SAFETY DATA SHEET

1. Identification

Product identifier **Ferrous Chloride Solution**

Other means of identification

SDS number WS012

Recommended use Acid Recovery.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier The Worthington Steel Company

Address
200 Old Wilson Bridge Road
Columbus, OH 43085
United States

Email: steel@worthingtonindustries.com

Telephone Number: 800-944-3733

CHEMTREC - 24 HOURS: Within US: 800-424-9300 International: +1 703-741-5970 (collect calls accepted)

2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, repeated exposure	Category 2 (liver)
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement May be corrosive to metals. Causes severe skin burns and eye damage. May cause respiratory irritation. May cause damage to organs (liver) through prolonged or repeated exposure. Toxic to aquatic life.

Precautionary statement

Prevention Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe mist or vapor. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area. Keep only in original container. Avoid release to the environment.

Response Immediately call a poison center/doctor. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Absorb spillage to prevent material damage.

Storage Store in a well-ventilated place. Keep container tightly closed. Store in corrosive resistant container with a resistant inner liner. Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Water	7732-18-5	65-75
Ferrous chloride	7758-94-3	20-30
Hydrochloric acid	7647-01-0	2-8

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Skin contact Remove and isolate contaminated clothing and shoes. Immediately flush with plenty of water for at least 15 minutes. Get medical attention immediately. Wash clothing separately before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Ingestion Rinse mouth and drink plenty of water. Do not induce vomiting. Never give anything by mouth to a victim who is unconscious or is having convulsions. Get medical attention immediately.

Most important symptoms/effects, acute and delayed Corrosive effects. Symptoms include itching, burning, redness, and tearing of eyes.

Indication of immediate medical attention and special treatment needed Treat symptomatically.

General information Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media Dry chemical, foam, carbon dioxide.

Unsuitable extinguishing media None.

Specific hazards arising from the chemical Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters Firefighters should wear full protective clothing including self contained breathing apparatus.

Fire fighting equipment/instructions Move containers from fire area if you can do it without risk.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards During fire, gases hazardous to health may be formed.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Avoid inhalation of vapors and contact with skin and eyes. Local authorities should be advised if significant spills cannot be contained.

Methods and materials for containment and cleaning up Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Neutralize with soda ash or sodium bicarbonate. For waste disposal, see Section 13 of the SDS.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not contaminate water.

7. Handling and storage

Precautions for safe handling Wear appropriate personal protective equipment (See Section 8). Use only with adequate ventilation. Do not breathe fumes. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities Store only in original container. Store in corrosive resistant container with a resistant inner liner. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Hydrochloric acid (CAS 7647-01-0)	Ceiling	7 mg/m3
		5 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Ferrous chloride (CAS 7758-94-3)	TWA	1 mg/m3
Hydrochloric acid (CAS 7647-01-0)	Ceiling	2 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Ferrous chloride (CAS 7758-94-3)	TWA	1 mg/m3
Hydrochloric acid (CAS 7647-01-0)	Ceiling	7 mg/m3
		5 ppm

Biological limit values No biological exposure limits noted for the ingredient(s).

Exposure guidelines Use personal protective equipment as required. Keep working clothes separately.

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear approved safety glasses or goggles.

Skin protection

Hand protection Wear protective gloves.

Other Wear suitable protective equipment.

Respiratory protection Use a respirator when local exhaust or ventilation is not adequate to keep exposures below the OEL. In a confined space a supplied respirator may be required. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid.

Color Green to brown.

Odor Slightly acrid.

Odor threshold Not available.

pH < 1

Melting point/freezing point Not available.

Initial boiling point and boiling range 200 - 225 °F (93.33 - 107.22 °C)

Flash point Not applicable.

Evaporation rate 0.6 (Butyl acetate = 1)

Flammability (solid, gas)	Non flammable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not applicable.
Flammability limit - upper (%)	Not applicable.
Vapor pressure	40 mm Hg (35°C/95°F)
Vapor density	Not available.
Relative density	1.2 - 1.4 (Water = 1)
Solubility(ies)	
Solubility (water)	Very Soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Percent volatile	65 - 75 % Water

10. Stability and reactivity

Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with metals. Excessive heat or cold.
Incompatible materials	Alkalines. Strong oxidizing agents.
Hazardous decomposition products	Thermal decomposition or combustion may liberate corrosive gases or fumes. Hydrogen chloride gas. Chlorine. Ferric oxide and ferrous oxide fumes.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Corrosive to the respiratory tract.
Skin contact	Causes skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Harmful if swallowed. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract.
Symptoms related to the physical, chemical and toxicological characteristics	Corrosive effects. Symptoms include itching, burning, redness, and tearing of eyes.

Information on toxicological effects

Acute toxicity Causes burns. Harmful if swallowed.

Components	Species	Test Results
Ferrous chloride (CAS 7758-94-3)		
Acute		
Oral		
LD50	Rat	450 mg/kg
Hydrochloric acid (CAS 7647-01-0)		
Acute		
Inhalation		
LC50	Rat	3124 ppm, 1 Hours

Skin corrosion/irritation	Causes skin burns.
Serious eye damage/eye irritation	Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Not classified.

Skin sensitization Not classified.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA. Dissolved metals may be present that are suspected or confirmed human carcinogens (e.g. chromium, nickel)

IARC Monographs. Overall Evaluation of Carcinogenicity

Hydrochloric acid (CAS 7647-01-0) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity Not classified.

Specific target organ toxicity - single exposure May cause respiratory tract irritation.

Specific target organ toxicity - repeated exposure May cause damage to organs (liver) through prolonged or repeated exposure.

Aspiration hazard Not classified.

Chronic effects Can cause delayed lung injury.

Further information No other specific acute or chronic health impact noted.

12. Ecological information

Ecotoxicity Toxic to aquatic life.

Components		Species	Test Results
Ferrous chloride (CAS 7758-94-3)			
Aquatic			
Fish	LC50	Striped bass (Morone saxatilis)	4 mg/l, 96 Hours

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Mobility in soil This product is water soluble and may disperse in soil.

Other adverse effects An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. Disposal considerations

Disposal instructions Dispose waste and residues in accordance with applicable federal, state, and local regulations.

Hazardous waste code D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]

Waste from residues / unused products Dispose in accordance with all applicable regulations.

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN1760

UN proper shipping name Corrosive liquids, n.o.s. (Ferrous chloride RQ = 400 LBS, Hydrochloric acid RQ = 100000 LBS)

Transport hazard class(es)

Class 8

Subsidiary risk -

Label(s) 8

Packing group II

Environmental hazards

Marine pollutant No

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Special provisions B2, IB2, T11, TP2, TP27

Packaging exceptions 154

Packaging non bulk 202

Packaging bulk 242

IATA

UN number	UN1760
UN proper shipping name	Corrosive liquid, n.o.s. (Ferrous chloride, Hydrochloric acid)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	II
Environmental hazards	No
ERG Code	8L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1760
UN proper shipping name	CORROSIVE LIQUID, N.O.S. (Ferrous chloride, Hydrochloric acid)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	II
Environmental hazards	
Marine pollutant	No
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

15. Regulatory information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Ferrous chloride (CAS 7758-94-3)	LISTED
Hydrochloric acid (CAS 7647-01-0)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
Hydrochloric acid	7647-01-0	5000	500		

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Hydrochloric acid	7647-01-0	2-8

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Hydrochloric acid (CAS 7647-01-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Hydrochloric acid (CAS 7647-01-0)

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Hydrochloric acid (CAS 7647-01-0) 6545

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Hydrochloric acid (CAS 7647-01-0) 20 %WV

DEA Exempt Chemical Mixtures Code Number

Hydrochloric acid (CAS 7647-01-0) 6545

US state regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Ferrous chloride (CAS 7758-94-3)
Hydrochloric acid (CAS 7647-01-0)

US. New Jersey Worker and Community Right-to-Know Act

Ferrous chloride (CAS 7758-94-3)
Hydrochloric acid (CAS 7647-01-0)

US. Pennsylvania Worker and Community Right-to-Know Law

Ferrous chloride (CAS 7758-94-3)
Hydrochloric acid (CAS 7647-01-0)

US. Rhode Island RTK

Hydrochloric acid (CAS 7647-01-0)

US. California Proposition 65

Not Listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 01-June-2015

Revision date -

Version # 01

Further information HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings Health: 3*
Flammability: 0
Physical hazard: 0

NFPA ratings

Disclaimer

All information in this Material Safety Data Sheet is believed to be accurate and reliable. However, no guarantee or warranty of any kind is made with regard to the accuracy of information or the suitability of the recommendations contained herein. It is the user's responsibility to assess the safety and toxicity of this product under their own conditions of use and to comply with all applicable laws and regulations.