

# Safety Data Sheet

Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

## 1. Goods and Manufacturers information

Item Name : Ferric Chloride Solution (FeCl <sub>3</sub> )	
Manufacturer or supplier	Company: Jongmaw chemical Co., Ltd.
	Address: No. 6 Jing Hwa Rd. Jung Kang City Tainan County Taiwan
	Tel: +886-62333503 Fax: +886-62336125
Emergency Contact Phone: +886-62333503 Fax: +886-2336125 (Monday to Friday, 8:00 am ~ 5:00 pm)	

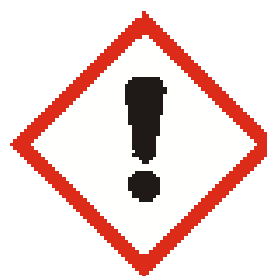
## 2. Hazard Identification Information

Hazard Classification:

1. Acute Toxicity (Oral) : Category 4
2. Acute Toxicity (Dermal) : Category 4
3. Skin Corrosion/Irritation : Category 1C
4. Serious Eye Damage/Eye Irritation : Category 1

Labeling :

Pictograms : Symbol Classified according to the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (UN GHS) as GHS05 (Corrosion) and GHS07 (Exclamation Mark).



Signal Word : Danger

Hazard Statements :

1. Harmful if swallowed.
2. Contact with skin, causing skin irritation
3. Eye contact with harmful, causing serious eye irritation

Precautionary Statements :

1. If contact with eyes, wash immediately with plenty of water and then seek medical
2. Once contaminated clothing, take off immediately
3. Wear proper protective clothing, gloves, goggles, face shield

### 3.Component Identification Information

Name : Ferric Chloride Solution	
Synonyms: Ferric chloride, Iron(III) chloride, Iron chloride	
Chemical Abstracts Service (CAS No.) : 7758-85-0	
Molecular Formula: $\text{FeCl}_3$	Chemical Properties: Corrosive, strong oxidizing agent
Purity (w / w): ferric chloride 32% ~ 46%	Molecular Weight: 162.22
Use: Used as an etchant for printed circuit boards, OLED/FPD/ITO electrodes, and as a coagulant in wastewater treatment.	

### 4.First Aid Measures

Different routes of exposure of first aid	
Skin Contact:	
<ol style="list-style-type: none"> <li>1. Immediately wash with plenty of water for 15 minutes.</li> <li>2. Removal of contaminated clothing and shoes</li> <li>3. As soon as possible for medical treatment.</li> </ol>	
Eye Contact:	
<ol style="list-style-type: none"> <li>1.Immediately wash with plenty of water for more than 15 minutes, flip the upper and lower eyelids time to time.</li> <li>2.As soon as possible for medical treatment.</li> </ol>	
Ingestion:	
<ol style="list-style-type: none"> <li>1. Do not induce vomiting.</li> <li>2. If the patient is conscious, drink plenty of water, milk or magnesium emulsion.</li> <li>3. If the intention is or spasm in patients, do not feed anything.</li> <li>4. As soon as possible for medical treatment.</li> </ol>	
Symptoms and hazardous effects:	
<ol style="list-style-type: none"> <li>1. To stimulate the skin to the redness, pain.</li> <li>2. Conjunctival hyperemia, blurred vision.</li> <li>3. Gastrointestinal corrosion, sore throat, abdominal pain, diarrhea, nausea phenomenon.</li> </ol>	
Protection of emergency personnel:	
<ol style="list-style-type: none"> <li>1. Should wear protective gloves, safety glasses ◦</li> <li>2. Swallowed do not induce vomiting and administer artificial respiration ◦</li> </ol>	
Note to Physician: If swallowed do not induce vomiting, milk and edible acid.	

### 5.Fire Extinguishing Measures

Suitable Extinguishing Media:Use extinguishing agents appropriate for the surrounding fire. This product is non-flammable but is corrosive.
Specific Hazards Arising from the Chemical: This product is non-combustible. Acidic vapors may be released at low temperatures. Thermal decomposition at high temperatures may produce Chlorinated acidic gases.
Special Firefighting Procedures:Not applicable.
Special Protective Equipment for Firefighters: Firefighters should wear full-face self-contained breathing apparatus (SCBA) and full

protective firefighting clothing (structural firefighter's protective gear) for adequate protection.

## 6. Accidental Release Measures

Personal precautions : Wear acid-fast, waterproof overalls and full protective equipment including rubber gloves, rubber work shoes .

Methods for cleaning up and Environmental Considerations :

1. A small leak or drip, the need to wipe or wipe, and the solution drip down on the waste water treatment pond .
2. A lot of leakage, the use of soil or non-combustible absorbent material put containment building, then soda ash or lime and in carefully; such as soda ash is required to use proper ventilation, drain itself of carbon dioxide waste in the container unit and lawful processing; waste solution down to the pool water treatment .
3. And not in the material to avoid entering sewers, drains, surface water and soil .

## 7. Handling and Storage

Safe disposal :

1. Prohibited in the workplace in eating, drinking and smoking .
2. The operation is completed, wash hands thoroughly .
3. required before entering the dining remove contaminated clothing and protective equipment .
4. Eyes, skin or clothing do not contact with this material .

Storage methods and conditions :

1. In order to avoid corrosion caused by acid vapors environment when not in use, the container should be closed .
2. Store in a cool, dry and ventilated area away from direct sunlight cause deterioration .
3. Store in rubber lined steel drums or plastic containers, away from all other chemicals and possible sources of contamination .
4. Containers even empty, there may be residue and vapors, to comply with hazard warning and a way to operate the operating empty bucket full bucket .

## 8. Exposure Controls

Engineering Controls : 1. Use local exhaust ventilation.  
2. Preferably operate within a closed system.

Control Parameters: No established occupational exposure limits.

Personal Protective Equipment :

Eye Protection :

1. Use chemical safety goggles. A hood-type or half-face respirator may be used if there is a risk of exposure.

2. Contact lenses should not be worn when handling this substance, as they may increase the severity of eye injuries in case of an accident.

Respiratory Protection : If vapor or mist is present, use an acid-resistant, droplet-type full-face or half-face air-purifying respirator. For high exposure levels, use a pressure-demand self-contained breathing apparatus (SCBA) or a supplied-air respirator. Protective clothing and footwear : Wear long-sleeved shirts, long pants, acid-resistant rubber shoes, gloves, and aprons or coveralls.

Safe Operation : 1. Keep containers tightly closed when not in use. 2. Wash hands and exposed skin thoroughly after handling. 3. Avoid contact with eyes, skin, and clothing. 4. Residues in empty containers should be handled with the same precautions as full containers, as they may still pose hazards.

Ventilation : Use local mechanical exhaust ventilation to minimize airborne concentrations during handling.

#### Health Measures :

1. Always wear appropriate PPE such as gloves and safety glasses when handling.
2. If clothing is contaminated, clean immediately with a dilute oxalic acid solution (if appropriate and safe to do so).

## 9. Physical and Chemical Properties

Chemical Properties: as the oxidant, a corrosion	Molecular Weight: 162.22
Physical State: the proportion of the acidic solution	Density(Water = 1) : 1.38~1.53(20°C)
Color: Red Brown	Shape: and thick liquid
pH : < 2	Odor: Acid odor
Decomposition temperature: 400 °C	Boiling point / boiling range: 229 °C
Autoignition Temperature: No data	Flash point: no data Test method: not available
Vapor density: 0.9 (air = 1)	Explosion limits: no data
Vapor pressure: 50 mmHg	

## 10. Stability and Reactivity

Stability: Stable
Special situations Hazardous Reactions: No data
Should avoid: avoid using copper, iron, aluminum and other metals when the container, it is appropriate pottery, plastic or glass
Avoid substances: copper, iron, aluminum
Hazardous decomposition products: chlorine, hydrogen chloride gas
Incompatible substances: alkali metals

## 11.Toxicological information

Acute toxicity: No data
Skin corrosion : irritation
Serious eye damage : irritation
Respiratory or skin allergy: Skin contact can cause redness itching
Germ cell mutation: No data
Carcinogenicity: no data
Reproductive toxicity: No data
Target organ toxicity - single exposure: no information
Target organ toxicity - Repeated exposure: no information
Pour inhalation hazards: long-term inhalation of acid gases, will affect the respiratory system

## 12.Ecological Information

Possible environmental impact / environmental flow fabric :
1. Exposed to the atmosphere, there will be acidic smell oven, air pollution
2. Runoff to water, it will form a reddish-brown precipitate, causing river pollution
3. Flow to the soil, resulting in red-brown soil pollution and groundwater pollution, water quality

## 13.Waste Disposal Method

Waste disposal methods :
1. Empty containers will be residues, gases and droplets, to be treated according to the above RELEASE
2. Liquid waste disposal , To qualified institutional re-use recycling process
3. Using the proper handling of the material handled by the leakage of contaminated materials and substances used when cleaning up
4. to consult appropriate government authorities to seek appropriate treatment

## 14. Shipping Information

Proper shipping name : Ferric Chloride Solution
UN/NA # : UN 2582
Hazard Label : Class 8
Packing Group : III
Domestic Transport Regulations (Taiwan) :
Road Transport : According to Article 84 of the "Road Traffic Safety Regulations": Dangerous goods must be transported by qualified vehicles, operated by licensed drivers and escorts authorized for hazardous materials. Relevant labeling, loading/unloading, parking, and driving safety regulations must be strictly followed.
1. Special transport methods and precautions:
1.1.Transport vehicles must be approved for hazardous goods (e.g., certified tankers or sealed

containers), and must carry valid inspection certificates issued by the competent authority.

1.2. During transport, appropriate hazard labels (Class 8 – Corrosive substances) and the UN number (UN 2582) must be prominently displayed.

1.3. Tankers must be equipped with leakage containment equipment and must not be loaded together with alkaline substances or incompatible chemicals.

1.4. Loading/unloading operations must be carried out by trained personnel wearing appropriate personal protective equipment (PPE).

Sea Transport (IMDG Code) : According to the “Regulations Governing the Carriage of Dangerous Goods by Ships,” shipments must comply with the IMDG Code regarding packaging, labeling, and classification.

1. Proper shipping name : Ferric chloride solution

2. UN Number : UN 2582

3. Hazard Label : Class 8 (Corrosive substances)

4. Packing Group : III

5. Packaging must pass corrosion resistance and leak-proof tests.

6. Packaging must comply with the IMDG Code requirements for Packing Group III, with correct labels and the proper shipping name clearly displayed.

7. UN 2582 and Class 8 hazard label must be indicated; a Dangerous Goods Declaration (DGD) must be submitted prior to shipment.

8. Ships must have designated cargo holds suitable for Class 8 substances, as per the IMDG Code stowage and segregation requirements.

Air Transport (IATA DGR) : Air transport must comply with the IATA Dangerous Goods Regulations (DGR), including the relevant appendices on packaging, labeling, and classification.

1. Proper shipping name : Ferric Chloride Solution

2. UN Number : UN 2582 (Refer to IATA Dangerous Goods List – Table 4.2)

3. Hazard Label : Class 8 (Corrosive substances)

4. Packing Group : III

5. Passenger Aircraft :

5.1. Packing Instruction : PI852

5.2. Max net quantity per package : 5 L

5.3. Limited Quantity : PI Y841

6. Cargo Aircraft Only :

6.1. Packing Instruction : PI856

6.2. Max net quantity per package : 60 L

7. Special Provisions : A3, A803

8. Environmental Hazards : Not applicable

9. Emergency Response Guide (ERG) Code : 8L

## 15. Legal Information

Applicable laws and regulations :

1. Regulations for Labelling and Hazard Communication of Hazardous Chemicals(Promulgated by the Ministry of Labor, Executive Yuan)
2. Road Traffic Safety Rules(Promulgated by the Ministry of Transportation and Communications, Executive Yuan)
- Standards for Storage, Collection, and Disposal Methods and Facilities of Industrial Waste(Promulgated by the Environmental Protection Administration, Executive Yuan)

## 16. Other Information

References:

1. Industrial Technology Research Institute of Industrial Safety and Health Technology Development Center, Material Safety Data Sheet
2. Chemical Industry Press, He Tielin editor, water treatment chemicals, manual, 46 ~ 49
3. Council of Labor Affairs, Emergency Response Guide.

Tabulation unit	Company : Jongmaw Chemical CO., Ltd		
	Address: NO 6 Jing Hwa RD Jung Kang City Tainan County Taiwan TEL: +886-62333503      Fax: +886-62336125		
V a l i d a t e d	Manager Yulin Kuo	Date of Tabling	2025/01/01