

# Safety technical manual for ferric chloride solution chemicals

## Chemical product name and company identification

**Chinese name of chemical:** ferric chloride solution

**Chemical English name:** ferric trichloride, solution

**Molecular formula:** FeCl<sub>3</sub>

**Molecular weight:** 162.21

**Enterprise Name:** Shandong Starki Chemical Co., Ltd

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**Recommended use:** Mainly used for water purification, but also for printing, plate making, pigments, fuels, and pharmaceuticals.

## Composition/Composition Information

Pure product

Mixture

Harmful substances	content	CAS No
Ferric chloride	38% to 42%	7705-08-0

## Hazard Overview

### GHS hazard category:

According to the General Rules for Classification and Hazard Disclosure of Chemicals (GB13690-2009) and the series of standards for chemical classification, warning labels, and warning instructions, this product belongs to corrosive substances. Category 1 is severe eye injury/irritation, Category 1 is specific target organ toxicity - single contact, Category 2 is specific target organ toxicity - single contact, Category 3 (respiratory irritation) is harmful to aquatic environment - acute hazard, Category 3 is acute toxicity - oral exposure, and Category 4 is skin corrosion/irritation.

### Label elements

**Pictogram:**



**Warning word:** Danger

**Hazardous information:**

Causing serious eye damage; Organ damage caused by one contact;; May cause respiratory irritation, may cause drowsiness or dizziness; Causing serious skin burns and eye damage; Harmful if swallowed; Harmful to aquatic organisms.

**Prevention instructions:**

**Preventive measures:**

Operators must undergo specialized training and strictly adhere to operating procedures. Stay away from heat, fire, and water sources.

Eating, drinking, or smoking are prohibited at work.

Thoroughly clean after operation.

Prevent all contact. Maintain good hygiene habits.

Prevent contact with skin and eyes.

Wear appropriate personal protective equipment and avoid direct contact.

It is recommended that operators wear a hood type electric air supply filter type dust respirator, rubber protective clothing, and rubber gloves.

Avoid contact with oxidants and active metal powders.

**Accident response:**

In case of fire, please select appropriate extinguishing agent according to the fire medium, and use water, foam and carbon dioxide to extinguish the fire.

**Skin contact:** Immediately remove all contaminated clothing. Rinse skin with water and take a shower.

**Ingestion:** Drink milk or egg white, do not induce vomiting, seek medical attention immediately.

**Inhalation:** Quickly leave the scene and go to a place with fresh air. If breathing is difficult, administer oxygen. If the situation is serious, seek medical attention.

**Eye contact:** Immediately lift the eyelids and rinse with plenty of flowing water. In severe cases, seek medical attention.

**Safe storage:** Store in a cool and ventilated warehouse. Stay away from sparks and heat sources. Packaging sealing. It should be stored separately from oxidants, active metal powders, etc., and should not be stored together. The storage area should be equipped with appropriate materials to contain leaked materials.

**Disposal:** Dispose of according to relevant national and local regulations. Or contact the manufacturer or manufacturer to determine the disposal method.

**Physical and chemical hazards:** When heated to above 200 °C, the substance decomposes into toxic and corrosive gases containing chlorine and hydrogen chloride. When in contact with water, the substance decomposes to produce hydrogen chloride. Water solution is a moderately strong acid. Intense reactions with alkali metals, allyl chloride, ethylene oxide, styrene, and alkali pose a risk of explosion. Corrosion of metals, generating flammable/explosive gas hydrogen.

Has strong corrosiveness to the eyes, and in severe cases can lead to blindness. Skin contact can cause chemical burns. Oral burns to the mouth and digestive tract, accompanied by severe abdominal pain, vomiting, and collapse.

**Chronic effects:** Long term oral administration may cause liver and kidney damage.

**Explosive hazard:** This product is non flammable, corrosive, and highly irritating, and can cause burns to the human body.

**Environmental hazards:** Harmful to aquatic organisms.

**Skin contact:** Immediately remove contaminated clothing and rinse with plenty of flowing water for at least 15 minutes. Seek medical attention.

**Eye contact:** Immediately lift the eyelids and thoroughly rinse with plenty of flowing water or physiological saline for at least 15 minutes. Seek medical attention.

Maintain airway patency. If breathing is difficult, administer oxygen. If breathing stops, immediately perform artificial respiration. Seek medical attention.

**Ingestion:** Rinse mouth with water and drink milk or egg white. Seek medical attention.

**Advice to rescuers:** Rescue personnel must wear relevant labor protection equipment themselves

**Doctor's special reminder:** Seek medical attention as soon as possible after ingestion or inhalation.

## Firefighting measures

**Special danger:** Toxic and corrosive smoke generated by high thermal decomposition.

**Harmful combustion products:** This product is non flammable.

**Extinguishing agent:** use water, foam and carbon dioxide to extinguish the fire.

**Firefighting precautions and measures:** Firefighters should wear filter type gas masks or isolation type respirators, wear full body fire and gas suits, and extinguish the fire upwind. Isolate the accident scene and prevent unrelated personnel from entering. Shelter and handle fire water to prevent and control environmental pollution.

## Leakage emergency response

**Protective measures, equipment, and emergency response procedures for operators:** It is recommended that emergency response personnel wear dust masks (full face masks) and gas protective clothing. Do not come into direct contact with leaks. Isolate the contaminated area and restrict entry and exit.

**Environmental protection measures:** containment and treatment of fire water, prevention and control of environmental pollution. Prevent leaks from entering sewers, surface water, and groundwater.

**Methods for containment and removal of leaked chemicals, as well as disposal materials used:**

**Minor leakage:** Collect with a clean shovel in a dry, clean, and covered container.

**Large leakage:** Cover with plastic or canvas. Then collect, recycle or transport to a waste disposal site for disposal.

## Handling and storage

**Operation precautions:** Closed operation, local ventilation. Operators must undergo specialized training and strictly adhere to operating procedures. It is recommended that operators wear a hood type electric air supply filter type dust respirator, rubber protective clothing, and rubber gloves. Avoid contact with oxidants and active metal powders. When handling, it is important to load and unload with care to prevent damage to the packaging and containers. Equipped with leakage emergency response equipment.

**Storage precautions:** Store in a cool and ventilated warehouse. Stay away from sparks and heat sources. Packaging sealing. It should be stored separately from oxidants, active metal powders, etc., and should not be stored together. The storage area should be equipped with appropriate materials to contain leaked materials.

## Contact control and individual protection

**Occupational exposure limit:**

**Threshold limit value:** (soluble iron salts, measured as Fe)  $1\text{mg}/\text{m}^3$  (American Conference of Government Industrial Hygienists, 2004). The maximum allowable concentration MAC has not been standardized.

**Engineering control:** Closed operation, local ventilation. Provide safety shower and eye wash equipment.

**Respiratory protection:** When exposed to dust, it is necessary to wear a hood type electric air supply filter dust respirator. If necessary, wear a self-contained breathing apparatus.

**Eye protection:** Protective measures have been taken in respiratory protection.

**Body protection:** Wear adhesive and gas resistant clothing.

**Hand protection:** Wear rubber gloves.

**Other protective measures:** Smoking, eating, and drinking are prohibited at the workplace. After work, take a shower and change clothes. Store clothes contaminated with toxins separately and set aside after washing. Maintain good hygiene habits.

### Physical and chemical properties

**Appearance and Appearance:** Dark brown liquid with a slight odor of hydrochloric acid.

**PH value:** meaningless

**Melting point (°C):** meaningless

**Relative density (water=1):** 1.4

**Relative vapor density (air=1):** 5.61

**Flash point (°C):** meaningless

**Ignition temperature (°C):** meaningless

**Explosion limit% (V/V):** meaningless

**Lower explosive limit% (V/V):** meaningless

**Solubility:** soluble in water, insoluble in glycerol, soluble in methanol, ethanol, acetone, and ether.

**Main uses:** used as a treatment agent for drinking water and wastewater, oxidant and mordant in the dye industry, catalyst and oxidant in organic synthesis.

### Stability and reactivity

**Stability:** Stable at room temperature and pressure.

**Prohibited substances:** strong oxidants, potassium, sodium.

**Conditions to avoid:** Keep away from sparks and heat sources.

**Dangerous decomposition products:** Toxic and corrosive smoke generated by high-temperature decomposition, and harmful combustion products such as chlorides.

### Toxicological information

**Acute toxicity:** LD50: 1872 mg/kg (oral in rats), LC50: No data available  
**Skin irritation or corrosion:** redness.  
**Eye irritation or corrosion:** redness. Pain. Blurred vision.  
**Respiratory or skin allergies:** No data available  
**Germ cell mutagenicity:** no data available  
**Carcinogenicity:** No data available  
**Reproductive toxicity:** No data available  
**Specific target organ systemic toxicity - one-time exposure:** no data available  
**Specific target organ systemic toxicity - repeated exposure:** no data available  
**Inhalation hazard:** No data available  
**Toxicokinetic, metabolic, and distribution information:** No data available

### Ecological information

**Ecotoxicity:** Harmful to aquatic organisms. LC50: 21.84mg/L (96h) (black headed fish); 20.26mg/L (96h) (blue gilled sunfish); 30.06mg/L (48h) (reticulated water flea); T<sub>Lm</sub>: 15mg/L (96h) for water fleas; IC50: 1mg/L (72h) (algae).  
**Persistence and degradability:** No data available  
**Potential bioaccumulation:** No data available  
**Mobility in soil:** no data available

### Abandoned disposal

**Disposal method:** Dispose of according to relevant national and local regulations. Or contact the manufacturer or manufacturer to determine the disposal method.  
**Polluted packaging:** Return the packaging to the manufacturer or dispose of it in accordance with relevant national and local regulations.

### Transportation information

**United Nations Dangerous Goods Number (UN):** 2582  
**United Nations shipping name:** ferric chloride solution  
**English name:** ferric trichloride, solution  
**United Nations Hazard Classification:** Class 8 Corrosive Substances  
**Dangerous goods number:** 1850  
**Packaging mark:** corrosive liquid  
**Packaging category:** Class III  
**Marine pollutants (yes/no):** Yes

**Packaging method:** Tank truck or plastic bucket

**Transportation precautions:** During railway transportation, the dangerous goods loading table in the Ministry of Railways' Dangerous Goods Transport Rules should be strictly followed for loading. The packaging should be complete during transportation and the loading should be secure. During transportation, it is necessary to ensure that the container does not leak, collapse, fall, or be damaged. It is strictly prohibited to mix and transport with oxidants, active metal powders, edible chemicals, etc. Transport vehicles should be equipped with leak emergency response equipment during transportation. During transportation, it is necessary to prevent exposure to sunlight, rain, and high temperatures.

## Regulatory information

### Regulatory information:

The following laws, regulations, rules, and standards have made corresponding provisions on the safety production, use, storage, transportation, loading and unloading, classification and labeling, packaging, occupational hazards, and other aspects of chemicals:

"Regulations on the Safety Management of Hazardous Chemicals" (State Council Order No. 645 "Decision of the State Council on Amending Some Administrative Regulations" was passed at the 32nd Executive Meeting of the State Council on December 4, 2013, and is now published and implemented from the date of publication), "List of Hazardous Chemicals" (2015 edition), Implementation Rules for the Safety Management of Chemical Hazardous Materials (Hualaofa [1992] No. 677), Regulations on the Safe Use of Chemicals in the Workplace ([1996] No. 423), and "Classification and Labeling Standards for Chemicals" series of standards (GB 30000.2-2013~GB30000.29-2013), General Rules for Classification and Hazard Disclosure of Chemicals (GB13690-2009)

Regulations such as "List of Dangerous Goods Names" (GB122268-2012), "Content and Project Sequence of Chemical Safety Technical Instructions" (GB/T16483-2008), "Regulations on the Writing of Chemical Safety Labels" (GB15258-2009), etc.

## Other information

**Date:** August 10th, 2021

**Filling department:** Security department

**Data review department:** Changyi Hongda Chemical Co., Ltd

### Disclaimers

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