acid odour
pH	1.1 (0.1 N solution); strongly acidic
Boiling point/range	90°C
Melting point/range	-12° C
Flash point	Not applicable
Flammability	Not flammable
Explosive properties	Not applicable
Oxidising properties	None
Vapour pressure	Pa at 20°C: negligible
Specific gravity	min 1.45 @ 20°C
Viscosity	10 mPa.s at 20°C
Solubility - water	Miscible

SECTION 10. Stability and Reactivity

Stability: Stable under recommended conditions of handling and storage. Hygroscopic material.

Conditions to avoid:
The solution in water is a strong acid and reacts violently with alkali metals, allyl chloride, ethylene oxide, styrene and bases.

Incompatible materials:
- Alkali and organic bases with violent evolution of heat
- Lime stone, marble, dolomite and other carbonic minerals with evolution of suffocating CO2 gas
- Strong oxidants (bleaching agents, conc. H2O2, HNO3, etc. and their salts, chromates, permanganates, etc with evolution of toxic chlorine gas

- Sulphides with evolution of toxic H2S gas
- Sulphites, hydrogen sulphites and pyro sulphites with evolution of toxic SO2 gas
- Sodium azide to highly toxic and explosive hydrazoic acid

Hazardous decomposition products:
Decomposes above 200°C to produce toxic and corrosive gases including chlorine and hydrogen chloride. Hazardous polymerization does not occur.

SECTION 11. Toxicological Information

Acute toxicity	Result	Species	Dose/ Exposure	Caution
Oral	Abdominal pain, vomiting or diarrhoea.	mouse	LD50 440 - 1 300 mg/kg bw	Do not ingest the product
Dermal	Redness. Pain or allergic reaction	rat	LD50 881 - 2 000 mg/kg bw	Avoid skin contact

GHS – EU Group Classification, and C & L Inventory:
Skin Corrosion/Irritation: this substance is harmful if swallowed, causes skin irritation and may cause an allergic skin reaction.
Eye Damage: causes serious eye damage
Respiratory or skin sensitization: Can cause an allergic reaction
Germ Cell Mutagenicity: No data available
Carcinogenicity: Not considered to be carcinogenic by IARC, ACGIH, NTP or OSHA
Reproductive Toxicity: Not Considered to have any reproductive effects
Aspiration Hazard: Not available data but inhalation of mist may irritate the respiratory tract

SECTION 12. Ecological Information

GHS – EU Group Classification, and C & L Inventory:
Hazardous to the Aquatic Environment: Not Classified as hazardous to the environment but could impact on acidity in water with harmful effects on aquatic organisms
Hazardous to the Ozone layer: No evidence - not Classified
Persistence and Biodegradability: Not biodegradable
Bio-accumulation: no potential for bioaccumulation Mobility in soil: No data available but unlikely as will be neutralised by naturally occurring alkalinity in the soil.

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.
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. This informs permitted Waste Facilities and Service providers see the South African Waste Information Centre sawic.environment.gov.za

Disposal of packaging
Packagings and containers, even those that have been emptied, will retain product residue and vapours, handle empty containers as if they were full. Remove all possible traces of product and wash prior to disposal of packaging and containers. Dispose in compliance with Regulations – see above and Industry Best Practice
Always observe and comply with hazard warnings.

SECTION 14. Transport information

	SANS 10228:2012	IMDG	IATA
UN Number	UN 2582	UN 2582	UN 2582
UN proper shipping name – PSN	Ferric Chloride	Ferric Chloride	Ferric Chloride
Transport Class 8 and hazard - Corrosive			
Packing group - III	Use UN Certified packaging	Use UN Certified packaging	Use UN Certified packaging
Environmental hazards	Not a marine pollutant	IMDG Supplement EmS: F-A & S-B	Refer ICAO & IATA 2015
Additional information			
Emergency Response Guide - ERG 2016	Guide 154 & 157 Toxic and/or corrosive/Noncombustible and water sensitive	Refer IMDG 37-14 2014 Supplement & MARPOL	Refer ICAO & IATA 2015

SECTION 15. Regulatory information

OHS Act - Occupational Health and Safety Act 85 of 1993: requires site Risk Assessment and monitoring to inform personnel Health / Biological Monitoring. **Section 9A** requirement to provide MSDS
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.
Pressure Equipment Regulations - OHS Act: encompasses containers and service equipment
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 2016 Transport Canada and US Dept Transportation PHMSA - Pipeline and Hazardous Materials Safety Administration

SECTION 16. Other information, including information used for revision of this SDS:

ISO 11014:2009 Safety Data Sheets for Chemical Products – content and order of sections adopted as SANS 11014:2010
UN Recommendations for Transport of Dangerous Goods Model Regulations commonly known as **the "Orange Books"** 18th revision 2013 currently in effect, 19th revision published June 2015
UN Globally Harmonized System of Classification and Labelling of Chemicals – GHS commonly known as **the "Purple Book" 5th** revision 2013 in effect, 6th revision published July 2015
IMDG – International Maritime Dangerous Goods Code, 2014 edition, amendment 37-14

Regn No 2003/071152/07

IATA Technical Regulations 56th edition, January 2015
SANS 50888:2008: Chemicals used for treatment of water for human consumption – iron iii chloride

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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 mixes 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.