

SAFETY DATA SHEET



according to Regulation (EC) No. 1907/2006 (REACH)

Iron (II) sulfate technical

Date: 17.03.2009

Version: 2.0

replaces version: 1.0

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1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION:

1.1 Substance/Preparation identification: IRON (II) SULFATE TECHNICAL

Molecular formula Fe.H₂O₄S · nH₂O

Chemical name:

EINECS: Iron sulphate

IUPAC: Iron (II) sulfate

PRE-REFERENCE NUMBER – 05-2114100391-69-0000

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 sulfate is planned to be used for iron sulfate (III) production.

1.3 Company/Undertaking Identification:

Manufacturer: CJSC Crimea TITAN

Address: Severnaya Promzona, Armyansk, AR Crimea, Ukraine, 96012

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

Irene Nasdala

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tel. +49 40 5 300 300 (working time only)

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e-mail: nasdala@afkem.com

The person responsible for SDS:

Grendach Valentina Mikhailovna – HSE Director

Address: Severnaya Promzona, Armyansk, AR Crimea, Ukraine, 96012

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1.4 Emergency Tel: +38 06567 3 74 44 (working time only)

+38 06567 3 75 35 (twenty-four-hour)

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.

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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 No	Index No (EU)	CAS No	Mass fraction, %	Classification/ labeling (R-phrases)
Iron sulfate (anhydrous)	231-753-5	026-003-00-7	7720-78-7	80-98	Xn; R22 Xi; R36/38
Iron sulfate monohydrate: Iron sulfate Water	231-753-5		17375-41-6	80-98 72-78 9-10	Xn; R22 Xi; R36/38
Iron sulfate tetrahydrate: Iron sulfate Water	231-753-5		20908-72-9	80-98 54-67 26-32	Xn; R22 Xi; R36/38
Iron sulfate heptahydrate: Iron sulfate Water	231-753-5	026-003-01-4	7782-63-0	80-98 52-68 30,7-47,4	Xn; R22 Xi; R36/38

4 FIRST AID MEASURES

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, eggwhite, and mucous decoctions. Give purge. Get medical attention.

5 FIRE FIGHTING MEASURES

Flame- and explosionproof. 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

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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 labeled 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 sulfate in air. Use scrubbers for collecting and purifying acid gases.

7.2 Storage

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/m³ (on the basis of Fe).

Air of working area: TLV = 6 mg/m³ – maximal single dose; TWA = 2 mg/m³ – mean-shift dose, aerosol.

It is recommended to engage extract-input ventilation. Control of airborne concentration of iron sulfate 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 facepiece 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 sulfate (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 sulfate, iron sulfate monohydrate, diiron trisulfate).

Standard for water bodies of domestic and general water consumption:

not set. On the basis of iron (III) sulfate, 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
Color	grey with yellow-green hue
Odor	odorless

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 ₂ O). At 300°C the substance loses 7 molecules of water and transforms into anhydrous form (-7 H ₂ O).
Flash point	non-flammable
Flammability	flameproof
Explosive properties	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 ³ Iron sulphate (anhydrous form) - 3,14 g/sm ³
Solubility	Iron sulphate heptahydrate – practically insoluble in alcohols (ethanol, methanol) Iron sulphate (anhydrous form) – data not available
Water solubility	Iron sulphate heptahydrate – 33 g/100 g (при 0°C); 149 g/100 g (at 50°C) Iron sulphate (anhydrous form) – 26,5 % (20 °C); 50,9 % (70 °C)
Coefficient of n-octanol/water distribution	insoluble in n-octanol
Viscosity	not applicable
Vapor density	not volatile
Evaporation rate	low evaporation
9.3 Additional information	
Miscibility	(the substance-water, 20° C): non-miscible
Fat solubility	Iron sulphate heptahydrate – insoluble in fats Iron sulphate (anhydrous form) – information not identified
Melting point	Iron sulphate heptahydrate – 64 °C Iron sulphate (anhydrous form) - ~700 °C

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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, alkalies, organic compounds.

Anhydrous form – strong acids, alkilies, 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.

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 cancerigenic for humans.

Iron sulphate (anhydrous form):

Acute toxicity:

LD₅₀ = 1520 mg/kg (mice, per os). LD₅₀ = 319 mg/kg (rat, per os). LC₅₀ = data not available.

Irritant action:

Respiratory tract: yes

Eyes: yes

Skin: yes

Sensibilizing action: data not available

Embryotoxic action: data not available

Gonadotoxic action: data not available

Teratogenic action: data not available

Mutagenic activity: yes

Carcinogenic activity. Humans: data not available. **Animals:** data not available. IARC evaluation: not listed as cancerigenic 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

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Algal toxicity: data not available

Invertebrate toxicity: mutation with microorganisms (Escherichia coli). $EC_0 = 100$ mg/l (bacterium – Pseudomonas fluorescens, 24 hours).

Iron sulphate (anhydrous form):

Acute toxicity for fish: data not available

Acute toxicity for Daphnia magna: data not available

Algal toxicity: data not available

Invertebrate toxicity: data not available

12.2 Mobility

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

In surface impoundments Fe^{++} may transit to Fe^{+++} , which is accompanied by absorption of the dissolved oxygen.

Will transform in the environment into ferric salts (trivalent) (basic iron sulfate, iron sulfate, iron sulfate 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.

In accordance with the international rules of carriage the cargo is rated as hazardous.

UN number **3077**

Hazard class **9**

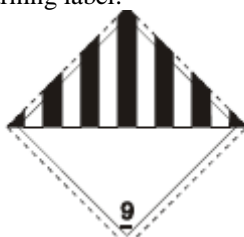
Hazard code **90**

Packing group **III**

Toxicity level **3**

Classification code **9163**

Warning label:



Obligatory label «Keep dry»

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15 REGULATORY INFORMATION

EC regulations

This product is classified and labeled for shipment in compliance with the Directives 67/548/ EEC and 1999/45/EC as follows:

Warning signs



Xn: Hazardous

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.

Labeling

Warning labeling is obligatory

Industrial Use

Follow instructions to prevent risk for humans and environment

Data sources:

State standard GOST 12.1.007-76 SSBT. Hazardous substances. Classification and general safety requirements.
State standard GOST 12.1.005-88 SSBT. General hygiene requirements for the workplace air.
Instructional guidelines MU No. 2717-83 on spectrophotometrical determination of iron sulfate content (on the basis of the Fe) authorized by the Ministry of Health of USSR.
Specifications TU U 24.1-32785994-007:2008 Iron (II) sulfate technical.
State standard DSTU 2463-94 (GOST 6981-94) Commercial copperas.
Safety data card of hazardous factor dated 15.08.2008 No. 9612 B000010 Iron (II) sulfate.
Safety data card of hazardous factor dated 09.03.2005 No. 3836 B000306 Iron (II) sulfate heptahydrate.
Copperas Material Safety Data Sheet MSDS 32785994.21.00131.
"Hygiene and toxicology datasheet developed by the Institute of Ecohygiene and Toxicology named for L. I. Medved, Ministry of Health of Ukraine. 2008
Standard EN 374
Standard EN 149: 2001
Standard EN 166 1F (2002)

16 OTHER INFORMATION

16.1 Abbreviations for signs and risks (R-фразы) of the section 3:

Sign «Xn» - hazardous substances;
Sign «Xi» - substances irritating to mucosal tunic;
R22 - toxic if swallowed;
R36 - irritating to eyes;
R38 - irritating to skin.

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16.2 Training advice

Read the SDS 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.