MATERIAL SAFETY DATA SHEET

FERRIC CHLORIDE SOLUTION

MSDS 006/R4
2012-02-23

$FeCl_3\,6(H_2O)$

Reg. No. 2001/019171/07

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1. PRODUCT IDENTIFICATION

TRADE NAME	Ferric Chloride Solution
CHEMICAL FAMILY	Inorganic Chloride Solution
CHEMICAL NAME	Ferric Chloride Hexahydrate Solution
SYNONYMS	Iron (III) Chloride Hexahydrate Solution
CHEMICAL ABSTRACTS No.	7705-08-0 (Anhydrous), 10025-77-1 (hexahydrate)
NIOSH No.	LJ9150000
HAZCHEM CODE	2R
UN No.	2582

2. COMPOSITION

HAZARDOUS COMPONENTS

42.5-44.0 % m/m Ferric chloride

EEC CLASSIFICATION

Not available

RISK PHRASES

R22 Harmful if swallowed
R34: Causes burns.
R41 Risk of serious damage to eyes

SAFETY PHRASES

S1/2: Keep locked up and out of reach of children.
S7/8: Keep container tightly closed and dry.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S28: After contact with skin, wash immediately with plenty of water.
S39 Wear eye/ face protection.
S45: In case of accident or if you feel unwell, seek medical advice immediately, show label where possible.

3. HAZARD IDENTIFICATION

MAIN HAZARDS

Primary routes of exposure: Skin or eye contact, inhalation.

Mists are extremely corrosive to the nose, throat, and mucous membranes. Bronchitis, pulmonary oedema, and chemical pneumonitis may occur. Irritation, coughing, chest pain, and difficulty in breathing may occur with brief exposure while prolonged exposure may result in severe irritation and tissue damage.

Liquid and mists may severely irritate, burn or damage the eyes.

Brief contact with liquid will cause irritation. Prolonged or repeated exposure may cause burns.

Swallowing the liquid burns the tissues, causes severe abdominal pain, nausea, vomiting, and collapse.

Hazard Rating (NFPA 704)

Health: 2	Hazard Rating Scale:
Fire: 0	0=Minimal 3=Serious
Reactivity: 0	1=Slight 4=Severe
Special:None	2=Moderate

Exposure Limits - TLV, 8 h TWA (ACGIH) : 1 mg/m^3, Iron Salts, Soluble, as Fe

HEALTH EFFECTS - EYES

Eye contact may cause discoloration of eye tissues; eye irritation with discomfort, tearing, or blurring of vision; or eye corrosion with corneal or conjunctival ulceration.

HEALTH EFFECTS - SKIN

Skin contact may cause skin irritation with discomfort or rash; or skin burns or ulceration. The compound has been infrequently associated with skin sensitization in humans.

HEALTH EFFECTS - INGESTION

Ingestion may cause corrosive damage to the gastrointestinal tract. Repeated ingestion of sub-lethal doses can lead to excessive deposition of iron in the tissues with liver and pancreatic damage.

Higher ingestion exposures may lead to abnormal liver function with nausea or vomiting, reduced appetite, or abdominal pain; lethargy, nausea, vomiting, tarry stools, diarrhoea, fast and weak pulse, hypotension, dehydration, acidosis and coma.

HEALTH EFFECTS - INHALATION

Inhalation overexposure may cause irritation of the upper respiratory passages with coughing.

ADDITIONAL MEDICAL INFORMATION

Individuals with pre-existing diseases of the liver may have increased susceptibility to the toxicity of excessive exposures.

CARCINOGENICITY

Ferric chloride is not listed by IARC, NTP, OSHA, or ACGIH as a carcinogen.
Tests in animals demonstrate no carcinogenic activity

MUTAGENICITY

Tests in bacterial and mammalian cell cultures demonstrate no genetic damage.

REPRODUCTIVE HAZARDS

No data available.

4. FIRST AID MEASURES

PRODUCT IN EYE

In case of contact, immediately flush eyes with plenty of water for at least 30 minutes, lifting the upper and lower eyelids occasionally.
Get immediate medical attention.

PRODUCT ON SKIN

In case of contact, immediately wash skin with running water for 15 minutes. Remove contaminated clothing and shoes; wash before reuse. Get immediate medical attention.

PRODUCT INGESTED

If swallowed, do not induce vomiting. If conscious, give lots of water or milk, or milk of magnesia to drink. Do not give anything by mouth to an unconscious or convulsing person.
Get immediate medical attention.

PRODUCT INHALED

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give medical oxygen. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Ferric Chloride solutions will not burn or support combustion. Use media appropriate for surrounding material.

SPECIAL HAZARDS

May generate flammable, potentially explosive hydrogen gas on contact with metals.

PROTECTIVE CLOTHING

Fire fighters should wear self- contained breathing apparatus and full protective clothing.

OTHER INFORMATION

Use water spray to cool nearby containers and structures exposed to fire.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS

Restrict access to area until completion of the cleanup. Ensure cleanup is conducted by trained personnel only.
Wear acid-resistant slicker suit and complete protective equipment including suitable eye protection, rubber gloves, rubber boots, and a self-contained breathing apparatus in the pressure demand mode or a supplied-air respirator.
If the spill or leak is small, a full face- piece air-purifying cartridge respirator equipped for acid gases may be satisfactory.

ENVIRONMENTAL PRECAUTIONS

Keep non-neutralized material out of sewers, storm drains, surface waters, and soil.

CLEAN-UP METHODS

Small Spills

Contain; neutralize spill with lime or soda ash. Mop or wipe up and dispose of in approved waste containers. Flush area with water.

Large spills

Contain by diking with soil or other non-combustible absorbent material and carefully neutralize with soda ash or lime. If soda ash is used, provide adequate ventilation to dissipate the carbon dioxide gas produced.

Dispose of contaminated product and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate state and local regulatory agencies to ascertain proper disposal procedures.

Flush area with water to waste treatment system.

7. HANDLING AND STORAGE

SUITABLE MATERIALS

Store in rubber-lined steel, suitable GFPR or plastic tanks.

UNSUITABLE MATERIALS

Do not store in containers constructed of aluminium/aluminium alloys, carbon steel, stainless steel or copper/copper alloys.

HANDLING/STORAGE PRECAUTIONS

Store in a cool, dry, well-ventilated place, away from all other chemicals and potential sources of contamination. Keep containers tightly closed when not in use. Do not use pressure to empty containers.

Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing.
Do not cut, grind, weld, or drill on or near this container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE STANDARDS

HSE No data available.
MAK No data available.
ACGIH TLV: 1 mg/m^3, Iron Salts, Soluble, as Fe - 8 h TWA

ENGINEERING CONTROL MEASURES

Use local mechanical exhaust ventilation capable of minimizing emissions at the point of use to keep employee exposure below recommended exposure limits.

PERSONAL PROTECTION - RESPIRATORY

Wear a NIOSH/MSHA approved air purifying respirator with an acid gases /mist cartridge or canister if there is potential for exposure to mists in excess of applicable limits. Under severe conditions a self-contained breathing apparatus in the pressure demand mode, or a supplied-air respirator may be necessary.

PERSONAL PROTECTION - HAND

Avoid contact with this chemical. Wear rubber gloves.

PERSONAL PROTECTION - EYE

Wear safety glasses with side shields. Wear a face shield/chemical splash goggle combination if there is any possibility of eye or face contact due to splashing or spraying of the material.

PERSONAL PROTECTION - SKIN

Wear rubber gloves, boots, apron, and acid resistant trousers and jacket.

OTHER PROTECTIVE MEASURES

An eyewash and safety shower should be nearby and ready for use

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	Brown liquid
ODOUR	Slightly acrid
pH	Less than 1
BOILING POINT/RANGE	~ 106°C at 760 mm Hg.
MELTING POINT/RANGE	~-50°C
FLASH POINT	Not flammable.
FLAMMABILITY	Not applicable.
AUTOFLAMMABILITY	Not applicable
EXPLOSIVE PROPERTIES	None
OXIDISING PROPERTIES	None
VAPOUR PRESSURE	~40 mm Hg at 35°C.
DENSITY	1,45 g/cm^3 at 20°C
SOLUBILITY - WATER	100 % m/m

10. STABILITY AND REACTIVITY

STABILITY

Stable.

CONDITIONS TO AVOID

Alkalis and metals

INCOMPATIBLE MATERIALS

Rapidly corrodes most metals; may generate flammable, potentially explosive hydrogen gas. Avoid contact with nylon, aluminium/aluminium alloys, carbon steel, stainless steel, and copper/copper alloys.

HAZARDOUS DECOMPOSITION PRODUCTS

Thermal decomposition may liberate hydrogen gas and hydrogen chloride gas.

POLYMERIZATION

Will not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

No human oral toxicity data available.

Animal data:
Oral LD50(rat): 900 mg/kg
Toxic effects in animals from repeated exposures by ingestion include reduced weight gain, elevated serum iron levels, increased red blood cell counts, and iron deposition in many organs

SKIN AND EYE CONTACT

No human data available.
In animals, this compound is a skin and eye irritant.

CARCINOGENICITY

Ferric chloride is not listed by IARC, NTP, OSHA, or ACGIH as a carcinogen.
Tests in animals demonstrate no carcinogenic activity.

MUTAGENICITY

Tests in bacterial and mammalian cell cultures demonstrate no genetic damage.

REPRODUCTIVE TOXICITY

No data available.

12. ECOLOGICAL INFORMATION

AQUATIC TOXICITY - FISH	96-hour LC50, fathead minnows: 61 mg/l
AQUATIC TOXICITY - DAPHNIA	Not applicable
AQUATIC TOXICITY - ALGAE	Not applicable
BIODEGRADABILITY	Not applicable
BIO-ACCUMULATION	Not applicable.
MOBILITY	Not applicable

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS

This material is highly corrosive. Disposal must be made in accordance with the applicable Government regulations at approved chemical dumpsites.

DISPOSAL OF PACKAGING

Empty containers can contain residues, gases and mists and are subject to proper waste disposal.

Always obey hazard warnings and handle empty containers as if they were full.

14. TRANSPORT INFORMATION

UN No.	2582
SUBSTANCE IDENTITY No.	
ADR/RID CLASS	8
ADR/RID ITEM No.	Not applicable
ADR/RID HAZARD IDENTITY No.	80
IMDG - SHIPPING NAME	Ferric Chloride Solution
IMDG - CLASS	8, Corrosive
IMDG - PACKAGING GROUP	III
IMDG - MARINE POLLUTANT	Corrosive
IMDG - EMS No.	
IMDG - MFAG TABLE No.	
IATA - SHIPPING NAME	Ferric Chloride Solution
IATA - CLASS	8
IATA - SUBSIDIARY RISK(S)	Corrosive, Packaging Group III
ADNR - CLASS	Not applicable
UK - DESCRIPTION	Not applicable
UK - EMERGENCY ACTION CODE	Not applicable
UK - CLASSIFICATION	Not applicable
TREMCARD No.	

15. REGULATORY INFORMATION

EEC HAZARD CLASSIFICATION Not applicable

RISK PHRASES

R22 Harmful if swallowed
R34: Causes burns.
R41 Risk of serious damage to eyes.

SAFETY PHRASES

S1/2: Keep locked up and out of reach of children.
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NATIONAL LEGISLATION Hazardous Substances Act 15 of 1973 and Regulations, Occupational Health and Safety Act 85 of 1993,

16. OTHER INFORMATION

CAS No.	7705-08-0 (anhydrous), 10025-77-1 (hexahydrate)
EINECS No.	231-729-4
EEC ANNEX 1 No.	Not applicable
MITI No.	Not applicable
FDA LIST No.	Not applicable
LISTING - TOSCA	Not applicable

APPENDIX

MSDS PREPARATION DATE	**1993-10-28**
MSDS SERIAL No.	**F005/MS1**
COMPILED BY	**D D LIEBENBERG**
MSDS REVISION DATE	**2003-07-01**
REVISED BY	**D D LIEBENBERG**
MSDS SERIAL No.	**MSDS 006/R2**
MSDS REVISION DATE	**2009-06-05**
REVISED BY	**H.H. MARINGA**
MSDS SERIAL No.	**MSDS 006/R3**
MSDS REVISION DATE	**2012-02-23**
REVISED BY	**H.H. MARINGA**
MSDS SERIAL No.	**MSDS 006/R4**
APPROVED BY	**VIC VAN ZYL – MANUFACTURING DIRECTOR**
DATE OF APPROVAL	**2012-02-27**

SOURCES OF INFORMATION

1. Canadian Centre for Occupational Health and Safety, Record No. 534870 and 528315.
2. International Maritime Dangerous Goods Code, Vol 4, 1990

EXCLUSION OF LIABILITY

It is the sole responsibility of the person in receipt of this MSDS, wherever such recipient may be situated, to ensure that the information provided is communicated to and understood by any person who may come in contact with the substance in any place and in any manner whatsoever. If such recipient produces formulations or mixes using the substance, then it is such recipient's sole responsibility to comply with the provisions of the Act in respect of the provision of the necessary MSDS, or to comply with any other applicable legislation."