

# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

## 1 Identification

- **Product identifier**
- **Trade name:** Reagent 2/Ferrozine
- **Article number:** ND287
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**  
Aqua Solutions, Inc.  
6913 Highway 225  
DEER PARK, TX 77536  
USA  
800-256-2586
- **Information department:**  
Technical Coordinator  
Sherman Nelson sherman@aquasolutions.org
- **Emergency telephone number:**  
Chemtrec: 800-424-9300  
Canutec: 613-996-6666



## 2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS01 Exploding bomb

Unst. Expl. H200 Unstable explosive.



GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.

STOT RE 2 H373 May cause damage to organs through prolonged or repeated exposure.



GHS05 Corrosion

Skin Corr. 1A H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.



GHS07

Skin Sens. 1 H317 May cause an allergic skin reaction.

STOT SE 3 H335 May cause respiratory irritation.

- **Label elements**

- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

(Contd. on page 2)

# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

Trade name: Reagent 2/Ferrozine

(Contd. of page 1)

## · Hazard pictograms

· Signal word *Danger*

## · Hazard-determining components of labeling:

*Hydrochloric Acid**Hydroxylamine Hydrochloride*

## · Hazard statements

*Unstable explosive.**Causes severe skin burns and eye damage.**May cause an allergic skin reaction.**Suspected of causing cancer.**May cause respiratory irritation.**May cause damage to organs through prolonged or repeated exposure.*

## · Precautionary statements

*Obtain special instructions before use.**Do not handle until all safety precautions have been read and understood.**Do not breathe dusts or mists.**Wash thoroughly after handling.**Use only outdoors or in a well-ventilated area.**Contaminated work clothing must not be allowed out of the workplace.**Wear protective gloves/protective clothing/eye protection/face protection.**Wear personal protective equipment/face protection.**If swallowed: Rinse mouth. Do NOT induce vomiting.**If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.**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.**IF exposed or concerned: Get medical advice/attention.**Immediately call a poison center/doctor.**Get medical advice/attention if you feel unwell.**Specific treatment (see on this label).**If skin irritation or rash occurs: Get medical advice/attention.**Wash contaminated clothing before reuse.**Explosion risk in case of fire.**DO NOT fight fire when fire reaches explosives.**Evacuate area.**Store in accordance with local/regional/national/international regulations.**Store in a well-ventilated place. Keep container tightly closed.**Store locked up.**Dispose of contents/container in accordance with local/regional/national/international regulations.*

## · Classification system:

## · NFPA ratings (scale 0 - 4)

*Health = 3**Fire = 1**Reactivity = 0*

(Contd. on page 3)

# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

Trade name: Reagent 2/Ferrozine

(Contd. of page 2)

- **HMIS-ratings (scale 0 - 4)**

HEALTH	3	Health = 3
FIRE	1	Fire = 1
REACTIVITY	0	Reactivity = 0

- **Other hazards**
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.

### 3 Composition/information on ingredients

- **Chemical characterization: Mixtures**
- **Description:** Mixture of the substances listed below with nonhazardous additions.

- **Dangerous components:**

CAS: 7647-01-0	Hydrochloric Acid	53.0399%
CAS: 5470-11-1	Hydroxylamine Hydrochloride	9.224%

- **Table of Nonhazardous Ingredients**

CAS: 28048-33-1	Ferrozine Disodium 4,4'-[3-(Pyridin-2-yl)-1,2,4-Triazine-5,6-Diyl]bis(Benzenesulphonate)	0.461%
CAS: 7732-18-5	Water	37.275%

### 4 First-aid measures

- **Description of first aid measures**
- **General information:**  
Immediately remove any clothing soiled by the product.  
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
- **After inhalation:**  
Supply fresh air and to be sure call for a doctor.  
In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing:** Drink copious amounts of water and provide fresh air. Immediately call a doctor.
- **Information for doctor:**  
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.  
· **Indication of any immediate medical attention and special treatment needed**  
No further relevant information available.

### 5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** No special measures required.

US

(Contd. on page 4)

# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

Trade name: Reagent 2/Ferrozine

(Contd. of page 3)

## 6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**

Remove persons from danger area.

Wear protective equipment. Keep unprotected persons away.

- **Environmental precautions:**

Dilute with plenty of water.

Do not allow to enter sewers/ surface or ground water.

- **Methods and material for containment and cleaning up:**

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Use neutralizing agent.

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

- **Reference to other sections**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

- **Protective Action Criteria for Chemicals**

- **PAC-1:**

CAS: 7647-01-0	Hydrochloric Acid	1.8 ppm
CAS: 5470-11-1	Hydroxylamine Hydrochloride	0.42 mg/m <sup>3</sup>

- **PAC-2:**

CAS: 7647-01-0	Hydrochloric Acid	22 ppm
CAS: 5470-11-1	Hydroxylamine Hydrochloride	4.7 mg/m <sup>3</sup>

- **PAC-3:**

CAS: 7647-01-0	Hydrochloric Acid	100 ppm
CAS: 5470-11-1	Hydroxylamine Hydrochloride	28 mg/m <sup>3</sup>

## 7 Handling and storage

- **Handling:**

· **Precautions for safe handling** Open and handle receptacle with care.

- **Information about protection against explosions and fires:**

Keep ignition sources away - Do not smoke.

Prevent impact and friction.

- **Conditions for safe storage, including any incompatibilities**

- **Storage:**

· **Requirements to be met by storerooms and receptacles:** No special requirements.

· **Information about storage in one common storage facility:** Not required.

- **Further information about storage conditions:**

Keep receptacle tightly sealed.

Protect from heat and direct sunlight.

· **Specific end use(s)** No further relevant information available.

## 8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

(Contd. on page 5)

# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

**Trade name: Reagent 2/Ferrozine**

(Contd. of page 4)

- **Control parameters**

- **Components with limit values that require monitoring at the workplace:**

The following constituent is the only constituent of the product which has a PEL, TLV or other recommended exposure limit.

At this time, the remaining constituent has no known exposure limits.

**CAS: 7647-01-0 Hydrochloric Acid**

NIOSH RECOMENDED EXP LIM	Ceiling limit value: 7.0 mg/m <sup>3</sup> mg/m <sup>3</sup>
PEL	Ceiling limit value: 7 mg/m <sup>3</sup> , 5 ppm
REL	Ceiling limit value: 7 mg/m <sup>3</sup> , 5 ppm
TLV	Ceiling limit value: 2.98 mg/m <sup>3</sup> , 2 ppm

- **Additional information:** The lists that were valid during the creation were used as basis.

- **Exposure controls**

- **Personal protective equipment:**

- **General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing.

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Avoid contact with the eyes.

Avoid contact with the eyes and skin.

- **Breathing equipment:**

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

- **Protection of hands:**



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

- **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

- **Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

- **Eye protection:**



Tightly sealed goggles

- **Body protection:** Protective work clothing

US

(Contd. on page 6)

# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

Trade name: Reagent 2/Ferrozine

(Contd. of page 5)

## 9 Physical and chemical properties

· <b>Information on basic physical and chemical properties</b>	
· <b>General Information</b>	
· <b>Appearance:</b>	
Form:	Liquid
Color:	Light yellow
· <b>Odor:</b>	Odorless
· <b>Odor threshold:</b>	Not determined.
· <b>pH-value at 20 °C (68 °F):</b>	<2
· <b>Change in condition</b>	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	100 °C (212 °F)
· <b>Flash point:</b>	Not applicable.
· <b>Flammability (solid, gaseous):</b>	Not applicable.
· <b>Ignition temperature:</b>	
Decomposition temperature:	Not determined.
· <b>Auto igniting:</b>	Product is not selfigniting.
· <b>Danger of explosion:</b>	Risk of explosion by shock, friction, fire or other sources of ignition.
· <b>Explosion limits:</b>	
Lower:	Not determined.
Upper:	Not determined.
· <b>Vapor pressure at 20 °C (68 °F):</b>	23 hPa (17.3 mm Hg)
· <b>Density at 20 °C (68 °F):</b>	1.08409 g/cm <sup>3</sup> (9.04673 lbs/gal)
· <b>Relative density</b>	Not determined.
· <b>Vapor density</b>	Not determined.
· <b>Evaporation rate</b>	Not determined.
· <b>Solubility in / Miscibility with</b>	
Water:	Fully miscible.
· <b>Partition coefficient (n-octanol/water):</b> Not determined.	
· <b>Viscosity:</b>	
Dynamic:	Not determined.
Kinematic:	Not determined.
· <b>Solvent content:</b>	
Water:	37.3 %
VOC content:	0.00 %
	0.0 g/l / 0.00 lb/gl
Solids content:	9.7 %
· <b>Other information</b>	No further relevant information available.

## 10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

(Contd. on page 7)

# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

Trade name: Reagent 2/Ferrozine

(Contd. of page 6)

- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

## 11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**

**ATE (Acute Toxicity Estimate)**

Oral	LD50	4,423 mg/kg (mouse)
Dermal	LD50	11,925 mg/kg

**CAS: 7647-01-0 Hydrochloric Acid**

Irritation of skin	Skin Corrosion/Irritation	(rabbit)
Irritation of eyes	Eye damage/eye irritation	(rabbit)
	Germ cell mutagenicity	(Human)

**CAS: 5470-11-1 Hydroxylamine Hydrochloride**

Oral	LD50	408 mg/kg (mouse)
Dermal	LD50	1,100 mg/kg (ATE)

- **Primary irritant effect:**
- **on the skin:** Strong caustic effect on skin and mucous membranes.
- **on the eye:**  
Strong caustic effect.  
Strong irritant with the danger of severe eye injury.
- **Sensitization:** Sensitization possible through skin contact.
- **Additional toxicological information:**  
The product shows the following dangers according to internally approved calculation methods for preparations:  
Corrosive  
Irritant  
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

- **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**

None of the ingredients is listed.

· **NTP (National Toxicology Program)**

None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

## 12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.

(Contd. on page 8)

# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

Trade name: Reagent 2/Ferrozine



(Contd. of page 7)

- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**  
*Water hazard class 3 (Self-assessment): extremely hazardous for water*  
*Do not allow product to reach ground water, water course or sewage system, even in small quantities.*  
*Must not reach bodies of water or drainage ditch undiluted or unneutralized.*  
*Danger to drinking water if even extremely small quantities leak into the ground.*  
*Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.*
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

## 13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**  
*Must not be disposed of together with household garbage. Do not allow product to reach sewage system.*
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agent:** Water, if necessary with cleansing agents.

## 14 Transport information

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>· <b>UN-Number</b></li> <li>· <b>DOT, IMDG, IATA</b></li> </ul>                                | <p style="text-align: center;">UN1760</p>  |
| <ul style="list-style-type: none"> <li>· <b>UN proper shipping name</b></li> <li>· <b>DOT</b></li> <li>· <b>IMDG, IATA</b></li> </ul> | <p style="text-align: center;"><i>Corrosive liquids, n.o.s. (Hydrochloric acid, Hydroxylamine Hydrochloride)</i><br/> <b>CORROSIVE LIQUID, N.O.S. (HYDROCHLORIC ACID, Hydroxylamine Hydrochloride)</b></p> |
| <ul style="list-style-type: none"> <li>· <b>Transport hazard class(es)</b></li> <li>· <b>DOT</b></li> </ul>                           | <p style="text-align: center;"></p>   |
| <ul style="list-style-type: none"> <li>· <b>Class</b></li> <li>· <b>Label</b></li> </ul>  | <p style="text-align: center;">8 Corrosive substances<br/>8</p>  |
| <ul style="list-style-type: none"> <li>· <b>IMDG, IATA</b></li> </ul>   | <p style="text-align: center;"></p>   |
| <ul style="list-style-type: none"> <li>· <b>Class</b></li> </ul>  | <p style="text-align: center;">8 Corrosive substances</p>  |

(Contd. on page 9)



# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

Trade name: Reagent 2/Ferrozine

(Contd. of page 8)

· <b>Label</b>	8
· <b>Packing group</b> · <b>DOT, IMDG, IATA</b>	II
· <b>Environmental hazards:</b> · <b>Marine pollutant:</b>	No
· <b>Special precautions for user</b> · <b>Danger code (Kemler):</b> · <b>EMS Number:</b> · <b>Segregation groups</b> · <b>Stowage Category</b> · <b>Stowage Code</b>	Warning: Corrosive substances 80 F-A,S-B Acids B SW2 Clear of living quarters.
· <b>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</b>	Not applicable.
· <b>Transport/Additional information:</b> · <b>DOT</b> · <b>Quantity limitations</b>	On passenger aircraft/rail: 1 L On cargo aircraft only: 30 L
· <b>IMDG</b> · <b>Limited quantities (LQ)</b> · <b>Excepted quantities (EQ)</b>	1L Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· <b>UN "Model Regulation":</b>	UN 1760 CORROSIVE LIQUIDS, N.O.S. (HYDROCHLORIC ACID, HYDROXYLAMINE HYDROCHLORIDE), 8, II

## 15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

· **Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients is listed.

· **TSCA (Toxic Substances Control Act):**

Hydrochloric Acid

Hydroxylamine Hydrochloride

Ferrozine

Disodium 4,4'-[3-(Pyridin-2-yl)-1,2,4-Triazine-5,6-Diyl]bis(Benzenesulphonate)

Water

· **TSCA new (21st Century Act) (Substances not listed)**

· **Proposition 65**

· **Chemicals known to cause cancer:**

None of the ingredients is listed.

(Contd. on page 10)

# Safety Data Sheet

acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

**Trade name: Reagent 2/Ferrozine**

(Contd. of page 9)

· **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**

None of the ingredients is listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**

None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**

None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients is listed.

· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

· **Hazard pictograms**



GHS01

GHS05

GHS07

GHS08

· **Signal word** *Danger*

· **Hazard-determining components of labeling:**

Hydrochloric Acid

Hydroxylamine Hydrochloride

· **Hazard statements**

Unstable explosive.

Causes severe skin burns and eye damage.

May cause an allergic skin reaction.

Suspected of causing cancer.

May cause respiratory irritation.

May cause damage to organs through prolonged or repeated exposure.

· **Precautionary statements**

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Do not breathe dusts or mists.

Wash thoroughly after handling.

Use only outdoors or in a well-ventilated area.

Contaminated work clothing must not be allowed out of the workplace.

Wear protective gloves/protective clothing/eye protection/face protection.

Wear personal protective equipment/face protection.

If swallowed: Rinse mouth. Do NOT induce vomiting.

If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

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.

IF exposed or concerned: Get medical advice/attention.

Immediately call a poison center/doctor.

Get medical advice/attention if you feel unwell.

Specific treatment (see on this label).

(Contd. on page 11)

# Safety Data Sheet

## acc. to OSHA HCS

Printing date 12/12/2017

Reviewed on 12/12/2017

**Trade name: Reagent 2/Ferrozine**

(Contd. of page 10)

*If skin irritation or rash occurs: Get medical advice/attention.*  
*Wash contaminated clothing before reuse.*  
*Explosion risk in case of fire.*  
*DO NOT fight fire when fire reaches explosives.*  
*Evacuate area.*  
*Store in accordance with local/regional/national/international regulations.*  
*Store in a well-ventilated place. Keep container tightly closed.*  
*Store locked up.*  
*Dispose of contents/container in accordance with local/regional/national/international regulations.*

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

### 16 Other information

*This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.*

· **Department issuing SDS:** Environment protection department.

· **Contact:**

· **Date of preparation / last revision**

12-12-2017: review SDS for accuracy. STN

Creation date for SDS 03-13-2015. STN

12/12/2017 / -

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

Unst. Expl.: Explosives – Unstable explosive

Skin Corr. 1A: Skin corrosion/irritation – Category 1A

Eye Dam. 1: Serious eye damage/eye irritation – Category 1

Skin Sens. 1: Skin sensitisation – Category 1

Carc. 2: Carcinogenicity – Category 2

STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

STOT RE 2: Specific target organ toxicity (repeated exposure) – Category 2