

SAFETY DATA SHEET

Safety data sheet according to (EF) no. 1907/2006.

POINT 1: Identification of material/compounds and of the company/factory

1.1. Product identifier:

Ferro-Min

UFI: N820-K06F-N00A-113J

1.2. Relevant identifying use of the material or compound and the usage that is contraindicated:

Liquid supplementary feed. Only for commercial use.

1.3. Detailed information about the supplier for the safety data sheet:

Jorenku A/S

Teglvaerksvej 11

4733 Tappernoeye

Denmark

Tel.: +45 56214070

Responsible for safety data sheet (e-mail): jorenku@jorenku.dk

1.4. Emergency phone:

Contact the poison centre in your own country.

POINT 2: Identification of danger

2.1. Classification of the material or compound:

Corrosive, corrosive to metal, and environmentally dangerous liquid.

CLP (1272/2008): Skin Corr. 1;H314 Eye Dam. 1;H318 Met. Corr. 1;H290 Aquatic Chronic 3;H412

2.2. Label elements:



DANGER

Contains:

Hydrochloric acid and propionic acid

H290:

May be corrosive to metals.

H314:

Causes severe skin burns and eye damage.

H412:

Harmful to aquatic life with long lasting effects.

P273:

Avoid release to the environment.

P280:

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

P303+P361+P353+P310:

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. Immediately call a POISON CENTER/doctor.

P305+P351+P338+P310:

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

2.3. Other dangers:

PBT/vPvB: The ingredients are not PBT/vPvB according to the criteria in REACH annex XIII.

Endocrine disrupting properties: The ingredients are not considered endocrine disruptors according to the criteria of Regulation 2017/2100 or Regulation 2018/605.

POINT 3: Compensation of/information about contents

3.1. Compensation of/information about contents

3.2. Compounds:

Substance name	CAS	EF-No.	Index-no.	REACH reg.no.	Substance Classification	Note
Iron(II) sulphate, (1:1) heptahydrate	7782-63-0	231-753-5	026-003-01-4	01-2119513203-57	Acute Tox. 4;H302 Skin Irrit. 2;H315 Eye Irrit. 2;H319	1,2
Hydrochloric acid	7647-01-0	231-595-7	017-002-00-2	-	Skin Corr. 1B;H314 Eye Dam. 1;H318 STOT SE 3;H335	3
Propionic acid	79-09-4	201-176-3	607-089-00-0	01-2119486971-24	Flam. Liq. 3;H226 Skin Corr. 1B;H314 Eye Dam. 1;H318 STOT SE 3;H335	4
Citric acid	77-92-9	201-069-1	607-750-00-3	01-2119457026-42	Eye Irrit. 2;H319 STOT SE 3;H335	-
Zinc oxide	1314-13-2	215-222-5	030-013-00-7	01-2119463881-32	Aquatic Acute 1;H400 (M=1) Aquatic Chronic 1; H410 (M=1)	1
Copper sulphate pentahydrate	7758-99-8	231-847-6	029-023-00-4	01-2119520566-40	Acute Tox. 4;H302 Eye Dam. 1;H318 Aquatic Acute 1;H400 (M=10) Aquatic Chronic 1; H410 (M=1)	1,5

- 1) The substance is an organic solvent.
- 2) SCL (Specific Concentration limits) for classification: Skin Irrit. 2;H315: $C \geq 25\%$ (Harmonised classification). ATE (oral) = 1300 mg/kg.
- 3) SCL (Specific Concentration limits) for classification (the C&L list, EU-harmonised):
 Skin Corr. 1B;H314: $C \geq 25\%$; Eye Irrit. 2;H319: $10 < C < 25\%$; Skin Irrit. 2;
 H315: $10\% < C < 25\%$; STOT SE 3;H335: $C \geq 10\%$
- 4) SCL (Specific Concentration limits) for classification: Skin Corr. 1B;H314: $C \geq 25\%$;
 Skin Irrit. 2;H315: $10\% \leq C < 25\%$; Eye Irrit. 2;H319: $10\% \leq C < 25\%$; STOT SE 3;H335: $C \geq 10\%$
 (Harmonised classification)
- 5) ATE (oral) = 482 mg/kg

The wording of the hazard statements - see point 16.

POINT 4: First aid measures

4.1. Description of first aid measures:

- General:** The first aider must protect themselves from the risk of corrosion. The patient may lie on his back while the first aider continuously pours water into the injured eye (make sure you have plenty of eyewash).
- Inhalation:** Immediately bring the person to fresh air and evacuate others! **Mild cases:** Keep the person calm under supervision. In case of discomfort: Seek medical attention. **Severe cases:** Unconscious people are placed into the recovery position with their head low and kept warm. If breathing is stopped, artificial respiration is given. Immediately call a doctor or ambulance.
- Skin:** Immediately remove contaminated clothing. Rinse skin and wash thoroughly with soap and water. Rinsing is continued until a doctor can undertake the treatment.
- Eyes:** Immediately rinse with water or physiological saline for at least 30 minutes. If possibly remove contact lenses and open the eye wide. In all cases, seek medical attention. Rinsing is continued during transport to the doctor/hospital.
- Ingestion:** Immediately rinse mouth thoroughly and drink water in copious amounts. **Do not induce vomiting.** If vomiting occurs, keep the head low to avoid stomach contents in the lungs. Immediately call an ambulance.
- Burns:** Rinse with water until the pain has stopped. During rinsing, do not remove burnt clothing from the burned area. If medical treatment is needed, continue rinsing until a doctor has undertaken the treatment.

4.2. Most important symptoms and effects, both acute and delayed:

Painful burns with redness and blisters. Tissue damage. Risk of corrosive wounds. Painful eye burns that may cause permanent eye damage and blindness. Epiphora, reflective blinking and cramping of the eyelids. Bloody sputum. Ingestion causes corrosion of the gastrointestinal tract with severe pain and risk of permanent damage.

4.3. Indication of whether emergency medical attention and special treatment are needed:

Show this safety data sheet to doctors or casualty ward.

POINT 5: Fire suppression

5.1. Suppression methods:

Not flammable. Against surrounding fire: Water fogging (never water jet - spreads the fire), foam, powder or carbon dioxide.

5.2. Special dangers in connection with the material or compound:

Cannot burn.

5.3. Indication for a fire department:

Use compressed air mask by heavy smoke from surrounding fire.

POINT 6: Accidental release measures

6.1. Personal precautions, personal protective equipment, and emergency procedures:

Use personal protective equipment - see point 8. Limit spread. Ensure good ventilation. Keep unauthorized persons at a distance.

6.2. Environmental protection indications:

Avoid discharge to drains - see point 12. Inform local environmental authorities in case of spillage to the environment.

6.3. Methods and equipment for containment and cleaning:

Smaller amounts are soaked up with a cloth and larger amounts with granulate or similar. Collect in suitable containers. Rinse thoroughly with water. Further waste handling - see point 13.

6.4. References to other points:

See above.

POINT 7: Handling and storage

7.1. Measures for safe handling:

AVOID ALL CONTACT! Provide effective ventilation. Immediately change contaminated clothing. If skin becomes contaminated, wash immediately. There must be access to emergency shower, plenty of water and eyewash bottles. When diluted with water, the acid is poured into the water - never the other way around. Never use near fire, sparks, or hot surfaces. No smoking. After use, wash with plenty of soap and water.

7.2. Conditions for safe storage, including any incompatibility:

In a closed container in a cool and well-ventilated place. Separated from incomparable materials - see point 10. Safe, inaccessible to unauthorized persons, separated from food, medicines and the like.

7.3. Special usage:

See use - point 1.

PUNKT 8: Exposure control/personal protective equipment

8.1. Control parameter:

AT-limit value (reg. 1054 of 28.06.2022):

	8-hours limit value	Short-term limit value	Note
Iron salts, dissolvable, calculated as Fe	1 mg/m ³	2 mg/m ³	-
Propionic acid	10 ppm = 31 mg/m ³	20 ppm = 62 mg/m ³	E
Copper, powder and dust	1 mg/m ³	2 mg/m ³	-
Hydrochloric acid (Hydrogen chloride)	-	5 ppm = 8 mg/m ³	E
Zinc oxide and zinc oxide smoke, calculated as Zn	4 mg/m ³	8 mg/m ³	-

E = The substance has an EF-limit value

DNEL:	Exposure	Value	Population	Effects
Hydrochloric acid	Long-term, inhalation	8 mg/m ³	Workers	Local
	Acute, inhalation	15 mg/m ³	Workers	Local
Propionic acid	Long-term, skin	0.26 mg/kg	Workers	Local
	Long-term, skin	20.9 mg/kg	Workers	Systemic
	Acute, inhalation	62 mg/m ³	Workers	Local
	Acute, inhalation	62 mg/m ³	Workers	Systemic
	Long-term, inhalation	31 mg/m ³	Workers	Local
	Long-term, inhalation	73 mg/m ³	Workers	Systemic

Zinc oxide	Long-term, inhalation Long-term, skin Long-term, inhalation Long-term, skin Long-term, inhalation	5 mg/m ³ 83 mg/kg/d 0.83 mg/kg/d 83 mg/kg/d 2.5 mg/m ³	Workers Workers Consumers Consumers Consumers	Systemic Systemic Systemic Systemic Systemic
PNEC:	Medium	Value		
Hydrochloric acid	Fresh water Sea water Sporadic discharge	36 µg/l 36 µg/l 45 µg/l		
Zinc oxide	Fresh water Sea water Fresh water sediment Sea water sediment Sewage works (STP) Soil	0.0206 mg/l 0.0061 mg/l 117.8 mg/kg 56.5 mg/kg 52 µg/l 35.6 mg/kg		
Propionic acid	Fresh water Sea water Fresh water sediment Sea water sediment Sewage works (STP) Soil	0.5 mg/l 0.05 mg/l 1.86 mg/kg 0.186 mg/kg 5 mg/l 0.126 mg/kg		
Copper sulphate	Fresh water Sea water Soil	7.8 µg/l 5.2 µg/l 65 mg/kg		
Citric acid	Fresh water Sea water Fresh water sediment Sea water sediment Sewage works (STP) Soil	0.44 mg/l 0.044 mg/l 34.6 mg/l 3.46 mg/l 1000 mg/l 33.1 mg/kg jord		

8.2. Exposure control:

Appropriate measures for exposure control: Provide effective ventilation during handling.

Personal protective equipment:

Inhalation: By dusty work: Use approved mask (EN149) with particle filter P2. The filters have a limited service life (must be changed). Read the manufacturer's instructions.

Skin: Use protective gloves (EN374) of nitrile rubber or neoprene. It has not been possible to find data of the breakthrough time of all the ingredients, so in case of spillage it is recommended immediately to replace the gloves.

Eyes: Close-fitting safety glasses (EN166) by risk of eye contact.

Environmental exposure controls: Avoid discharge to the environment.

POINT 9: Physical and chemical characteristics

9.1. Information about basic physical and chemical characteristics:

Appearance: Liquid
 Colour: Not decided
 Odor: Not decided

Melting point/freezing point (°C):	Not decided
Boiling point or bubble-point and boiling point interval (°C):	Not decided
Ignitability (solid, gaseous):	Not decided
Upper/lower explosion limits (vol-%):	Not decided
Flash point (°C):	Not relevant
Auto-ignition temperature (°C):	Not decided
Self-accelerating decomposition temperature (°C):	Not relevant
pH:	1,5
Kinematic viscosity (mm ² /s at 40°C):	Not decided
Solubility (mg/l):	Soluble in water
Partition coefficient n-octanol/water Log K _{ow} :	Not relevant – solution (see point 12)
Vapor pressure (hPa, 20°C):	Not decided
Density and/or relative density (g/cm ³):	Not decided
Relative vapor density (air=1):	Not decided
Particulate properties:	Not decided for liquids
9.2. Other information:	None known.

POINT 10: Stability and reactivity

10.1. Reactivity:

No available data.

10.2. Chemical stability:

Stable under recommended storage conditions - see point 7.

10.3. Risk of dangerous reactions:

None known.

10.4. Conditions that should be avoided:

Avoid strong heating.

10.5. Materials that should be avoided:

Hydrochloric acid and propionic acid react with the most metals (e.g. aluminium, tin and zinc) under development of hydrogen gas, which can form explosive mixtures with air. Reacts heavily with strong bases.

10.6. Dangerous decomposition products:

None known.

POINT 11: Toxicological information

11.1. Information about hazard classes as defined in Regulation (EC) No 1272/2008:

Acute toxicity: Based on available data, the classification criteria are not met.

Skin corrosion/irritation: Skin Corr. 1B; H314 Causes severe skin burns and eye damage.

Serious eye damage/eye irritation: Eye Dam. 1; H318 Causes serious eye damage.

Respiratory or skin sensitization: Based on available data, the classification criteria are not met.

Germ cell mutagenicity: Based on available data, the classification criteria are not met.

Carcinogenicity: Based on available data, the classification criteria are not met.

Reproduction toxicity: Based on available data, the classification criteria are not met.

Single STOT-exposure: Based on available data, the classification criteria are not met.

Repeated STOT-exposures: Based on available data, the classification criteria are not met.

Based on available data, the classification criteria are not met.

Aspiration hazard: Based on available data, the classification criteria are not met.

Danger class	Data	Test	Data source
Acute toxicity: Inhalation	LC ₅₀ (rat) = 1 mg/m ³ /4h (Iron sulphate)	Not informed	ECHA
	LC ₅₀ (rat) > 19.7 mg/l/1H (vapour) (Propionic acid)	Not informed	ECHA
	LC ₅₀ (rat) > 5.7 mg/l/4h (Zinc oxide)	OECD 403	Supplier
Dermal	LC ₅₀ (rat) = 5800 mg/l (Citric acid)	Not informed	ECHA
	LC ₅₀ (rat) = 45.6 mg/l/5 min (Hydrochloric acid)	Not informed	ECHA
	LC ₅₀ (rat) > 2000 mg/kg (Iron sulphate)	OECD 402	ECHA
Oral	LD ₅₀ (rabbit) = 3235 mg/kg (Propionic acid)	Not informed	ECHA
	LD ₅₀ (rat) > 2000 mg/kg (Zinc oxide)	OECD 402	Supplier
	LD ₅₀ (rabbit) > 1000 mg/kg (Copper sulphate)	Not informed	IUCLID
	LD ₅₀ (rat) > 2000 mg/kg (Citric acid)	OECD 402	ECHA
	LC ₅₀ (rabbit) > 5010 mg/kg (31.3% solution) (Hydrochloric acid)	Not informed	ECHA
	LD ₅₀ (mouse) = 1300 mg/kg (Iron sulphate)	Not informed	ECHA
	LD ₅₀ (rat) = 2600 mg/kg (Propionic acid)	Not informed	TOXNET
	LD ₅₀ (rat) > 5000 mg/kg (Zinc oxide)	OECD 401	ECHA
	LD ₅₀ (rat) = 482 mg/kg (Copper sulphate)	Not informed	Supplier
	LD ₅₀ (rat) = 5400 mg/kg (Citric acid)	OECD 401	ECHA
	LD ₅₀ (rat) = 2222 mg/kg (Hydrochloric acid)	Not informed	ECHA
Corrosivity/ irritation:	Skin irritation, rabbit (Iron sulphate)	OECD 404	ECHA
	Eye irritation, rabbit (Iron sulphate)	OECD 405	ECHA
	Corrosive, rabbit (Propionic acid)	OECD 404	ECHA
	No skin- or eye irritation (Zinc oxide)	OECD 404, 405	ECHA
	Eye irritation, rabbit (Copper sulphate)	OECD 405	ECHA
	No skin irritation, rabbit (Copper sulphate)	OECD 404	ECHA
	No skin irritation, rabbit (Citric acid)	OECD 404	ECHA
	Eye irritation, rabbit (Citric acid)	OECD 405	ECHA
	Severe corrosive hazard to skin and eyes, rabbit (Hydrochloric Acid)	OECD 404, 405	ECHA
Sensitisation:	No skin sensitisation, guinea pig (Propionic acid)	OECD 406	ECHA
	No skin sensitisation, guinea pig (Copper sulphate)	OECD 406	ECHA
	Not sensitizing (guinea pig) (Citric acid)	OECD 406	ECHA
	Not sensitizing (Hydrochloric acid)	Maximization test	ECHA
CMR:	No CMR-effects (Propionic acid)	Different	ECHA
	No CMR-effects (Copper sulphate)	Different	ECHA
	No CMR-effects (Hydrochloric acid)	Div. tests	ECHA

Usual exposure methods: Lungs, skin, and gastrointestinal tract.

Symptoms:

Inhalation: May irritate the respiratory tract mucous membranes with sore throat, cough, shortness of breath, and a risk of water in the lungs (lung edema). Be aware that symptoms

(shortness of breath) may occur several hours after exposure. Risk of lung damage at high concentrations.

Skin: Strong irritation to corrosive with redness, pain, and wounds that heal with difficulty.

Eyes: Corrosive with redness, pain, and a risk of vision loss.

Ingestion: Corrosive to the mucous membranes in the mouth, throat, and gastrointestinal tract, leading to stomach pain, nausea, vomiting, and stomach bleeding.

Chronic

effects: Frequent or prolonged skin contact can decrease the skin, cause eczema, cracking, redness, and itching, and trigger allergic reactions. Prolonged inhalation of vapours may result in chronic tracheitis (bronchitis).

11.2. Information about other hazards: None known.

POINT 12: Environmental information

12.1. Toxicity:

Aquatic	Data	Test (Media)	Data source
Fish	LC ₅₀ (Leuciscus idus, 96h) > 10,000 mg/l (Propionic acid) LC ₅₀ (Pimephales promelas, 96h) = 0.3 mg/l (Zinc sulphate) LC ₅₀ (Oncorhynchus mykiss, 96h) = 0.032 mg/l (Copper sulphate) LC ₅₀ (Gambusia affinis, 96h) = 282 mg/l (Hydrochloric acid) LC ₅₀ (Leuciscus idus, 96h): 440-760 mg/l (Citric acid)	Not informed Static (FW) Not informed (FW) Not informed (FW) OECD 203 (FW)	ECHA ECHA EPA Ecotox IUCLID IUCLID
Crustacean	LC ₅₀ (Daphnia magna, 48h) = 7.1 mg/l (Iron sulphate) EC ₅₀ (Daphnia magna, 48h) > 500 mg/l (Propionic acid) EC ₅₀ (Daphnia magna, 48h) = 0.3 mg/l (Zinc sulphate) EC ₅₀ (Daphnia magna, 48h) = 0.019 mg/l (Copper sulphate) LC ₈₀ (Daphnia magna, 72h) = 56 mg/l (Hydrochloric acid) EC ₅₀ (Daphnia magna, 24h) = 1535 mg/l (Citric acid)	Not informed Not informed OECD 202 (FW) Not informed (FW) Not informed (FW) Not informed (FW)	IUCLID ECHA ECHA EPA Ecotox IUCLID ECHA
Alga	EC ₅₀ (Pseudokirchnerella subcapitata, 72h) = 0.14 mg/l (Zinc sulphate) EC ₅₀ (Pseudokirchneriella subcapitata, 5d) = 0.003 mg/l (Copper sulphate) EC ₅₀ (Selenastrum capricornutum, 72h) = 0.17 mg/l (Zinc oxide) EC ₅₀ (Scenedesmus quadricauda, 168h) = 425 mg/l (Citric acid)	OECD 201 (FW) Not informed (FW) OECD 201 Not informed (FW)	ECHA EPA Ecotox Supplier ECHA

12.2. Persistence and degradability:

Most of the ingredients are inorganic substances. Methods for determining the biodegradability do not apply to inorganic substances.

Citric acid is rapidly biodegradable, 100 % (OECD 301 E).

Propionic acid is rapidly biodegradable, 95 % in 10 days (OECD 302B).

12.3. Bioaccumulative potential:

Propionic acid: Log K_{ow} = 0.3 (OECD 107) (no bioaccumulation).

Citric acid: Log K_{ow} = -1.72 (no significant bioaccumulation).

The bioconcentration factor (BCF) is for citric acid calculated to 3.2, and therefore the substance is not seen as bioaccumulating.

Copper bioaccumulates strongly in invertebrates.

Hydrochloric acid: $\text{Log } K_{ow} < 1$ (no bioaccumulation).

Zinc oxide: $\text{Log } K_{ow} = 1,53$ (no significant bioaccumulation).

12.4. Mobility in soil:

Copper sulphate is easily soluble in water (forms copper and sulphate ions upon dissolution) and has great mobility in soil environments.

Hydrochloric acid: $K_{oc} < 5$ (very high mobility in land treatment).

Citric acid: $\text{Log } K_{oc} = -1,72$ (very high mobility in land treatment is expected).

12.5. Results of PBT and vPvB assessment:

The ingredients are not PBT/vPvB according to the criteria in REACH annex XIII.

12.6. Endocrine-disrupting capacities:

None known.

12.7. Other adverse effects:

None known.

POINT 13: Removal

13.1. Methods for waste handling:

The chemical must be considered as hazardous waste. Use the local authority's collection scheme.

Chemical waste group: **EAK-code:**

H 02 01 06

POINT 14: Transport information

14.1. UN-number or ID-number: 1760

14.2. UN-shipment designation (UN proper shipping name): CORROSIVE LIQUID, N.O.S.

(hydrochloric acid; propionic acid)

14.3. Transport danger class(es): 8

14.4. Packaging group: III

14.5. Environmental dangers: Yes.

14.6. Special regulations for the user: None.

14.7. Bulk transport by sea according to IMO instruments: Not relevant.

POINT 15: Information about regulations

15.1. Special determinations/special rules for the material or compound with respect to safety, health and environment:

May not be used by young people under 18 years of age. (cf. the working environment authority's report on the performance of young people's work).

15.2. Chemical safety evaluation:

No CSR.

POINT 16: Other information

Hazard statements given under point 3:

H226: Flammable liquid and vapour.

H290: May be corrosive to metals.

H302: Harmful if swallowed.
H314: Causes severe skin burns and eye damage.
H315: Causes skin irritation.
H318: Causes serious eye damage.
H319: Causes serious eye irritation.
H335: May cause respiratory irritation.
H400: Very toxic to aquatic life.
H410: Very toxic to aquatic life with long lasting effects.

Abbreviations:

AT = Working environment authority
CMR = carcinogenic, mutagenic, or toxic to reproduction
CSR = Chemical Safety Report
DNEL = Derived No-Effect Level
EC₅₀ = Effect Concentration 50 %
FW = Fresh Water
LC₅₀ = Lethal Concentration 50 %
LD₅₀ = Lethal dosage 50 %
PBT = Persistent, Bioaccumulative, Toxic
PNEC = Predicted No-Effect Concentration
vPvB = very Persistent, very Bioaccumulative

Literature:

ECHA = REACH Registration dossier from ECHA's website
EPA Ecotox = US Environmental Protection Agency (database with ecotoxicological data)
IUCLID = International Uniform Chemical Database Information
TOXNET = Toxicology Data Network via Toxline database

Advice on training / instruction:

The product may only be used by persons who are carefully instructed in the execution of the work and who have knowledge of the contents of this safety data sheet.

Changes since previous version:

Not relevant - first edition.

Made by: Altos a/s - Tonsbakken 16-18 - DK-2740 Skovlunde - Tel. +45 38 34 77 98 / PH - Quality control PW
Translated by: Jorenku A/S - Teglvaerksvej 11 - DK-4733 Tappernoeye - Tel. +45 56 21 40 70 / LVB