



# Safety Data Sheet

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## Section 1 - Product and Company Identification

Product name : Ferric Chloride Solution

Other names : --

Product use : etching aluminum metallizations on silicon devices and in integrated circuit applications.

Supplier's name : San Fu Chemical Co., Ltd., Shan Hua Plant

Supplier's address : 1,Sec.1,Huanyuan E..Rd.,Liuying Dist.,Tainan, Taiwan 736.

Supplier's phone : 886-6-6231821

Emergency phone : 886-6-6231821

FAX. : 886-6-6231822

## Section 2 - Hazards Identification

Classification :

- |                                      |            |
|--------------------------------------|------------|
| 1. Corrosive to Metals               | Category 1 |
| 2. Skin Corrosion/Irritation         | Category 1 |
| 3. Serious Eye Damage/Eye Irritation | Category 1 |

The Most Important Hazards and effect

Label element :

- Hazard symbol : Corrosion



- Signal word : Danger

Hazard statement :

1. Harmful if swallowed
2. May corrode metals
3. Cause serious skin burns and eye damage
4. Cause serious eye damage

Precautionary statement :

1. If contact with eyes, flush water and get medical attention immediately.
2. Wear proper protective gears.
3. If case of accident or if you feel unwell, seek medical advice immediately.

Others Hazard : --

## Section 3 - Composition/Information On Ingredients

Mixture :

Component or impurities contributing to the hazard	Concentration or concentration range (%)	CAS No.
Ferric Chloride	32~45%	10025-77-1

## Section 4 - First Aid Measures

The First-aid Information :

- Inhalation :



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<ol style="list-style-type: none"><li>1. Remove casualty from expose ensuring one's own safety whilst doing so.</li><li>2. If unconscious and breathing is OK, place in the recovery position.</li><li>3. If conscious, ensure the casualty sits or lies down.</li><li>4. If breathing becomes bubbly, have the casualty sit and provide oxygen if available.</li><li>5. Transfer to hospital ASAP.</li></ol> <p>■ Skin Contact :</p> <ol style="list-style-type: none"><li>1. Wear protective impervious gloves to avoid contacting with this substance.</li><li>2. Flush the affected skin for at least 20 minutes.</li><li>3. Remove all contaminated clothes, shoes, and leather products.</li><li>4. Get medical attention immediately.</li><li>5. Clean thoroughly the contaminated clothing before reuse or discard.</li></ol> <p>■ Eye Contact :</p> <ol style="list-style-type: none"><li>1. Immediately flush eyes with water for at least 20 minutes. Forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues.</li><li>2. Avoid contaminated unaffected area.</li><li>3. Get medical attention immediately.</li></ol> <p>■ Ingestion :</p> <ol style="list-style-type: none"><li>1. Never give anything by mouth to an unconscious or convulsive person.</li><li>2. If swallowed, don't induce vomiting.</li><li>3. If the patient is conscious, rinse mouth thoroughly and drink about 240~300 ml water.</li><li>4. Do not induce vomiting.</li><li>5. Get medical attention immediately.</li></ol>
<p>The Most Important Symptoms and Hazardous Effects :</p> <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>
<p>Protection of First-aiders :</p> <ol style="list-style-type: none"><li>1. Avoid providing aid to give mouth-to-mouth resuscitation.</li><li>2. Wear adequate personal protective equipment, such as Class C Chemical protective clothing.</li></ol>
<p>Notes to a Physician : If swallowed do not induce vomiting, milk and edible acid.</p>

## Section 5 - Fire Fighting Measures

<p>Extinguishing Media : Use a fire extinguisher suitable for surrounding fire.</p>
<p>Specific Hazards when Fire-fight : Not flammable, low temperature evaporation of acidic gases, high temperature decomposition of nitrogen oxides when the gas.</p>
<p>Specific Fire-fighting Procedure : --</p>
<p>Specific Protection of Firefighters : Wear positive pressure self-contained breathing masks and protective clothing firefighters buildings can provide effective protection.</p>

## Section 6 - Accidental Release Measures

<p>Personal Precautions : Wear acid-fast, waterproof overalls and full protective equipment including rubber gloves, rubber work shoes .</p>
<p>Environmental Precautions :</p> <ol style="list-style-type: none"><li>1. Keep well-ventilation before cleaning up the indoor.</li></ol>



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2. Prevent entry into sewers or rivers.
<b>Methods for Cleaning up :</b> 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 as his 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 ◦

## Section 7 - Handling and Storage

<b>Handling :</b> 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 ◦
<b>Storage :</b> 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 ◦

## Section 8 - Exposure Controls & Personal Protection

<b>Engineering measures :</b> Ferric chloride at 400 °C in the rise of its gas for the dimer; high temperature and then began to dissociate in the presence of an excess amount of chlorine at 750 °C, into a single. When there is no excess chlorine, then decomposed at above 200 °C ferrous chloride and chlorine.			
Control parameters			
TWA	STEL	Ceiling	Biological standards
--	--	5ppm(HCl)	--
<b>Personal protective equipment :</b> <ul style="list-style-type: none"> <li>■ Eye protection :              1. Chemical goggles and a half and hood-type respirator with ◦              2. Work must not wear contact lenses, or victims of accidents will increase the severity of the eye ◦</li> <li>■ Respiratory Protection : Will have a vapor or mist, use anti-acid as, droplet-type of full face mask or half mask air-purifying filter tank-type respirator for pressure-type self-contained breathing apparatus or supplied-air respirator ◦</li> <li>■ Protective clothing and footwear : Long-sleeved shirts, long pants, rubber shoes, rubber gloves and rubber aprons or overalls acid water ◦</li> </ul>			
<b>Hygiene measures :</b>			



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|--|
| 1. Operators must wear protective gloves, safety glasses.<br>2. Clothes are contaminated with dilute oxalic acid solution when cleaning. |
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## Section 9 - Physical & Chemical Properties

Appearance : Liquid	Odor : Acid odor
Color : Red Brown	Melting Point: --
pH value : < 2	Boiling point/boiling range : 229°C
Flammability: --	Flash point : --
Decomposition temp : 400°C	Test method : --
Auto ignition temp : --	Explosion properties : --
Vapor pressure : 50mmHg	Vapor density :
Density : 1.38~1.35(20°C)	Solubility : miscible in water
log Kow : --	Evaporation Rate : --

## Section 10 - Stability & Reactivity Data

Stability : Stable under normal condition
Possible hazardous reactions under specific conditions : --
Conditions to avoid : Avoid using copper, iron, aluminum and other metals when the container, it is appropriate pottery, plastic or glass
Materials to avoid : copper, iron, aluminum
Hazardous decomposition products : chlorine, hydrogen chloride gas

## Section 11 - Toxicological Information

Route of exposure : inhalation, skin, ingestion, eye
Symptoms : irritation, burning sensation,
Immediate Toxicity : <ol style="list-style-type: none"><li>1. Skin : Skin contact can cause redness itching</li><li>2. Inhalation : There may be shortness of breath with a burning sensation in the throat.</li><li>3. Eye : Irritation</li><li>4. Ingestion : --<ul style="list-style-type: none"><li>● LD<sub>50</sub>: --</li><li>● LC<sub>50</sub>: --</li></ul></li></ol>
Specific effects : --

## Section 12 - Ecological Information

Ecotoxicology : <ul style="list-style-type: none"><li>■ LC<sub>50</sub>(fish) : --</li><li>■ EC<sub>50</sub>(Aquatic Invertebrates) : --</li></ul>
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■ Bioconcentration factor (BCF) : --
Persistence and degradability : ■ Half-Life (Air) : -- ■ Half-Life (Water surface) : -- ■ Half-Life (Groundwater) : -- ■ Half-Life (Soil) : --
Bioaccumulative potential : --
Mobility in soil : --
Other adverse effects : --

## Section 13 - Disposal Considerations

Methods of disposal : 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
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## Section 14 - SDS Transport Information

UN classification number : UN 2582 (UN/NA # : UN 2582)
Proper D.O.T Shipping Name : (Ferric Chloride Solution)
Hazard Class : 8
Packing Group : Tote Delivery
Marine pollution : --
Specific precautionary transport measures and conditions : --

## Section 15 - Regulatory Information

Regulations : 1. Occupational Safety and Health Act 2. Regulations for the Labelling and Hazard Communication of Hazardous Chemicals 3. Road Traffic Safety Regulations 4. Industrial Waste Storage and Disposal Regulations 5. Assessment and Classification Administration of Hazardous Chemicals 6. Permissible Exposure Limits of Hazardous Substances in the Work Environment
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## Section 16 - Other Information

Literature references	1. RTECS Database, TOMES CPS CD-ROM, Vol.65, 2005 2. ChemWatch Database, 2005-1 3. Cheminfo Database, CCINFO CD-ROM, 2005-3 4. HSDB Database, TOMES CPS CO-ROM, Vol.65, 2005
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Prepared by	Supplier : San Fu Chemical Co., Ltd. Shan Hua Plant	
	Address : 1,Sec.1,Huanyuan E..Rd.,Liuying Dist.,Tainan, Taiwan 736.	
	TEL : 886-6-6231821	FAX : 886-6-6231822
	Name : X.Z.Lin	
Issue date	Apr-17 <sup>th</sup> 2024	Revision : 4
Re-revision date	Apr-16 <sup>rd</sup> 2027	
Remarks	Symbols Explanations: "--" No information is available at this time. "/" Not applicable to this substance.	
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