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## **SAFETY DATA SHEET**

**According to Regulation (EC) No. 1907/2006 (REACH)**

### **Ferrous Sulphate**

Date: 06.04.2009      Version: 2.0      Replaces version: 1.0      From 27.02.2005      Pages: 10

#### **1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION:**

##### **1.1 Substance/Preparation identification: Ferrous Sulphate**

**Molecular formula** FeSO<sub>4</sub>.7H<sub>2</sub>O  
**Chemical name:** IRON SULFATE  
**EINECS:** 231-753-5  
**CAS No:** 7782-63-0

##### **1.2 Use of the substance:**

Available in the form of various hydrates.

It is used for purifying urban and industrial wastewaters, in machine-building industry – for neutralization of sulphuric acid in electrolyte production, in cement production – as reagent for lowering the content of the chrome (VI) in cement, as a raw material for synthesis of anticorrosive pigments and special-purpose iron oxide pigments. 7-hydrate of iron sulphate is planned to be used for iron sulphate (III) production.

##### **1.3 Company/Undertaking Identification:**

#### **The person responsible for commercial introduction of the substance in the EU:**

KLEMAT CZ Ltd.  
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## 2 HAZARDS IDENTIFICATION

According to the Directive 67/548/EEC and Annex 1 to this Directive the product has been classified as hazardous substance.

### Potential Health Effects:

The substance won't cause acute intoxication.

**Inhalation:** irritating to the respiratory tract, symptoms including cough and difficult breathing

**Eye contact:** irritant to eyes, symptoms being reddening and pain

**Skin contact:** will irritate the skin, symptoms – reddening, pain, and itch

**Ingestion:** hazardous in large doses

## 3 COMPOSITION AND INFORMATION ON INGREDIENTS

### 3.1 Composition

Chemical name	EINECS number	CAS number	Mass fraction, %	Classification/ labelling (R-phrases)
Ferrous sulphate heptahydrate: Ferrous sulphate water	231-753-5	7782-63-0	80-98 52-68 30,7-47,4	R22 R36/38
Ferrous sulphate monohydrate: Ferrous sulphate water	231-753-5	17375-41-6	80-98 72-78 9-10	R22 R36/38
Ferrous sulphate tetrahydrate: Ferrous sulphate water	231-753-5	20908-72-9	80-98 54-67 26-32	R22 R36/38
Ferrous sulphate (waterless)	231-753-5	7720-78-7	80-98	R22 R36/38

## 4 FIRST AID MEASURES

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**General measures:** provide rest, warm conditions, comfortable position, fresh air availability, free air access.

**Inhalation:** take out to fresh air. If breathing is difficult, provide oxygen; if not breathing, give artificial respiration.

**Eye contact:** flush eyes with running water until irritation ceases. If irritation continues, get medical attention.

**Skin contact:** remove contaminated clothing, shoes and outfit. Flush the contaminated skin with plenty of water using soft soap until the skin is clean.

**Swallowing:** clear the oral cavity free of the substance. Make the injured person drink plenty of water, give charcoal; make take milk, egg-white, and mucous decoctions. Give purge. Get medical attention.

## 5 FIRE FIGHTING MEASURES

Flame- and explosion-proof. Non-flammable, it won't sustain combustion.

**Thermally decomposable:** yes. **Products of decomposition:** sulphur and iron oxides. Use extinguishing media appropriate for surrounding fire.

## 6 ACCIDENTAL RELEASE MEASURES

### 6.1. Personal protection measures

If spilled, immediately contain the spilled substance. Avoid direct contact with the substance and inhalation of aerosol particles. Provide proper extract-input ventilation. Use personal protection means as stated in the section 8.

### 6.2. Environmental protection measures

Exclude the entering of the substance into wastewaters.

### 6.3. Cleaning procedure

If spilled: collect in dry form into the lockable labelled container for further use or disposing in such a way that there is no spilling out.

## 7 HANDLING AND STORAGE

### 7.1 Handling

Production facilities must be equipped with the extract-input ventilation. Production equipment must be sealed. Prevent over-limit concentration of iron sulphate in air. Use scrubbers for collecting and purifying acid gases.

### 7.2 Storage

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Store in manufacturer's package in cool and dry area where it is safe from contamination and exposure to rain, snow and subsoil water.

**7.3. Special use** – not specified.

## **8 EXPOSURE CONTROLS/PERSONAL PROTECTION**

### **8.1 Permissible exposure limits**

**Atmospheric air:** TLV = 0,007 mg/m<sup>3</sup> (on the basis of Fe).

**Air of working area:** TLV = 6 mg/m<sup>3</sup> – maximal single dose; TWA = 2 mg/m<sup>3</sup> – mean-shift dose, aerosol.

It is recommended to engage extract-input ventilation. Control of airborne concentration of iron sulphate is to be implemented spectrophotometrically (on the basis of Fe).

### **8.2 Exposure controls**

#### **8.2.1 Occupational exposure controls**

The running drinkable water must be supplied to the production facilities. Storage of foodstuff and eating in the substance processing area are forbidden.

##### **8.2.1.1. Respiratory protection**

Use dust respirator according to the EN149, equipped with the dust recovery filter.

##### **8.2.1.2. Hands protection**

Use protective gloves.

##### **8.2.1.3. Eye protection**

Use safety goggles according to EN166 or the full face mask.

##### **8.2.1.4. Skin protection**

It is recommended to use impermeable protective clothing including boots, gloves, lab coat, apron and union suit.

#### **8.2.2 Environmental effects controls**

The main pollutant is the iron sulphate (II) aerosol. It affects the environment by penetrating into air of inhabited localities, wastewaters and soil.

Prevent the entering of the substance into water sources, wastewaters and the soil.

The substance half-life – 7-1 days (stable).

The substance in the environment will transform into: ferric salts (trivalent) (basic iron sulphate, iron sulphate monohydrate, diiron trisulfate).

#### **Standard for water bodies of domestic and general water consumption:**

not set. On the basis of iron (III) sulphate, TLV in water = 0, 3 mg/l (org. [waft.]), (for the iron, taking into account total content of all forms of iron).

**Standard for fisheries waters:** iron, water soluble forms (on the basis of the all forms iron content): TLV = 0,1 mg/l; for sea waters TLV = 0,05 mg/l.

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### 8.2.3 Substance consumptive use measures

If the section 8.2.1 recommendations are observed the additional measures are not required.

## 9 PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 General information

Appearance: crystalline powder

Physical state: solid

Colour: grey with yellow-green hue

Odour: odourless

### 9.2 Important information on health, safety and environmental protection.

9.2 Important information on health, safety and environmental protection.	
pH	Iron sulphate heptahydrate - 3-4 (concentration 50 g/l water at 20°C) Iron sulphate (anhydrous form)- 3,7 (10 % water solution)
Boiling point/ boiling range	at 100 °C the substance loses 6 molecules of water and transforms into monohydrate form (- 6 H <sub>2</sub> O). At 300°C the substance loses 7 molecules of water and transforms into anhydrous form (-7 H <sub>2</sub> O).
Flash point Flammability Explosive properties	non-flammable flameproof explosion-proof
Oxidizing properties	will oxidize in air especially in the presence of another acid substance
Vapour pressure	Iron sulphate heptahydrate – data unavailable Iron sulphate (anhydrous form) - 28,9 hPa at 30,7 °C
Specific gravity	Iron sulphate heptahydrate - 1,9 g/sm <sup>3</sup> Iron sulphate (anhydrous form) - 3,14 g/sm <sup>3</sup>
Solubility	Iron sulphate heptahydrate – practically insoluble in alcohols (ethanol,

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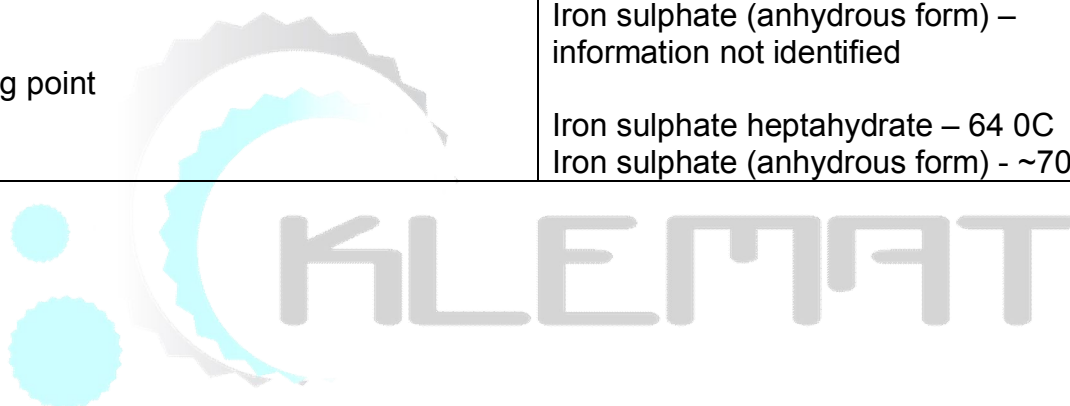
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	methanol) Iron sulphate (anhydrous form) – data not available
Water solubility	Iron sulphate heptahydrate – 33 g/100 g (при 00C); 149 g/100 g (at 500C) Iron sulphate (anhydrous form) – 26,5 % (20 0C); 50,9 % (70 0C)
Coefficient of n-octanol/water distribution	insoluble in n-octanol
Viscosity	not applicable
Vapor density	not volatile
Evaporation rate	low evaporation
<b>9.3 Additional information</b>	
Miscibility Fat solubility  Melting point	(the substance-water, 20° C): non-miscible Iron sulphate heptahydrate – insoluble in fats Iron sulphate (anhydrous form) – information not identified  Iron sulphate heptahydrate – 64 0C Iron sulphate (anhydrous form) - ~700 0C



## 10 STABILITY AND REACTIVITY

The product appears to be stable under regular storage and use conditions.

### 10.1 Conditions to avoid

Light, dust, moisture, excess heat, continuous exposure to air.

### 10.2 Incompatibilities (materials to avoid)

Heptahydrate – strong acids, alkalis, organic compounds.

Anhydrous form – strong acids, alkalis, soluble carbonates, gold and silver salts, lead acetate, limewater, potassium iodide, potassium and sodium tartrate, tannin, herbal astringent tinctures and decoctions.

### 10.3 Hazardous decomposition products

There are no dangerous decomposition products.

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## 11 TOXICOLOGICAL INFORMATION

### Iron sulphate heptahydrate:

#### Acute toxicity data:

LD50 = 1520 mg/kg (mouse, oral). LD50 = 245 mg/kg (mouse, intraperitoneal). LD50 = 51 mg/kg (mouse, intravenous).

LDL0 = 279 mg/kg (rabbit, subcutaneous). LC50 = not reachable.

#### Irritant action data:

**Skin:** yes (rat, 50 % vaseline-base ointment, trimmed area on the side of back of a rat - 4 hours; irritant action is identified).

**Eyes:** yes (50 mg, single exposure, rabbits, lachrymation, hyperemia, edema of mucosa).

**Respiratory tract:** yes

**Sensibilizing action:** not studied

**Embryotoxicity:** not studied

**Gonadotoxicity:** not studied

**Teratogenicity:** yes

**Mutagenic activity:** yes (Escherichia coli)

**Carcinogenic activity. Humans:** data not available. **Animals:** data not available. IARC rating: not listed as Causing cancer for humans.

## 12 ECOLOGICAL INFORMATION

### 12.1 Ecotoxicity

#### Iron sulphate heptahydrate:

**Acute fish toxicity:** EC = 0,9 mg/l at pH 6,5-7,5

**Acute Daphnia magna toxicity:** data not available

**Algal toxicity:** data not available

**Invertebrate toxicity:** mutation with microorganisms (Escherichia coli). EC0 = 100 mg/l (bacterium – Pseudomonas fluorescens, 24 hours).

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## 12.2 Mobility

Prevent the entering of the substance into the water sources, wastewaters and soil. In surface impoundments Fe<sup>++</sup> may transit to Fe<sup>+++</sup>, which is accompanied by absorption of the dissolved oxygen.

Will transform in the environment into ferric salts (trivalent) (basic iron sulphate, iron sulphate, iron sulphate monohydrate, diiron trisulfate).

## 12.3 PERSISTENCE AND BIODEGRADABILITY

**Biodegradation [BD = (BOD5 : COD) · 100 %]** : < 10 % (practically not degradable).

**Chemical oxygen demand:** data unavailable.

**Biological oxygen demand:** not applied.

**The substance half-life:** > 30 days (extremely stable).

## 12.4 Bioaccumulation potential

**Cumulation:** weak

## 12.5. PBTs classification (persistent-bioaccumulative and toxic substances)

The substance is not persistent and bioaccumulative one.

## 12.6 Other negative effects

**Substances which may cause destruction of the ozone layer:** unavailable

**Volatility:** non-volatile

## 13 WASTE DISPOSAL

If rework or disposal is impossible the product must be displaced to the appropriate approved waste disposal unit.

Disposal of the waste and package in strict correspondence with the state and local laws and regulations.

## 14 TRANSPORT INFORMATION

Transportation by railway (RID), road (ADR), and sea (IMDG) transport.

Hazard class **no**

## 15 REGULATORY INFORMATION

**EC regulations** This product is classified and labelled for shipment in compliance with the Directives

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67/548/ EEC and 1999/45/EC as follows:

### **Risk phrases**

R22 – hazardous if swallowed;  
R36/38 – irritating to the skin and eyes.

### **Safety phrases**

S2 – keep out of reach of children;  
S46 – if swallowed, immediately get medical attention showing the container or the label.

**Industrial Use** Follow instructions to prevent risk for humans and environment

## **16 OTHER INFORMATION**

### **16.1 Abbreviations for signs and risks of the section 3:**

R22 - toxic if swallowed;  
R36 - irritating to eyes;  
R38 - irritating to skin.

### **16.2 Training advice**

Read the MSDS before using the product.

### **16.3 Recommended use restrictions**

Information contained in this Safety Data Sheet refers to this particular substance. It may be invalid in case this substance is used together with any other materials or in any other production process. The User bears responsibility for assessment of applicability and completeness of this information for his particular applications.

### **DISCLAIMER:**

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