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MSDS NO : AA00258-0000000007

1. Product and Company Identification

- A. Product name : Ferrous Sulfate (Hepta Hydrate)
- B. Relevant identified uses of the substance or mixture and uses advised against
- ☐ Recommended Use :
11. Fertilizer, 26. Medicine, 34. Water treatment agent, 48. Others (secondary battery)
 - ☐ Usage Limits : No data available
- C. Manufacture / Supplier/ Distributor information
- ☐ Company : Youngjin co. ltd.
 - ☐ Address : 38, Ojeong-ro, Ojeong-gu, Bucheon-si, Gyeonggi, Korea
 - ☐ Department : Quality Control Department
 - ☐ Telephone : 82-32-674-4221


2. Hazards Identification

- A. Hazards Identification Classification
- Acute toxicity(Oral, Skin, Inhalation): Category4
- Chronic aquatic environment: Category3

- ☐ Pictorial symbol



- ☐ Signal word: Warning
- ☐ Hazardous expression
H302 : Harmful if swallowed
H412: Harmful to aquatic life with long-lasting effects.
- ☐ Precaution expression
P264 : Wash ... thoroughly after handling.

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P270 : Do not eat, drink or smoke when using this product.

P271 : Use only outdoors or in a well-ventilated area.

P273: Avoid discharge to the environment

○ Respond

P301+P312 : IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

P330: Wash your mouth.

○ Storage

P403+P233 : Store in a well-ventilated place. Keep container tightly closed.

○ Disposal

P501 Dispose of container in conformity with relevant regulations.

C. NFPA Rating (0-4 level): Health=3, Fire=0, Reactivity=0

3. Composition, Information on Ingredients

Chemical Name	Idiomatic name	Percent (%)	CAS No.
Ferrous Sulfate (Hepta Hydrate)	Ferrous Sulfate (Hepta Hydrate)	100%	7782-63-0

4. First Aid Measures

A. Eye Contact


- Take emergency medical service.
- Rinse cautiously with water for several minutes. Remove contact lenses, continue rinsing.

B. Skin Contact

- If exposed or if uncomfortable, consult medical personnel.
- Wash contaminated clothing thoroughly before re-use.
- If the material is hot, soak affected area in a great quantity of cold water and wash to remove heat.
- If exposed, rinse skin and eyes immediately with running water more than 20 minutes
- Remove all contaminated clothing immediately.
- Remove and contaminated clothing and shoes and isolate contaminated area.

C. Inhalation

- If exposed to excess dust or fume, wash clear air. If there are cough or other symptoms, take medical action.
- Consult medical personnel immediately

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- If breathing is hard, supply oxygen.

D. Ingestion

- If exposed or if uncomfortable, consult medical personnel.

- Wash mouth out.

E. Other medical notices.

- Let medical personnel recognize the material and take protective measure.

- If exposed, contact the medical staff and follow up take special emergency measures.

5. Explosion / Fire Fighting Measures

A. Appropriate (and inappropriate) Extinguishing Media

- Use alcohol foam, carbon dioxide or water spray.

- If extinguishing by smothering, use dry sand or earth.

B. Specific Hazards in Presence of Chemical Substances

- If boiled, container may explode.

- Inhalation of substance may be hazardous.

- Partly, solution may generate steam causing dizziness and suffocation.

- Some liquid may generate steam causing dizziness and suffocation.

- May burn partly, but does not ignite easily.

- Causes skin and eyes burn if exposed.

- Fire may cause irritative and toxic gas.- While burning, thermal decomposition or combustion can generate irritative and highly hazardous gas.

- Fire may cause irritative and toxic gas.

C. Precaution and Protective equipments for Fire Fighting

- Rescuer should use appropriate protective equipment.

- Dig a ditch to dispose fire fighting water and keep material not dispersed.


- If not dangerous, move container from fire area.- May be transported at high temperature.

- Keep proper distance while extinguishing.

- Fire involving Tanks; After extinguish, cool down container with water spray for considerable time

- Fire involving Tanks; Step back immediately if pressure relief device makes loud sound or tank discolors.

- Fire involving Tanks; Do not approach tank in flames.

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6. Accidental Release Measures

A. Require measures and protection to protect human body

- Do not inhale dust, smoke, gas, mist, steam, spray.
- Do not touch and walk on leakage.
- Do not enter if not needed, or if protection equipment is not prepared.
- Prevent forming dust.
- Clear spilth immediately, follow precaution of Personal Protection section.
- Isolate the contaminated area.
- Stop leaking if it's not dangerous.
- Pay attention to Conditions and Materials to Avoid.

B. Required measures to protect environment

- Leakage may cause contamination.
- Prevent of inflow into waterway, drain, basement, or closed space.


C. Purification or removal method

- Remove airborne dust and moisten with water to prevent scattering.
- In case of a many leak, create a trench away from the liquid spill.
- In case of powder leakage, cover it with a plastic sheet to prevent the spread and keep it in dry condition.
- Absorb the spill with inert material (e.g. dry sand or earth) and place it in the chemical waste container.
- In case of small leakage, absorb it with sand or non-combustible material and place it in a container.
- Absorb liquid and wash contaminated area with detergent and water.
- Use a clean shovel to scoop the spill into a clean, dry container, close loosely, and move the container away from the spill area.

7. Handling & Storage

A. Safe handling

- Open cap carefully.
- Give care to high temperature.
- Do not handle before reading and understanding whole safety precaution.
- Handle only in exterior or well-ventilated place.
- Follow all precautions of MSDS/LABEL though container is emptied. Product residues can rest.
- Prevent long term or continuous skin contact.

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- Do not eat, drink or smoke while using this product.
- Wash thoroughly after handling.
- Use carefully taking notice of Handling & Storage.
- Pay attention to Conditions and Materials to Avoid.

B. Safe Storage

- Drain the water out from an empty drum and close properly and put it back to drum regulator or place appropriately.
- Store container in well-ventilated place and securely airtight.
- Stay away from food and drinks.
- Pay attention to Conditions and Materials to Avoid.

8. Exposure Controls & Personal Protection

A. Chemical Exposure Limits, Biological Exposure Limit

- Korean Regulation : TWA : 1 mg/m³
- ACGIH Regulation : No data available
- Biological Exposure Limit : No data available

B. Engineering Controls


- Install local exhaust ventilation, use process isolation or other ways to comply tolerable standard.
- If dust, fume or mist is generated while operating, ventilate to maintain air pollution lower than exposure limit.

C. Personal Protective Equipment

- Respiratory Protection
 - Use respiratory protective equipment that is appropriate to exposed material's physical & chemical properties and authorized by Korean Occupational Safety and Health Act.
- Eyes Protection
 - Wear safety glasses and mask to protect eyes and face(front head, forehead, chin, front neck, nose, mouth) from various missiles and hazardous liquid generated during work.
- Hands Protection : Wear appropriate chemical-resistant gloves.
- Body Protection : Wear appropriate chemical-resistant clothing to avoid skin exposure.

9. Physical & Chemical Properties


A. Appearance: Blue-green solid crystal.

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- B. Odor: None.
- C. Odor Threshold : None
- D. PH: 10% solution pH 3.7~4.5
- E. Melting point/Freezing point: 64°C
- F. Initial Boiling point and Boiling point range: No data available.
- G. Flash point: No data available.
- H. Evaporation Rate: No data available.
- I. Flammability (solid, gas): No data available.
- J. Low & Upper limit of Flammable or Explosion Range: No data available.
- K. Vapor Pressure: 14.6 mmHg (at 25 °C)
- L. Solubility: 22.8% (20°C)
- M. Vapor Density: No data available.
- N. Specific Gravity: 0.999(g/ml at 25°C)
- O. n-Octanol/water partition coefficient: -0.37 (Estimate)
- P. Auto-ignition Temp.: No data available.
- Q. Decomposition Temp.: No data available.
- R. Viscosity: No data available
- S. Molecular Formular / Molecular Weight : $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ / 278.01

10. Stability & Reactivity

- A. Chemical stability and Possibility of hazardous reactions
- May decompose and generate toxic gas at high temperature.
 - If boiled, container may explode. May burn partly, does not ignite easily.
 - May burn partly, but does not ignite easily.
- Contact with material causes skin and eyes burn.
- Fire causes irritative, corrosive, toxic gas from material.
 - Inhalation of substance may be hazardous.
 - Partly, solution may generate steam causing dizziness and suffocation.
- B. Conditions to Avoid : Heat
- C. Materials to Avoid : Alkaline
- D. Hazardous Decomposition Products :
- While burning, thermal decomposition or combustion may generate highly hazardous gas from material.
 - Irritative and toxic gas.

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11. Toxicological Information

A. Information about possible exposure route :

- Irritation, burn, metallic taste, vomit, stomach disorder, dyspnea, irregular heartbeat, drowsiness, blue skin, lung blood congestion, lung disorder, spasm, coma, hepatosis.

B. Health effect

○ Acute oral toxicity:

- ORAL : LD₅₀ 1,389 mg/kg Rat (EPA Pesticide, 1993)
LD₅₀ > 2,000 mg/kg Rat (OECD TG 401)Based on Category 4
(Japanese Ministry of Health, Labor and Welfare).

- SKIN : Not classifiable

LD₅₀ > 2000 mg/kg Rat (ECHA, OECD Guideline 402, GLP, Read across;
cas no. 7758-94-3, Ferrous Chloride)
(ECHA, OECD Guideline 402, GLP, Read across)

- Inhalation : Dust LD₅₀ > 1.1mg/L×4hr Rat, No side effects were observed.
(EPA OPP 81-3) ECHA Fe₂(SO₄)₃

○ Skin corrosivity or irritation : Not classifiable

: Skin corrosive / irritant test using rabbits Irritating to skin. (OECD Guideline 404, GLP)

○ Severe eye damage or irritation :

Severe eye damage / irritation test with rabbit causes slight irritation. (ECHA)

○ Respiratory sensitization : No data available(ECHA, OECD)


○ Skin sensitization : Not classifiable

No sensitization on mouse(female) test

(OECD Guideline 429, GLP (Skin Sensitisation: Local Lymph Node Assay))

○ Carcinogenesis

- Occupational Safety and Helath Act : No data available
- Ministry of Employment and Labor : No data available
- IARC : No data available
- OSHA : No data available
- ACGIH : No data available
- NTP : No data available
- EU : FeCl₃ (ECHA) considered non-cancerous
- CLP : No data available


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- Gamete Mutagenicity : Not classifiable
 - According to the Japanese Ministry of Health, Labor and Welfare, in vivo, micronucleus tests in the stomach, duodenum, and colon showed negative results, and in vitro, bacterial reverse mutation tests showed negative results.
 - In addition, the chromosomal abnormality test of cultured mammalian cells showed positive results, making classification impossible.
- Reproductive toxicity: Not classifiable
 - According to the Japanese Ministry of Health, Labor and Welfare, in a combined oral and reproductive toxicity study in rats, No effects on fertility were observed at doses affecting pregnant mother animals.
 - Additionally, no effects on newborns were observed. Therefore, due to insufficient reports on developmental toxicity, it was judged to be "unclassifiable."
- Specific target organ toxicity (single exposure) :Not classifiable
 - When forcibly administered orally to rats, it was reported that at the highest dose (2,000 mg/kg), decreased activity, salivation, and temporary weight loss were observed, but no other toxic symptoms were observed.
- Specific target organ toxicity (repeated exposure) :
 - In repeated dose toxicity, reproductive, and developmental toxicity studies in rats following forced oral administration, an increase in extramedullary hematopoiesis was observed in the spleen of male rats. The result was 163 mg/kg/day (equivalent to 90 days), which is below the toxicity level of oral category 2 for specific target organ toxicity (repeated exposure). Since there is no toxicity information on other exposure routes, classification is impossible due to insufficient data.
- Aspiration Hazard : No data available

12. Ecological Information

A. Aquatic & Eco-toxicity:

- Fish : Orange-red killifish $LC_{50} > 67 \text{ mg/l}$ 96 hr ※ Data Source: NITE
- Crustacean : No data
- Algae :
- Aquatic acute Daphnia magna $EC_{50} = 91 \text{ mg/L}$ 48h ※ Source: NITE
- Aquatic Chronic: No classification
- Daphnia magna NOEC = 10mg/L 21day
- Corresponds to chronic category 3, $10 < LC_{50}, EC_{50}, ErC_{50} \leq 100$

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B. Residue property and degradability

- Residue property : 0.37 log Kow (estimated) ※ Data Source: EPISUITE
- Degradability : (Non-degradable, BOWIN 5,6) ※ Data Source: EPISUITE

C. Bioaccumulative potential

- Bioaccumulation : BCF 3.16 (estimated) ※ Data Source: EPISUITE
- Biodegradation :
(Non-degradable - does not degrade and have high potential for bioaccumulation)

※ Data Source: EPISUITE

D. Movement in soil : water solubility 744g/L , @ 0°C

※ Data Source: ECHA

E. Other hazardous effect : No data available.

13. Disposal Considerations

A. Disposal method

- Bury designated waste in a managed landfill not disrupting institution of leachate prevention and treatment and its performance.

B. Disposal Considerations

- Dispose of container in conformity with relevant regulations.

14. Transport information

A. UN Number : No data available

B. UN proper shipping name : Not applicable

C. UN hazardous ranking : Not applicable

D. Un package group : Not applicable

E. Marine pollutant : Not applicable


F. Special precautions:

- In case of fire : Not applicable
- in case of leakage : Not applicable

15. Regulatory Information

A. Regulation by Occupational Safety and Health Act :


Chemicals set Exposure Standards : Substances for which exposure standards are set

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- B. The Chemicals Control Act : N/A
- C. Dangerous Material Safety Management Regulation : N/A
- D. Waste Control Act : Designated waste
- E. Other regulation by Korea and foreign acts
- Korean Regulation
Persistent organic pollutants control acts : 노출기준설정물질
 - Foreign Regulation
U.S.A management information(OSHA Regulation) : N/A
U.S.A management information(CERCLA Regulation) : N/A
U.S.A management information(EPCRA 302 Regulation) : N/A
U.S.A management information(EPCRA 304 Regulation) : N/A
U.S.A management information(EPCRA 313 Regulation) : N/A
U.S.A management information(Rotterdam Protocol) : N/A
U.S.A management information(Stockholm Protocol) : N/A
U.S.A management information(Montreal Protocol) : N/A
EU classification information(Classification) :
Acute Tox. 4*, Skin Irrit. 2, Eye Irrit. 2
EU classification information(Risk Phases) : H302, H315, H319
EU classification information(Safety Phrases) : N/A

16. Other Information

- A. Data Source : Korean Occupational Safety and Health Act., Warning sign Japanese Ministry of Health, Labor and Welfare, OECD SIDS
- B. Date of establishment : June, 3, 1996.
- C. Revision Number and recent revision date : Rev. No.9 / Nov, 6, 2023.
- D. Others :
Revised contents / April, 27, 2020.
2. Hazards Identification → A. Hazards Identification Classification → 11. Toxicological Information
- Acute toxicity (Oral, Skin, Inhalation): Category 4
 - Skin corrosivity or irritation : Category 2
 - Severe eye damage or irritation : Category 2
 - Gamete Mutagenicity : Category 2
 - Chronic aquatic environment : Category 1
 - Pictorial symbol & Hazardous expression

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11. Toxicological Information

Acute oral toxicity : OECD SIDS, ECHA
 Skin corrosivity or irritation : OECD SIDS, ECHA
 Severe eye damage or irritation : ECHA
 Skin sensitization
 Carcinogenesis
 Gamete Mutagenicity
 Reproductive toxicity
 Specific target organ toxicity (single exposure) : ECHA
 Specific target organ toxicity (repeated exposure)

12. Ecological Information

Aquatic & Eco-toxicity (Fish, Crustacean, Algae) : ECOTOX
 Residue property and degradability, Bioaccumulative potential : EPISUITE

source :

Kosha <http://msds.kosha.or.kr/> (2020.3.20.)

OECD SIDS

https://hpcvchemicals.oecd.org/UI/SIDS_Details.aspx?key=30261bf0-6f3e-405c-a71b-9f99a906980b&idx=0
 (2020.3.20.)

ECHA <https://echa.europa.eu/registration-dossier/-/registered-dossier/15513/7/1> (2020.3.20.)

USA EPA <https://chemview.epa.gov/chemview/> (2020.3.20.)

Revised contents / Nov, 6, 2023.

2. Hazards Identification →Warning sign Japanese Ministry of Health

<https://www.nite.go.jp> (2023. 11. 6.)

11. Toxicological Information

12. Ecological Information

Aquatic & Eco-toxicity (Fish, Crustacean, Algae) : ECOTOX
 Residue property and degradability, Bioaccumulative potential : EPISUITE

source :

OECD SIDS <https://hpcvchemicals.oecd.org/UI/handler.axd?id=c846866f-73eb-4e4a-ac53-ba193e751f56>
 (2023.11.6)

ECHA <https://echa.europa.eu/registration-dossier/-/registered-dossier/15513/7/1> (2023.11.6)

KOSHA <https://msds.kosha.or.kr/> (2023.11.6)