



OFZ, a. s.

MATERIAL SAFETY DATA SHEET

for

Ferrosilicon (FeSi)

prepared according to Annex II of Regulation EP and Council
(1907/2006/EC and Commission Regulations (EU) 2020/878)

Number: KBU-001-EN

Release date:

01/11/2024

Revision No: 0

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FeSi is **not** classified as dangerous according to the CLP regulation (1272/2008/EC). FeSi is **not** classified as a PBT (persistent, bioaccumulative and toxic) or vPvB (very persistent and very bioaccumulative) substance according to the criteria set out in Annex VIII of the REACH regulation. FeSi is **not** included in ECHA's candidate list of substances of very high concern. Therefore, provision of the Safety Data Sheet according to Regulation 1907/2006 (REACH) is not mandatory. This product safety information is a voluntary presentation of certain information that may assist the user in handling.

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Trade name: FeSi 90%, FeSi 75%, FeSi 65%, FeSi 45%
Chemical name: Ferrosilicon
Reaction mixture of iron, iron disilicide, iron silicide and silicon

Ferrosilicon (FeSi)	EC number	CAS number	REACH registration number	Index number
	912-631-7	not applicable	01-2119485286-28-0016	not applicable

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses:

raw material to produce steel, alloys and special steel,
deoxidation and alloying of cast iron
source of silicon as an alloying element,
metal finishing,
for other uses, please, see the website of the European Chemicals Agency (ECHA)

Uses advised against: No information available.

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer: OFZ as
Address: Široká 381, 027 41 Oravský Podzámok, Slovakia
Phone number: +421/43/5804 111
Fax number: +421/43/5804 320
E-mail: ofz@ofz.sk

1.4 Emergency telephone number

Since the substance is not classified as dangerous, there is no need for emergency numbers. However, in case of accident, please, call your local emergency number.

European emergency tel. number: 112
National toxicological
information center: +421 2 5477 4166

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2. HAZARD IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Classification according to regulation (EC) no. 1272/2008 (CLP)

It is not classified.

2.1.2 Additional information

FeSi is registered in REACH as a "multi-component substance".

For the purpose of REACH regulation, FeSi is classified as a substance, not as a mixture.

2.2 Label elements

Labeling is not required.

2.3 Other hazards

Contact of FeSi dust with moisture, acids and bases may result in formation of flammable and toxic gases (see section 10.). Inhalation of a small amount of these gases can cause headaches, nausea and vomiting. Inhalation of a larger dose may cause lung damage.

Use appropriate eye protection when handling FeSi, Use gloves when handling FeSi directly. When handling the material generates dust, use appropriate respiratory protection.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Description: The registered substance is present in the form of an alloy.
Degree of purity: <= 95.1% (mass concentration)

Component	Typical concentration	Concentration range	Notes
Silicon (Si) CAS: 7440-21-3 EC: 231-130-8	FeSi 90 %: 90,0 % (w/w) FeSi 75 %: 75,0 % (w/w) FeSi 65 %: 66,0 % (w/w) FeSi 45 %: 45,0 % (w/w)	87,0 – 96,0 % (w/w) 72,0 – 78,0 % (w/w) 65,0 – 70,0 % (w/w) 42,0 – 50,0 % (w/w)	
Iron (Fe) CAS: 7439-89-6 EC: 231-096-4	FeSi 90 %: ≥6,0 % (w/w) FeSi 75 %: ≥ 22,0 % (w/w) FeSi 65 %: 30,0 % (w/w) FeSi 45 %: 52,0 % (w/w)	4,0 – 10,0 % (w/w) 18,0 – 24,0 % (w/w) 28,0 – 34,0 % (w/w) 45,0 – 55,0 % (w/w)	

The substance does not contain any impurities necessary for classification and labeling.

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4. FIRST AID MEASURES

4.1 Description of first aid measures

<u>General notes:</u>	There is no anticipation of FeSi to cause any harm if in contact with clothes, skin and eyes. In all cases, when in doubt, or when symptoms persist, seek medical attention. Provide this Safety Data Sheet.
<u>After inhalation:</u>	Mechanical irritation caused by dust in the respiratory tract. Remove person from a dust-exposed area to fresh air. If the person is not breathing, give artificial respiration. In case of any difficulties, contact a physician.
<u>After skin contact:</u>	Wash the skin with water or mild soap.
<u>After contact with eyes:</u>	Flush the eyes with water or saline solution. In case of persistent discomfort, seek medical treatment.
<u>After ingestion:</u>	Remove source of for further ingestion. See section on inhalation.

4.2 Most important symptoms and effects, both acute and delayed

Excessive exposure to FeSi dust can cause irritation symptoms such as cough and sore throat, redness and severe watering of the eyes. Contact of FeSi dust with skin may cause itching and dehydration.

Symptoms of poisoning: Nausea, vomiting, diarrhea, weakness.

4.3 Indication of any need for immediate medical attention and special treatment needed

No relevant information was identified.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Bulk FeSi is not flammable.

Suitable extinguishing agents: dry sand, CO₂ extinguisher or powder extinguisher

Unsuitable extinguishing media: do not extinguish powdered FeSi with water.

5.2 Special hazards arising from the substance or mixture

Hazardous combustion products:

Flammability test according to REACH (EC directive) showed that FeSi is not flammable.

Wet material added to molten or hot FeSi can cause explosions. If FeSi comes into contact with moisture, acids or bases it can form under certain conditions highly flammable hydrogen gas (H₂) and highly flammable and highly toxic gases phosphine (PH₃) and arsine (AsH₃) (garlic-like odor).

5.3 Advice for firefighters

If FeSi dust is generated at unventilated areas, use breathing apparatus.

Use firefighting measures appropriate to local circumstances and surrounding environment.

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6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

In case of FeSi dust leakage:

Keep unprotected persons at a safe distance.

Wear suitable protective equipment (see section 8).

Ventilate the spill site thoroughly. Prevent further dust formation. Keep dry.

Eliminate all sources of ignition (do not smoke, create sparks or flame in the hazardous area).

6.1.2 For emergency personnel

In case of FeSi dust leakage:

Keep unprotected persons at a safe distance.

Wear suitable protective equipment (see section 8).

Ventilate the spill site thoroughly. Avoid dust formation. Keep dry.

Eliminate all sources of ignition (do not smoke, create sparks or flame in the hazardous area).

6.2 Environmental precautions

Avoid dispersal into the environment, runoff of material into soil, waterways and sewers.

6.3 Methods and material for containment and cleaning up

6.3.1 To prevent proliferation

Keep the material in a dry environment.

Handle the material to minimize dust generation.

Avoid formation of dust.

Damp/wet material shall be separated from dry one and shall not be collected and stored in closed containers.

6.3.2 For cleaning

FeSi dust shall be collected in suitable closed vessels/containers.

Prefer vacuuming over sweeping with a system that does not create ignition sources.

Thoroughly clean contaminated objects and surfaces in compliance with environmental regulations.

6.3.3 Other information

Do not wash off FeSi dust with water or water-based cleaning agents.

6.4 Reference to other sections

Information on handling: see section 7.

Information on combustion products: see section 5.

Information on incompatible materials: see section 10.

Information on personal and environmental protection: see section 8, 12 and 13.

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7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Safety measures:

Keep dry.

Handle the material to minimize generation of dust.

Ensure adequate ventilation/extraction in the workplace.

Prevent FeSi dust from reacting with moisture, acids and bases.

Avoid creating sparks or other sources of ignition in areas with high dust concentrations.

Warehouses shall meet the fire safety requirements for buildings and electrical equipment shall comply with valid regulations.

Environmental protection measures:

Collect FeSi dust in a closed container.

Dispose of in a way approved by the relevant local authorities.

Do not pour water on dust or containers with FeSi dust.

Dry material can be reused.

Damp or wet material shall be kept away from dry one and shall not be stored in closed containers.

Instructions regarding general hygiene in the work environment:

Avoid raising dust. Wear protective clothing, gloves and goggles. Wear suitable respirators where desirable.

7.2 Conditions for safe storage including any incompatibility

Store in a dry and well-ventilated place, away from water, acids and bases.

7.3 Specific end use (s)

See section 1.2.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Users should always consult their national or regional regulatory authorities for advice on the current exposure limits that apply to them. They should further check whether these limits are legally binding or just recommended as per available guidelines.

8.1.1 Exposure limit values

Occupational exposure Limit (OEL): 4 mg/m³ of inhaled FeSi dust

Derived no-effect level (DNEL) for long-term exposure:

0.3 mg/m³ of respirable FeSi dust, which can be achieved by keeping the OEL below the exposure limit value.

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PNEC_{water} :

not determined for FeSi due to its low solubility

PNEC_{soil} :

low probability of soil exposure from FeSi production and from currently known uses of the material down the supply chain. There is no direct use of this indicator on soil. The soil PNEC is derived using a calculation method and data on the known effects of metal components, which indicates its value at the level of 680 mg/kg dry weight.

PNEC_{sediment} :

low probability of sediment exposure from FeSi production and from currently known uses of the material down the supply chain.

8.2 Exposure controls

To control possible exposure, it is necessary to prevent the formation and raising of dust. The use of suitable protective equipment is recommended. In the case of visible accumulation of dust from FeSi, it is necessary to take occupational safety measures preventing the accumulation of dust above 4 mg/m³ at the workplace.

8.2.1 Adequate technical control measures

Measure the workplace exposure limit regularly. If dust is generated during the handling of the material, use an extraction or ventilation system or other means to maintain dust limit values in the air.

8.2.2 Individual protective measures, such as personal protective equipment

8.2.2.1 Information on the use of protective equipment

Personal protective equipment shall adhere to good hygienic practice in the work environment and be in accordance with control measures, including technical control measures, ventilation and isolation.

8.2.2.2 Equipment to provide adequate and appropriate protection

a) eye/face protection

Wear safety glasses.

b) skin protection

Hand protection: wear gloves and use protective hand cream

Other skin protection: Wear protective clothing

c) respiratory protection

Use a respirator.

d) thermal hazard

No information available.

8.2.3 Environmental exposure controls

Dust emissions from the ventilation system or the workplace must be checked to see if they meet the requirements of environmental protection legislation. A concentration below 4 mg/m³ does not threaten the environment. Limit values for particles (PM 2.5 and PM 10) in the ambient air (Directive 1999/30/EC and its further amendments).

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9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

Property	Information
Physical state/Appearance	solid matter (pieces, ingots, granules or dust)
Colour	gray
Odour	odorless (gases released when dust meets water have a smell of garlic, odour threshold: not relevant)
Melting/freezing point	1220 — 1400 °C at 101,3 kPa
Boiling point	not applicable (substance in solid state with melting temperature > 300°C)
Flammability	non-flammable (method EU A.16)
Lower and upper explosion limits	not applicable (does not apply to solids)
Flash point	not applicable (does not apply to solids)
Auto-ignition temperature	> 400°C, without signs of burning (EU method A.16)
pH value	not applicable (substance is solid at ambient temperature)
Kinematic viscosity	not applicable (substance is solid at ambient temperature)
Solubility	Solubility in water: OECD T/D screening test: ≤ 0.02 mg Si/l ≤ 0.04 mg Fe/l at pH 6 (21.5 °C), ≤ 0.09 mg Si/l ≤ 0.02 mg Fe/l at pH 8 (21.5 °C) OECD 105: ≤ 0.01 mg Si/l at pH 5.8-5.9 (20 °C) FeSi particles with a diameter < 1 mm
Dissociation constant	not applicable
Vapour pressure	not applicable (melting temperature > 300°C)
Density and/or relative density	relative density: 2.5 - 7.5 g/cm ³
Relative vapour density	not applicable (only applies to gases and liquids)
Particle size	Granulometry: Size ranges given in ISO 5445-1980: Class 1: 100-315 μm; below average 20% (w/w) Class 2: 75-200 μm; below average 20% (w/w) Class 3: 35-100 μm; below average 18% (w/w) Class 4: 10-75 μm; below average 18% (w/w) Class 5: 3.15-35 μm; below average 8% (w/w) Class 6: 3.15-10 μm; below average 10% (w/w) Class 7: 3.15-6.3 μm; below average 10% (w/w)

9.2 Other information**9.2.1 Information regarding physical hazard classes**

See section 14.

9.2.2 Other safety characteristics

FeSi dust can react with moisture, acids and bases. See section 10.

10. STABILITY AND REACTIVITY**10.1 Reactivity**

FeSi is stable under normal handling and storage conditions.

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10.2 Chemical stability

Under normal temperature conditions, conditions of storage and use, FeSi is a stable substance.

10.3 Possibility of hazardous reactions

Contact of FeSi dust with moisture, acids or alkalis can produce highly flammable and explosive hydrogen gas (H₂) and highly flammable and highly toxic gases phosphine (PH₃) and arsine (AsH₃). PH₃ and AsH₃, which smell like garlic, are heavier than air and can accumulate at the bottom of closed containers. Dust with a Si/Fe ratio ≤ 2 and a particle diameter > 10 μm does not pose any explosion hazard.

Wet material added to molten or hot FeSi can cause explosions. (above 100-300 g/m³).

10.4 Conditions to avoid

Avoid contact of FeSi dust with moisture, acids and bases.

Avoid activities that generate FeSi dust and avoid sparks and other sources of ignition in areas with high concentrations of FeSi dust.

10.5 Incompatible materials

FeSi dust is incompatible with moisture, acids (mainly HF and HNO₃) and bases.

10.6 Hazardous decomposition products

FeSi has no hazardous decomposition products when used as intended. See section 10.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

FeSi is not classified as dangerous according to the CLP regulation (1272/2008/EC) or as dangerous according to the directive on dangerous substances (67/548/EEC).

Health hazard	Information
Acute toxicity	Based on the available data, the classification criteria are not met.
Skin corrosion/irritation	Based on the available data, the classification criteria are not met.
Serious eye damage/eye irritation	Based on the available data, the classification criteria are not met.
Respiratory or skin sensitization	Based on the available data, the classification criteria are not met.
Germ cell mutagenicity	Based on the available data, the classification criteria are not met.
Carcinogenicity	Based on the available data, the classification criteria are not met.
Reproductive toxicity	Based on the available data, the classification criteria are not met.
Specific target organ toxicity (STOT) – single exposure	Based on the available data, the classification criteria are not met.
Specific target organ toxicity (STOT) – repeated exposure	Based on the available data, the classification criteria are not met.
Aspiration hazard	Based on the available data, the classification criteria are not met.

Data according to the Chemical Safety Report issued in 2016 Euroalliages asbl. See section 4 and 8.

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11.2 Information on other hazards

11.2.1. Properties of endocrine disruptors

FeSi does not contain any substances over 0.1% (w/w) which would fall under an obligation to declare their content, and which would be classified as endocrine disruptors according to any EU regulation.

11.2.2. Other information

No information available.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

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

12.2 Persistence and degradability

Abiotic degradation: The rate of hydrolysis of FeSi is slow.

Physical and photochemical exclusion:

Phototransformation in air/water/soil: No relevant information available

Biodegradation: Not determined for inorganic substances.

12.3 Bioaccumulative potential

No or very low potential for bioconcentration and bioaccumulation.

12.4 Mobility in soil

FeSi is immobile in soil and sediments. Dissolved silica (and silicon) and all metals in FeSi, they are low-volatile substances and are distributed mainly in the aquatic environment or in soil or sediments.

12.5 Results of PBT and vPvB assessment

FeSi is an inorganic material and cannot be classified as a PBT/vPvB substance.

FeSi is not known to contain >0.1% or <0.1% PBT/vPvB impurities.

12.6 Properties of endocrine disruptors

FeSi does not contain any substances over 0.1% (w/w) which would fall under an obligation to declare their content, and which would be classified as endocrine disruptors according to any EU regulation.

12.7 Other adverse effects

No other adverse effects were detected.

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13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

FeSi is not listed as hazardous waste in the European Waste List.

Recycle unused FeSi in accordance with national legislation.

Disposal must meet the requirements of environmental protection and waste disposal legislation.

14. TRANSPORT INFORMATION

14.1. UN number

UN number 1408

14.2. UN proper shipping name

FeSi with 30% or more but less than 90% silicon.

14.3. Transport hazard class(es)

Standard classification: 4.3

Special Provisions: If the chemical or physical properties of the substance covered by this description are such that, when tested, it does not meet the prescribed defining criteria for the class given in column 3 or any other class, it is not subject to the provisions of this Code except in the case of sea transport where 2.10 applies .3 on pollution.

FeSi produced in OFZ, as was tested according to "Recommendations of the United Nations Organization for the Transport of Dangerous Goods, Manual of Tests and Criteria 2019 ST/SG/AC.10/11/Rev.7 part III 33.4.1.4 (test N.5):

RID/ADR: not classified in class 4.3

Classification certificate Nr/No 056/Lukasiewicz-IPO-BC/2022 for FeSi65% and FeSi75%

Classification certificate Nr/No 005/Lukasiewicz-IPO-BC/2023 for FeSi45%

IMDG: not classified in class 4.3

Classification certificate No/Nr 001/IMGD/Lukasiewicz-IPO-BC/2024 for FeSi90%,FeSi75%, FeSi65%,FeSi45%

14.4. Packing group

Packing group: III

14.5. Environment hazards

FeSi is not considered harmful to aquatic organisms (Lillicrap, 2011). FeSi is not a pollutant for the sea.

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14.6. Special precautions for user

Avoid contact of FeSi dust with moisture, acids and bases.

Avoid visible raising of FeSi dust and avoid sparks and other sources of ignition in areas with high concentrations of FeSi dust.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

When transporting bulk cargo, IMO instruments must be observed:

Chapter VI and Chapter VII of the SOLAS Convention.

Annex II or Annex V of the MARPOL Convention.

IBC Code and IMSBC Code.

UN number: 1408

BC code: Class 4.3 (30-90% Si), Class MHB ((25-30 and > 90) % Si)

Before loading, the manufacturer or shipper should provide a certificate that, after production, the material has been stored under cover, but in the fresh air, in the particle size in which it is for shipment, not less than three days before shipment.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture environment

EU regulations:

Regulation (EC) No. 1907/2006 REACH

Regulation (EC) No. 1272/2008 CLP

Commission Regulation (EU) 2020/878 amending Annex II no. 1907/2006 - REACH

Directive on dangerous substances no. 67/548/EEC

Directive on dangerous preparations no. 1999/45/EC

Directive on limit values of sulfur dioxide, nitrogen dioxide and nitrogen oxides, solid pollutants and lead in the ambient air no. 1999/30/EC

15.2 Chemical safety assessment

A chemical safety assessment for FeSi (reaction mass of iron, silicon, iron silicide and iron disilicide) was carried out in 2016 by Euroalliages asbl.

16. OTHER INFORMATION

16.1 List of abbreviations used

Abbreviation	Meaning
ADR/RID	European Agreement on the International Carriage of Dangerous Goods by Road/Rail
BC code	International Code on the Carriage of Bulk Cargo and Concentrates by Sea
CAS number	A unique accession number assigned by the Chemical Abstracts Service (CAS)
CLP	Regulation on classification, labeling and packaging of chemical substances and mixtures
DNEL	Derived no-effect level

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for

Ferrosilicon (FeSi)

prepared according to Annex II of Regulation EP and Council (1907/2006/EC and Commission Regulations (EU) 2020/878)

Number: KBU-001-EN

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Revision Date:-

EC number	The European Community number
IBC code	International code for the construction and equipment of ships carrying hazardous chemicals as bulk cargo, as amended.
IMDG	International maritime dangerous goods law
IMO	International maritime organization
IMSBC code	International code for the maritime carriage of solid bulk cargoes, as amended
MARPOL	International convention for the prevention of pollution from ships
NPEL	The highest permissible exposure limits of gases, vapors and aerosols with mostly toxic effect in the working atmosphere
OECD	Organisation for economic co-operation and development
OEL	Occupational exposure limit
PBT	persistent, bioaccumulative and toxic substances
PNEC	predicted no-effect concentration
REACH	Registration, evaluation and authorization of chemical substances
SOLAS	International convention on the safety of life at sea from 1974, as amended.
STOT	Specific target organ toxicity
T/D test	substance solubility test
UN number	four-digit number that identifies dangerous goods, hazardous substances and articles (OSN)
vPvB	very persistent, very bioaccumulative substances

16.2 List of changes compared to the previous revision

Replaces KBU-OFZ-08-EN, Rev. no. 8 of July 27, 2023.

16.3 Key Resources

This Safety Data Sheet was prepared according to the Chemical Safety Report issued in 2016.

Lillicrap A. Assessment of the Transformation/Dissolution (T/D) Data Generated for FeSi (high Ba). Norwegian Institute for Water Research. Lab. Testing Report n° 025-2010, Serial No. O-10158 of March 2011.

The safety data sheet is prepared according to Annex II of the EP and Council Regulation 1907/2006/EC and the Commission Regulation (EU) 2020/878).

These data are based on our current knowledge, but do not represent any guarantee of any product properties and do not establish any legally binding contractual relationships.

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