



Established 1875

8 Blackwood Business Park,
 Ash Road South, Wrexham Industrial Estate,
 Wrexham. LL13 9UG

Ferrous Sulphate Heptahydrate (Damp Grade) Safety Data Sheet

1. Identification of the Substance and Company

1.1 Personal precautions

Other names:	Iron Sulphate, Iron Sulphate Heptahydrate, Pickling Liquor	REACH Reg No.:	01-2119513203-57-XXXX
EINECS no.:	231-753-5	CAS no.:	7720-78-7

1.2

The pickling process in steel plants and tube plants is a surface treatment process of coils and tubes prior to coating of these articles. In order to generate a suitable surface on the belts/strips remaining iron oxides (and some other minor impurities) and the first surface layer of iron are removed in continuous pickling lines or tanks by treating the belt/strip/tube with sulphuric acid. The resulting liquid Ferrous Sulphate solution is produced. The iron salts are then crystallised and removed from solution.

Uses: The uses of Ferrous Sulphate will be covered in the exposure scenario annex, which will accompany this document.

1.3

Company:	Higgi Limited, 8 Blackwood Business Park, Ash Road South, Wrexham Ind. Estate, Wrexham. LL13 9UG
Telephone:	+44 (0) 1978 664766
Normal Hours:	08:00 – 16:30 Monday – Thursday, 08:00 – 14:30 on Friday
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Emergency:	Out of hours – please call mobile number +44 (0) 7967 303568
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2. Hazards Identification

2.1 Classification

Hazard Classification: Dangerous Substances (67/548/EEC) Directive			
Name	Hazard Class	Hazard Category	Risk Phrase
Ferrous Sulphate	Acute toxicity	Xn: Harmful	R22: Harmful if swallowed
	Irritation / Corrosion	Xi: Irritant	R36/38: Irritating to eyes and skin
Hazard Classification: CLP regulations (EC)1272/2008			
Name	Hazard Class	Hazard Category	Hazard Statement (code)
Ferrous Sulphate	Acute toxicity - oral	Acute Tox. 4	H302: Harmful if swallowed
	Skin irritation	Skin Irrit. 2	H315: Causes skin irritation
	Serious damage/eye irritation	Eye Damage 2	H319: Causes serious eye irritation

2.2 Label according to CLP regulations (EC)1272/2008

GHS07: Exclamation mark –



Signal word – Warning



CERTIFICATE NO. 1643

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Hazard statements:

H302: Harmful if swallowed.

H315: Causes skin irritation.

H319: Causes serious eye irritation.

Precautionary statements:

P264: Wash hands and exposed skin thoroughly after handling.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

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

P302+P352: IF ON SKIN: Wash with plenty of soap and water.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Other hazards

For aqueous solutions of Ferrous Sulphate the classification Corrosive to Metals should be given as required under CLP. The corresponding hazard category is Met Corr 1 and Hazard statement is H290: May be corrosive to metals.

Independent studies/tests carried out by Scientific Services Derby (A Division of SureScreen Dignostics Ltd) for Ferrous Sulphate solution at 20% and 30% concentrations were conducted between March and August 2011. Results concluded 'all samples were below the required corrosion rate of 6.25mm/year. Therefore, under the remit of ADR/CDG regulations for the Carriage of Dangerous Goods by Road outlined within the CLP regulations the above stated strengths of solution fall well below the required threshold according to a test specification quoted in OJEU UN recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria, Table 2.16.1.

3. Composition / Information on Ingredients

Substance	CAS-Nr.	Einecs No.	Registration No.	Classification (Dangerous Dir)	Sub	Classification (CLP Regs)	Range (%) by weight
Ferrous Sulphate	7720-78-7	231-753-5	01-2119513203-57-XXXX	Xn; R22, Xi; R36/38		H302, H315, H319	>80

The full text of the hazard statements mentioned in this section can be found in section 16.

The classification of Corrosive to metals H290 only applies to aqueous solutions of high concentrations and therefore is not included above. See section 2.3 Other hazards.

4. First Aid Measures

4.1 Description of first aid measures

Skin contact: Wash off with water, if symptoms persist, call a physician.

Eye contact: Rinse immediately with plenty of lukewarm water, also under the eyelids, for several minutes, consult a physician.

Inhalation: Supply fresh air, rinse mouth and nose with water, if symptoms persist, call a physician.

Ingestion: Call a physician immediately, do NOT induce vomiting, rinse mouth with water, drink 1 or 2 glasses of water or milk. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects

Can be acutely toxic but it's main symptoms will be irritation to the eye.

4.3 Indication of any immediate medical attention and special treatment needed

Seek medical attention if symptoms persist.

5. Fire-Fighting Measures

5.1 Extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Extinguishing media which shall not be used for safety reasons - None.

5.2 Special hazards arising from the substance

Sulphur Dioxide and Trioxide may be released when heating above the decomposition temperature.

5.3 Advice for fire-fighters

In the event of fire, wear self-contained breathing apparatus. Fire-fighters must wear fire resistant personal protective equipment.

6. Accidental Release Measures

6.1 Personal precautions

Refer to protective measures listed in section "Handling and Storage". Wear protective suit and boots, if dust, aerosols or mist are formed, use half mask with combination filter B/P2.

6.2 Environmental precautions

Cover the drains to prevent the product from entering the environment. If the product contaminates rivers and lakes or drains inform respective authorities. Restrict the spread of the spillage by using inert absorbent material (sand, gravel) solutions only.

6.3 Methods for cleaning up

Remove larger spills using a vacuum truck. Dilute residues with water and neutralise with lime or limestone powder. Sweep or shovel up smaller spills and residues. Must be disposed of in accordance with local and national regulations.



7. Handling and Storage

7.1 Handling

The work place and work methods shall be organised in such a way that direct contact with the product is prevented or minimised. Wear gloves in a suitable material such as PVC, Neoprene or Natural rubber. Please observe the instructions regarding permeability and breakthrough time, which are provided by the supplier of the gloves. Also consider the specific local conditions under which the product is used, such as the danger of cuts, abrasion and the contact time. Tightly fitting safety goggles must be worn.

7.2 Storage

Keep away from incompatible products. Avoid freezing. Avoid high temperatures.

Plastic material - Plastic (PE, PP, PVC), Fiberglass-reinforced polyester, Epoxy-coated concrete, Titanium, Acidproof or rubber-coated steel.

Materials to avoid - Non acid-proof metals (such as aluminium, copper and iron), Bases, Unalloyed steel, Galvanised surfaces.

8. Exposure Controls and Personal Protection

8.1 Control parameters (Occupational Exposure Limits (OELs))

Current OELs (GESTIS International Limit Values Institut fuer Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA))

Country in EU with OEL for the relevant substance	Iron Salts (as Fe)	
	8 hr TWA (mg/m ³)	STEL (mg/m ³)
Belgium	1.0	-
Denmark	1.0	-
Hungary	6.0 (Resp)	-
Spain	1.0	-
United Kingdom	1.0	2.0
TWA - Time Weighted Average measured over an 8 hour period		
STEL - Short Term Exposure Limit Value – 15 minute duration		
Resp - Respirable fraction of dust		

Derived DNELs for consumer and worker from the studies available from the REACH dossier

DNELs that have been derived for the registration dossier of this substance are not included here due to the current methodology used to derive such levels. Currently a program of updating the derivation of DNELs is being carried out by the lead registrant and consortium as part of a post registration update and this SDS will be updated as and when this program is completed.

8.2 Control Measures

To protect eyes wear suitable safety glasses and or safety goggles. Wear appropriate work wear to protect skin from contact. Check the resistance to chemicals of the protective gloves with the supplier of the gloves. Use only gloves conform to 89/686/EEC. Wear duration at permanent contact: gloves made of nitrile rubber, thickness of the glove material: 0.38 mm, breakthrough time (maximal wear duration): > 480 min. At occasional contact (splashes): gloves made of nitrile rubber, thickness of the glove material: 0.38 mm Breakthrough time (maximal wear duration): > 480 min this will include work overalls plus suitable gloves. If a dust is created then wear a suitable FFSP2 mask (EN149).

9. Physical and Chemical Properties

Property	Value used
Appearance at 20°C/ 1013 hPa	Physical State - Solid, powder, crystalline
Form and Odour	Light green with a slight acidic odour (threshold n/a)
pH	1.9 (30% solution), 2.2 (10% solution)
Melting point	60°C as Heptahydrate
Boiling point	>300°C as Heptahydrate
Relative density	2.97 g/cm ³ at 20°C
Vapour pressure	Not applicable
Surface tension	Not applicable
Water solubility	>100 g/l at 20°C
Partition coefficient (K _{ow} ⁴)	Not applicable, inorganic
Flash point	Not applicable
Flammability	Non flammable
Explosive properties	Non explosive
Oxidising properties	Known to be reducing agents
Granulometry	Not applicable
Stability in organic solvents	Stable in organic solvents
Dissociation constant	Not applicable
Viscosity	Not applicable

*Only properties that apply to the substance will be included in the table above



10. Stability and Reactivity

10.1 Reactivity

Product can be reactive under the correct conditions (oxidising agents).

10.2 Chemical stability

Loses water progressively from 56°C to 300°C. Aqueous solutions are oxidised slowly by air when hot, the rate of oxidation is increased by the addition of alkali or exposure to light.

10.3 Possibility of hazardous reactions

Rapid oxidation will occur if product comes into contact with oxidising agents.

10.4 Conditions to avoid

Avoid contact with oxidising agents. Thermal decomposition at 400°C.

10.5 Incompatible materials

Oxidising agents.

10.6 Hazardous decomposition products

If heated to above 600°C the product may give off acidic fumes of SO₃ Sulphur Trioxide and SO₂ Sulphur Dioxide.

11. Toxicological Information

Acute toxicity

The overall pattern of oral toxicity for iron salts is that they are harmful if swallowed. The human oral lethal dose is approximately 1000 mg/kg and 500-2000 mg/kg in rats. Toxic effects may, however, be produced by much lower doses especially when administered systemically. There is limited evidence that inhaled soluble iron salts are tolerated by rats plus limited evidence that inhaled soluble iron salts do not impair lung function and the dermal lethal dose would be greater than 2000 mg/kg. The dermal limit dose of Ferrous Chloride in rats is greater than 2,000 mg/kg (>881 mg Fe/kg) and thus should be used to compare against Ferrous Sulphate. This suggests little potential for systemic toxicity in humans after dermal contact.

Dose descriptor: Oral – LD₅₀s 300-2000 mg/kg bw
Dermal – LD₅₀s >2000 mg/kg bw
Inhalation – No data

Skin corrosion / irritation

Ferrous Sulphate is skin irritant based on (2:1 animals majority) in rabbit test and is an eye irritant. Read across from Ferrous Sulphate and Ferric Chloride, indicates that solutions have the same or a lower classification than the solid and that classification based on pH would be overly cautious. On this basis an irritant classification, Skin Irritation Cat 2. H315: Causes skin irritation should be applied to solutions based on rules for mixtures. This classification therefore applies for solutions of concentration ≥ 10%. Ferrous Sulphate should not be seen as corrosive just as an irritant.

Eye damage / irritation

Results are available for a GLP-compliant guideline study (Johnson, 2003), which showed that a 25% solution of Ferrous Sulphate Heptahydrate caused no more than mild redness and chemosis after instillation into the rabbit eye. The predicted classification based on reading across of several iron salts would be a classification between no classification and causes serious eye damage however due to the lack of test data and low pH (<2) a precautionary approach should be taken with classification as Eye Damage2.

Respiratory / Skin sensitisation

Ferrous Sulphate Heptahydrate has been tested in a guideline, GLP, Local Lymph Node Assay (Stitzinger, 2010: reliability 1). In this test Ferrous Sulphate gave a clear negative result and is therefore not considered a skin sensitiser. Results of a reliable LLNA test were clearly negative for Ferrous Sulphate Heptahydrate. There are a few case studies in which human subjects showed signs of sensitisation to iron; however overall these data are poor and do not provide convincing evidence of a positive reaction in humans. There is also poor evidence in animal studies of sensitisation as a result of exposure to iron. The widespread exposure of iron and its role in biological processes, together with the extensive use of dietary supplements suggest that sensitisation is not a concern.

Germ cell mutagenicity

With regard to their mutagenic properties, iron salts have been extensively tested in microbial and mammalian systems in vitro, and in mammalian and insect tests in vivo. There are inconsistencies in the in vitro findings, with a small number of studies returning positive results. This has been attributed to DNA damage following reduction of Fe(III) to Fe(II) with free radical or superoxide formation and subsequent redox recycling. This contrasts with the consistently negative results obtained in vivo where, presumably, more efficient control mechanisms exist that protect the body from iron-induced oxidative damage. It is concluded that iron salts are not genotoxic.

Carcinogenicity

Due to its potential pro-oxidant effects, there has been extensive research into possible links between iron and cancer development. These include many clinical investigations into the effects of oral (dietary) iron salts in humans and links to cancer. Although iron has been implicated in the development of cancers at various sites because of its role as a pro-oxidant, the UK Scientific Advisory Committee on Nutrition concluded that there is not enough evidence to reach conclusions for any specific links (EVM, 2003).



Reproductive toxicity

Results from recent guideline oral screening studies performed on Ferrous Chloride and Ferrous Sulphate gave NOAELs for reproductive and developmental effects of ≥ 500 mg/kg body weight/day or ≥ 1000 mg/kg body weight/day (no adverse effects were observed), respectively. These findings are considered to be relevant to Ferric as well as Ferrous salts, as oxidation of Ferrous to Ferric occurs in the low pH of stomach before ingested iron is absorbed into the body. In humans, iron supplementation of about 5.8 to 11.7 mg/kg

bw/day (for a 60kg individual) is routinely prescribed throughout pregnancy with no adverse effects on pregnancy outcome. Evidence of adverse effects on male testes has only been observed at acutely toxic, overload doses, at which some of the experimental animals died.

Dose descriptor: Oral – $LD_{50} \geq 1000$ mg/kg bw day
Dermal – No data
Inhalation – No data

Repeated dose toxicity

No human data is available for Ferrous Sulphate and repeated dose toxicity and even though effects are shown in some animal studies the overall conclusion is that no classification should be assigned for all endpoints oral, inhalation and dermal. NOAEL 49 days ~ 100mg/kg Ferrous Sulphate Heptahydrate, result = no effect.

Aspiration hazard

No data, not an aspiration hazard.

12. Ecological Information

12.1 Toxicity

In general toxic effects will not be seen by the presence of Ferrous Sulphate in the environment. However Ferrous Sulphate may present a toxic hazard to environmental species under specific conditions. For example, it is possible that Ferrous iron salts could have toxic effects in circumstances where the following conditions apply and persist: pH is low (<5), iron concentration is high (of the order of the apparent E(L)C50 values), oxygen content is very low, background concentrations of Ferrous iron are low. Such conditions would need to result in dissolved iron concentrations in the order of 1 to 10 mg/l and would not be expected to arise from the industrial production and use patterns for this product.

12.2 Persistence and degradability

An in-depth analysis of the oxidation and precipitation of iron was carried out by CEFIC as part of the recent European Chemicals Bureau classification process of Ferrous Sulphate (ECB, 2004b). A review of the scientific literature on the oxidation of Ferrous Sulphate reveals the following: Ferrous Sulphate reacts with water to form Ferrous Hydroxide ($Fe(OH)_2$), moderately insoluble. Any precipitate would in turn undergo further oxidation to form Ferric Hydroxide ($Fe(OH)_3$) which is highly insoluble. Formation of Ferric Hydroxide at pH levels above 5.0 limits the presence of iron in aqueous systems.

For inorganic metal salts the concept of biodegradation is not applicable in general (OECD, 2001). Removal of iron from solution via precipitation and abiotic processes is dominant. Iron is abundant in the environment from natural mineral sources and iron transformations and the whole iron cycle in the environment is a combination of abiotic and biological processes.

In summary, in the environment, a number of important steps follow from any releases. In effect, Ferrous and Ferric ions can be treated together because the Ferrous ion is rapidly transformed to Ferric ion under the conditions found at typical points of release. Ferric ions released into (or generated in) water will rapidly precipitate as highly insoluble oxides and oxo-Hydroxides. These stable compounds are exactly the forms in which iron is found naturally in the earth's crust.

12.3 Bioaccumulative potential

Biologically, iron is an essential trace element for organisms including micro-organisms, plants and animals. Iron plays an important role in biological processes, and iron homeostasis is under strict control.

12.4 Mobility in soil

Soil is the primary reservoir of naturally occurring iron. It has its own surface geochemical cycle. Iron can be mobilised from soil or sediment to surface waters as colloidal Ferric Hydroxide, fine suspended particulates and in bound to clay silt. Factors like pH, CO_2 concentration, redox conditions, availability of organic and inorganic complexing agents and soil type contribute to reactions of iron in soil.

12.5 Results of PBT and vPvB assessment

The criteria for persistence, bioaccumulation potential and toxicity are not met. The substance is not PBT or vPvB.

PNEC_{Water} - Any concentration of iron in water that can be considered as stable can only be due to the complexing effects of natural constituents in the water, bearing in mind that the amount in water will already be at saturation. This concentration will vary with location. It is not realistically possible to consider that any addition to the aquatic compartment can be stable, and therefore no PNEC can be set for water.

PNEC_{Sediment} - 49.5 g Fe/kg dwt, Indicative only, in the absence of intrinsic toxicity.

PNEC_{Soil} - 55.0 g/kg dwt, Indicative only, in the absence of intrinsic toxicity

PNEC_{Oral (secondary poisoning)} - widespread use of iron salts as human and veterinary dietary supplements, strongly suggest that effects resulting from long-term exposure at realistic environmental concentrations are very unlikely to occur.

13. Disposal Considerations

This product is classified as hazardous waste and as such is covered by local waste legislation. Do not discharge directly into watercourse or any other controlled watercourse. Waste disposal according to EC-regulations 2006/12/EC and 91/689/EEC in the corresponding versions, covering waste and dangerous waste. Bags are also considered to be hazardous waste and should be disposed of accordingly.



14. Transport Information

Not classified as hazardous for transport.

15. Regulatory Information

15.1 Safety, health and environmental regulations

Observe in addition the national legislative regulations. UK - Requirements in relation to drinking water treatment chemicals are set out in Regulation 31 of the Water Supply (Water Quality) Regulations 2000, as amended (UK only). There are specification limits on quality in relation to Ferrous Sulphate under the Drinking Water Inspectorate in the UK (UK only).

15.2 Chemical Safety Assessment

A chemical safety assessment has been carried out for this substance and full details of this can be found in the formal Chemical Safety Report (CSR) document held by each registrant. Details, which were seen to add value, have been included in the relevant sections of this SDS. Also see the Annex of this SDS for the relevant exposure scenarios written for this substance.

16. Other Information

Revision

This safety data sheet has been produced / revised in line with Regulation 453/2010 Annex I (Annex II of the REACH Regulations 2010). Information in this safety data sheet was collected and used where necessary from the work undertaken to produce a REACH Registration dossier and Chemical Safety Report for Ferrous Sulphate. This revision is the current version dated **17th Mar 2014** And supersedes previous version dated 27th Jun 2012

Risk and Safety Phrases according to (67/548/EEC):

R-phrases:

R22 - harmful if swallowed

R36/38 - irritating to eyes and skin

S-phrases:

S26 - in case of contact with eyes, rinse immediately with plenty of water and seek medical advice

S37/39 - wear suitable gloves and eye/face protection

S46 - if swallowed, seek medical advice immediately and show this document

S60 - this material and its container must be disposed of as hazardous waste

Hazard and Precautionary Statements according to CLP Regulations (EC)1272/2008):

Hazard statements:

H290: May be corrosive to metals (only applies to aqueous solutions)

H302: Harmful if swallowed

H315: Causes skin irritation

H319: Causes serious eye irritation

Precautionary statements:

P264: Wash hands and exposed skin thoroughly after handling

P280: Wear protective gloves/protective clothing/eye protection/face protection

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

P302+P352: IF ON SKIN: Wash with plenty of soap and water

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing

References

EVM 2003. Safe Upper levels for Vitamins and Minerals. Expert Group on Vitamins and Minerals, May 2003.

<http://www.food.gov.uk/science/ouradvisors/vitandmin/evmpapers>. FAO, 1997. A system approach to biogas technology, posted June 1997, an extract from "Biogas technology: a training manual for extension" (FAO/CMS, 1996). Sustainable Development Department of the Food and Agriculture Organisation of the United Nations (accessed online 24th February 2010 via <http://www.fao.org/sd/Egdirect/EGre0022.htm>).

GESTIS International Limit Values Institut fuer Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA) – website: http://bgia-online.hvbg.de/LIMITVALUE/WebForm_gw.aspx

Johnson, I., 2003. Ferrous Sulphate Heptahydrate solution - Eye irritation in the rabbit. Sponsor CEFIC. CTL report No.

CTL/FB6011/R/RE. 21 March 2003. Confidential unpublished report.

OECD 2001. Guidance Document on the Use of the Harmonised System for the Classification of Chemicals which are Hazardous for the Aquatic Environment. OECD Series on Testing and Assessment 27. ENV/JM/MONO(2001)8. OECD, Paris 2001. pp. 97 – 115.

Stitzinger, M (2010). Assessment of contact hypersensitivity to 202140/B in the mouse (local lymph node assay. NOTOX Project 494203 The Social and Economic Council of the Netherlands (SER) – website: http://www.ser.nl/en/oeel_database.aspx

Disclaimer

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Ferrous Sulphate Annex 1 – Exposure Scenarios

The current document includes all relevant occupational and environmental exposure scenarios (ES) for the production and use of Ferrous Sulphate as required under the REACH Regulation (Regulation (EC) No 1907/2006). For the development of the ES the Regulation and the relevant REACH Guidance have been considered. For the description of the covered uses and processes, the "R.12 – Use descriptor system" guidance (Version: 2, March 2010, ECHA-2010-G-05-EN), for the description and implementation of risk management measures (RMM) the "R.13 – Risk management measures" guidance (Version: 1.1, May 2008), for the occupational exposure estimation the "R.14 – Occupational exposure estimation" guidance (Version: 2, May 2010, ECHA-2010-G-09-EN) and for the actual environmental exposure assessment the "R.16 – Environmental Exposure Assessment" (Version: 2, May 2010, ECHA-10-G-06-EN) was used. The following exposure scenarios are taken directly from the Chemical safety report for iron salts that was made available via the ALFe REACH Consortium. The exposure scenarios included in this annex are those related to the use of Ferrous Sulphate for the customers in the supply chain and the steel industry. The intended use numbers (IU) indicate which exposure scenario should be used in conjunction with what is agreed by the customers down the supply chain.

IU number	ES code	Identified use (IU)
2	ES 2	Manufacturing of iron sulphates
3	ES3	Generic formulation including pelletisation
4	ES4	Water treatment: treatment of raw and potable waters
5	ES 5	Water treatment: treatment of waste waters and WWTP sludge
7	ES 7	Use as reactive product/precursor
8	ES 8	Manufacture of cement
9	ES 9a	Industrial use of cement
10	ES 9b	Professional use of cement
11	ES 9c	Consumer use of cement
12	ES10a	Industrial use as a metal etchant and surface treatment agent.
14	ES11	Professional use of selected iron salts in land remediation applications.
17	ES13b	Use in Agrochemicals (professional)
18	ES13c	Use in Agrochemicals (consumer)