

**PRODUCT SAFETY INFORMATION****for FESI**

Date of formation / date of updating: 01.07.2011 / 03.06.2020

FeSi is not classified as hazardous under the CLP Regulation (1272/2008/EC), is not persistent bio accumulative and toxic (PBT) or very persistent and very bio accumulative (vPvB) as defined in Annex XIII of the REACH Regulation, and is not included in the ECHA candidate list of substances of very high concern. Therefore, provision of a Safety Data Sheet (SDS) according to Regulation 1907/2006 (REACH) is not mandatory. This Product Safety Information (PIS) is a voluntary presentation of certain information that may assist the user in the handling of FeSi.

**1. IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY/UNDERTAKING****1.1. Product identifier****Trade name: ferrosilicon**

Synonyms: FeSi, FeSi alloys, ferro-silicon (alloy), iron-silicon alloy, iron silicide (alloy), iron disilicide (alloy), Reaction mass of iron and iron disilicide and iron silicide and silicon, master alloys, inoculants (smelting).

REACH registration number: 01-2119485286-28-0059

CAS number: not applicable

Index number: not applicable

EC number: 912-631-7

**1.2. Relevant identified uses of the substance or mixture and uses advised against****Identified uses:**

- Manufacture of basic metals, incl. Alloys SU 14, PC 7; PROC 1, 3, 4, 5, 8a, 8b, 9, 13, 14, 15, 21, 22, 23, 24, 25, 27a&b; AC7; ERC 3, 5, 12a&b):
- Refractories, ceramic formulations, other special products - SU0; PC 14, PROC 3, 4, 5, 8a&b, 9, 14, 22, 23, 24, 25; AC 7, ERC 3, 5):
- Manufacture of fabricated metal products, except machinery and equipment (SU 15, PC 7, PROC 1, 3, 4, 5, 8a, 8b, 9, 13, 14, 15, 21, 22, 23, 24, 25, 27a&b; AC7; ERC 3, 5, 12a&b).
- Used in arc welding (SU17; PC 38; PROC 5, 9, 8b, 25, 26).
- Mining, as a flotation agent (SU2a, PC0, PROC 26, ERC 4).
- Sewage treatment, as a flotation agent

Detailed list of identified uses: see section 16

**Uses advised against:**

Not applicable.

**1.3. Details of the supplier of the Product Safety Information**

Re Alloys Sp. z o.o.

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43-170 Łaziska Górne

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www.realloys.pl

E-mail address of a person responsible for drawing up the Product Safety Information:

biuro@realloys.pl

#### 1.4. Emergency telephone number

As the substance is not hazard classified, emergency numbers are not relevant. However, to be complete, hereafter the known emergency phones of members states:

112 is the emergency number throughout Europe

- Austria – VergiftungsInformationsZentrale: + 431 406 43 43
- Belgium – Centre Antipoison/Antigifcentrum: + 32 (0)70 245 245
- Bulgaria – Poison center: + 359 2 9154 409
- Cyprus: 112
- Czech Republic : + 420 224 919 293
- Denmark - Giftlinjen: 82 12 12 12
- Estonia:
- Finland - Poison Information Centre: + 358 (09) 471 977
- France – Centre anti-poisons: + 33 (0)1 4005 48 48
- Germany – Giftinformationszentren: + 49 (0) 30 - 19240
- Greece– Poison center: Poison Center + 30 2107793777
- Hungary- +36 (0)6 80 20 11 99
- Island:
- Ireland:
- Italy:
- Latvia:
- Liechtenstein:
- Lithuania: + 370 5 236 20 52
- Luxembourg:
- Malta: + 356 2545 0000
- the Netherlands: 112
- Norway - Norwegian Poison Information Centre: + 47 22 59 13 00
- Poland: +48 32 3247100
- Portugal - Centro de Informação Antivenenos: + 351 808 250 143
- Romania:
- Slovakia– National Toxicological Information Center: + 421 2 5477 4166

- Slovenia:
- Spain:
- Sweden- Giftinformationscentralen: + 46(0)8-331231
- Great Britain - The UK National Poisons Emergency number: +44 870 600 6266

List of national helpdesks: <https://www.echa.europa.eu/web/guest/support/helpdesks>

## 2. HAZARDS IDENTIFICATION

### 2.1 Classification of the substance or mixture

This product does not meet the criteria for hazard classification under the WE Regulation no 1272/2008 December 16th 2008 concerning classification, labelling, and packing (CLP). Therefore, there is no requirements to produce Exposure scenarios for the identified uses of section 1.2 (Art. 14 of REACH). FeSi is registered in REACH as a “multi-constituent substance” as “reaction mass of iron and iron disilicide and iron silicide and silicon with a provisional list number 912-631-7”. For classification purposes, FeSi is assessed as an entity and not as a mixture.

### 2.2 Label elements

Not applicable.

### 2.3 Other hazards

FeSi alloys in reaction with moisture, acid or bases can to leads to the formation of toxic and flammable gases. Particulate matter may in some cases result in dust explosion. See section 10.

## 3. COMPOSITION / INFORMATION ON INGREDIENTS

CAS/EC number and the registration number	Name of the main ingredient	Concentration	Classification under EC 1272/2008
EC: 912-631-7/ CAS: not applicable  EC: 617-088-7/ CAS: 8049-17-0;	FeSi*, including:	95 –100%	Not classified
EC: 234-670-2/ CAS: 12022-95-6;	iron silicide	phase diagram	Not classified
EC: 234-671-8/ CAS: 12022-99-0;	iron disilicide		
EC: 231-130-8/ CAS: 7440-21-3;	silicon	8-95 %	Not classified
EC: 231-096-4/ CAS: 7439-89-6	iron	4-88 %	Not classified

\*This PSI is based on the Chemical Safety Report of FeSi (reaction mass of iron, silicon, iron silicide and iron disilicide) made according to the qualities covered by the FeSi registration dossier under REACH

### 1.1. Mixtures

Not applicable.

## 4. FIRST AID MEASURES

### 4.1 Description of first aid measures

Inhalation: Mechanical irritation caused by dust in the airways. Remove person from dust-exposed area. In case of dyspnoea - trained personnel should provide oxygen. If the affected person is not breathing - artificial respiration by mouth-to-mouth method has to be provided. See a physician immediately.

Skin contact: Wash skin with water and/or a mild detergent. See a physician upon persistent discomfort.

Eye contact: Rinse eyes with water/saline solution. See a physician upon persistent discomfort.

Ingestion: Remove source for further ingestion. Rinse mouth with water. See a physician upon persistent discomfort.

### 4.2 Most important symptoms and effects, both acute and delayed

Acute over exposure to dust may cause irritation symptoms like coughing and sore throat, reddening and heavy watering of the eyes. Skin contact can cause reddening and itching of the skin.

### 4.3 Indication of any immediate medical attention and special treatment needed

No data.

## 5. FIRE FIGHTING MEASURES

### 5.1 Extinguishing media

Proper extinguishing media: dry sand, CO<sub>2</sub> or dry powder.

Improper extinguishing media: —

### 5.2 Special hazards arising from the substance or mixture

FeSi lumps or granules are not combustible.

Specific fire & explosion hazards: Flammability test under REACH (EC guideline) show FeSi to be non-flammable.

Although UN- test on flammability in contact with water was negative, wet material added to molten (hot) ferrosilicon may cause explosions due to formation of flammable hydrogen gas.

FeSi-particles suspended in air may under certain conditions cause dust explosions.

### 5.3 Advice for fire-fighters

A self-contained breathing apparatus and full work wear must be used.

## 6. ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures

Remove all sources of ignition (avoid smoking, sparks or flames in the hazard area). Cover large spills with plastic sheet and avoid spreading dust in the air and keep dry.

Use protection gloves, goggles / tightly sealed safety glasses, personal protective equipment, a dust protection mask.

### 6.2 Environmental precautions

Do not pour water on the scattered product or in the containers. Dispose of in a way approved of by the competent local authorities.

### 6.3 Methods and material for containment and cleaning up

Material in the form of dust should be collected in suitable containers. Damp or wet product must be kept away from dry one, and must not be collected and stored in closed containers. Ferrosilicon in the form of dust should be vacuumed by using a spark proof vacuuming system, rather than swept up.

### Reference to other sections

Remove in compliance with guidelines presented in section 13.

## 7. HANDLING AND STORAGE

### 7.1 Precautions for safe handling

Avoid generation of dust. Wear protective clothing, gloves, and goggles. Wear suitable respiratory protection where applicable.

Avoid generating sparks or other ignition sources (e.g. welding) in areas with high dust concentrations.

Addition of wet material to molten ferrosilicon may cause explosions due to formation of flammable hydrogen gas.

Avoid reactions with acids like hydrofluoric acid (HF) and nitric acid (HNO<sub>3</sub>) that lead to the formation of toxic gases.

Avoid contact with water.

### 7.2 Conditions for safe storage, including information on any incompatibilities

Storage: Keep dry and in a well-ventilated place and away from water, acids and bases.

### 7.3 Specific end uses

No data.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control parameters

#### National occupational exposure limit values

At an amount of free crystalline silica (SiO<sub>2</sub> WWK) below 2% the NDS of dust is equal to 10 mg/m<sup>3</sup> (Regulation of the Minister of Labour and Social Policy from the 06 June 2014 in the matter of the highest permissible concentrations and intensities of agents, which are harmful to the health in the place of employment (Journal of Law No. 217, item 1833).

#### National occupational exposure limit values

Dust, inhalable				
	Limit value –Eight hours		Limit value –Short term	
	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Austria		10		20
Belgium		10		
Canada – Quebec				
Denmark		10		20
European Union				
Finland		10		
France		10		
Germany (AGS)		10		20
Germany (DFG)		4		
Hungary		10		
Italy				
Japan				
Norway		10 (total dust)		
Poland				
Spain		10		
Sweden		10		
Switzerland		10		
the Netherlands				
USA-NIOSH*				
USA-OSHA**		15		
Great Britain				

\* National Institute for Occupational Safety and Health

\*\* Occupational Safety and Health Administration

### Other limit values

DNEL (Derived No Effect Level)

4 mg/m<sup>3</sup> proposal for inhalable FeSi

0,3 mg/m<sup>3</sup> proposal for respirable FeSi

PNEC (Predict No Effect Concentration)

Not applicable.

## 8.2 Exposure controls

### Appropriate engineering controls

Dust-free closed systems and local exhaust ventilation for dusty operations.

### Individual protection measures, such as personal protective equipment:

Applied protection measure should meet requirements of the Regulation of the Minister of Economy of 21 December 2005 on the basic requirements for personal protection measures (Journal of Laws of 2005, no. 259, item 2173)

#### Eye/face protection

Safety glasses or goggles

#### Skin protection

Protective clothes

#### Hand protection

Rubber or plastic gloves

#### Respiratory protection

Dusty work conditions use filtering facepiece (P2).

#### Thermal hazards

No data.

### Environmental exposure controls

The Limit values for particles (PM 2.5 and PM 10) of the Ambient Air (Directive 1999/30/EC and its further amendments) have to be implemented.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

<b>Appearance</b>	Solid grey substance in form of lumps, ingots, granules and powders with different size ranges.
<b>Odour</b>	Odourless
<b>Odour threshold</b>	<b>Not applicable</b>
<b>pH</b>	See solubility

<b>Melting point/freezing point</b>	1220 - 1400 °C (101.3 kPa)
<b>Initial boiling point and boiling range</b>	Not applicable
<b>Flash point</b>	Not applicable
<b>Evaporation rate</b>	Not applicable
<b>Flammability (solid, gas)</b>	Not applicable
<b>Upper/lower flammability or explosive limits</b>	lowest explosive limit is +/- 60 mg/m <sup>3</sup>
<b>Vapour pressure</b>	Not applicable
<b>Vapour density</b>	Not applicable
<b>Relative density</b>	2.5 - 7.3 g/cm <sup>3</sup>
<b>Solubility</b>	Water solub. ≤ 0.01 mg Si/l at pH 5.8-5.9 (20 °C) ferrosilicon; diameter < 1 mm - 15 mg Si/l at PH 5.8 (OECD 105)
<b>Partition coefficient: n-octanol/water</b>	Not applicable
<b>Auto-ignition temperature</b>	>400 °C; no signs of combustion (EU Method A.16)
<b>Decomposition temperature</b>	Not applicable
<b>Viscosity</b>	Not applicable
<b>Explosive properties</b>	Not applicable (only in contact with water)
<b>Oxidising properties</b>	Not applicable

## 9.2 Other information

No data.

## 10. STABILITY AND REACTIVITY

### 10.1 Reactivity

FeSi alloys can react with moisture

### 10.2 Chemical stability

Under normal conditions, the product is stable.

### 10.3 Possibility of hazardous reactions

Wet material added to molten (hot) ferrosilicon may cause explosions due to formation of flammable hydrogen gas.

FeSi particles suspended in air may under certain conditions (i.e. median particle size 40 mm) cause dust explosions.

Formation of flammable and toxic gases may present hazard in confined, poorly ventilated spaces, especially at elevated temperatures. Highly flammable hydrogen gas (H<sub>2</sub>) and the highly flammable and very toxic gases phosphine and arsine (garlic-like smell), both heavier than air, may be formed if Ferrosilicon Alloy comes in contact with water, moisture, acids or bases. A reaction with hydrofluoric acid (HF) or nitric acid (HNO<sub>3</sub>) leads to the formation of toxic gases such as silicon tetrafluoride (SiF<sub>4</sub>)



or nitrous oxide gases (NO<sub>x</sub>). Wet product will form highly flammable hydrogen gas if added to molten metal, due to decomposition of water.

#### 10.4 Conditions to avoid

Avoid dust generating activities and generating sparks and other ignition sources in areas with high dust concentrations.

Water (adding wet material to liquid metal may lead to explosion).

#### 10.5 Incompatible materials

Avoid contact with moisture and water and mixing with oxidant products (strong acid or base media).

#### 10.6 Hazardous decomposition products

In normal conditions of use and storage of the substance there are no hazardous composition products.

In contact with moisture, acids, or bases highly flammable hydrogen (H<sub>2</sub>) and very toxic gases phosphine and arsine (garlic-like smell). Phosphine and arsine gases both heavier than air. Adding wet material to liquid metal may lead to disintegration of water contained in the metal. The result is gas hydrogen (highly flammable).

## 11. TOXICOLOGICAL INFORMATION

### 11.1. Information on toxicological effects

#### Acute toxicity

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

#### Skin corrosion/irritation

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

#### Serious eye damage/irritation

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

#### Respiratory or skin sensitisation

No data are available on the sensitising potential of FeSi alloys. There are no data indicating a need for FeSi to be classified as sensitizing.

#### Germ cell mutagenicity

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

#### Carcinogenicity

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

#### Reproductive toxicity

Based on available data, no classification is recommended.

#### STOT-single exposure

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

#### STOT-repeated exposure

NOAEC: 1,3 mg/m3/ rat

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

#### Aspiration hazard

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

## 12. ECOLOGICAL INFORMATION

### 12.1 Toxicity

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

### 12.2 Persistence and degradability

FeSi is an inorganic substance and is not biodegradable. The solubility in water is considered low.

### 12.3 Bioaccumulative potential

No or very low potential for bioconcentration and bioaccumulation.

### 12.4 Mobility in soil

FeSi is immobile in soil and sediment. Dissolved silica (and silicon) and all the metals within FeSi alloys, are poorly volatile substances and partition predominantly in the aquatic or soil or sediment compartments.

### 12.5 Results of PBT and vPvB assessment

FeSi is an inorganic material (alloy) and it is not classifiable as a PBT/vPvB substance. FeSi is not known to contain any > 0,1 % or any < 0,1 % PBT/vPvB impurities.

### 12.6 Other adverse effects

No data.

## 13. DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

Dispose in accordance with all applicable national and local regulations. FeSi is not listed as hazardous waste in the European List of Waste (Commission Decision 2000/53 of 3 May 2000 and further amendments). Material in its life cycle is not classified as waste. It does not lose its physico-chemical properties to such an extent so that it cannot be treated as a high quality product.

In case the product cannot be applied by a client, it should be returned to the production plant-manufacturer, upon mutually agreed conditions.

Recovery / recycling / liquidation of packaging waste has to be conducted in compliance with applicable law. Only completely emptied packages can be recycled.

The Community legislation acts: directives of the European Parliament and Council: 2008/98/EC, 94/62/WE

National legislation i.e.: Journal of Laws of 2016, item 1987, as amended; i.e. Journal of Laws of 2016 item 1863 as amended).

## 14. TRANSPORT INFORMATION

**14.1 UN number**

1408

**14.2 UN proper shipping name**

Ferrosilicon with 30 percent or more but less than 90 percent silicon

**14.3 Transport hazard class(es)**

ADR / RID: Default classification 4.3

additional threats: 6.1

Special provisions:

If the chemical or physical properties of a substance covered by this description are compliant with tests results, it does not meet the established defining criteria for the class listed in column 3, or any other class, thus it is not subject to the provisions of this Code except in the case of marine transport where 2.10.3 on pollution applies.

IMGD: Not assigned to class 4.3 Transport hazard class III

ICAO/IATA: Not assigned to class 4.3 Transport hazard class III

ADR/RID: Not assigned to class 4.3

ADN: no data

**14.4 Packing group**

ADR/RID: III

IMGD: MP14

ICAO: MP14

ADN: no data

**14.5 Environmental hazards**

FeSi is not considered to cause harm to aquatic organisms (Lillicrap, 2011). FeSi is not a marine pollutant.

**14.6 Special precautions for user**

Avoid dust formation and generation of sparks or other ignition sources in places of high concentration of dust. The product may react with moisture, tiny particles of FeSi suspended in the air, under certain circumstances, may cause explosions.

**14.7 In bulk transport in line with the appendix II to the MARPOL and the IBC code**

UN number: 1408

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

Prior to loading, a certificate should be provided by the manufacture or shipper stating that, after manufacture, the material was stored under cover, but in the open air, in the particle size in which it is to be shipped, for not less than three days prior to shipment.

## 15. REGULATORY INFORMATION

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

The Product Safety Information sheet is prepared in compliance with:

- Regulation (EC) No 1907/2006 for Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH),
- Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP),
- Commission 2015/830 amending Regulation (EC) No 1907/2006 (SDS),
- Commission Decision 2000/532/WE of 3 May 2000 establishing a list of wastes pursuant (European List of Wastes),
- Directive of the European Parliament and Commission: 2008/98/EC on wastes and repealing some of other directives,
- Directive of the European Parliament and Commission: 94/62/WE on packages and package wastes,
- Directive 2008/50/EC on ambient air quality and cleaner air for Europe,
- the European Agreement (ADR) concerning the International Carriage of Dangerous Goods by Road,
- Act of 25 February 2011 on chemical substances and their mixtures (i.e. Journal of Laws of 2015, item 1203, as amended),
- The Ordinance of the Minister of Labour and Social Policy of 6 June 2014 on maximum permissible concentration and intensity of harmful factors in the work environment (i.e. Journal of Laws of 2017 item 1348),
- Waste Management Act of 14 December 2012 (i.e. Journal of Laws of 2016 item 1987 as amended),
- Act of 13 June 2013 on the management of packaging and packaging waste (i.e. Journal of Laws of 2016 item 1863 as amended),
- The Ordinance of the Ministry of Environment of 9 December 2014 on the catalogue of waste (Journal of Laws of 2014 item 1923),
- The Ordinance of the Minister of Economy of 21 December 2005 on the basic requirements for personal protection measures (Journal of Laws of 259 item 2173),
- The Ordinance of the Ministry of Health of 02 February 2011 on tests and measurements of harmful factors in the work environment (Journal of Laws of 33 item 166),

## Chemical safety assessment

### 15.2 Chemical safety assessment

Chemical Safety Assessment for the FeSi alloys (alloys (reaction mass of iron, silicon, iron silicide and iron disilicide) has been carried out.

## 16. OTHER INFORMATION

Other References:

## FeSi Chemical Safety Report

Commission regulation 2015/830 on the requirements for the Compilation of Safety Data Sheets;

- ECHA 2010. Guidance on the compilation of safety data sheets (draft of October 2010)

- 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.

Detailed list of identified uses:

- Manufacture of basic metals, incl. Alloys SU 14, PC 7; PROC 1, 3, 4, 5, 8a, 8b, 9, 13, 14, 15, 21, 22, 23, 24, 25, 27a&b; AC7; ERC 3, 5, 12a&b):
  - Addition in steel production, special steel production, and alloy baths included in steel and alloys matrix.
  - Addition in steel production, special steel production and alloys powder obtained by atomisation.
  - Deoxidiser and an alloying element in steel alloys: stainless steel production.
  - Used in arc furnaces and ladle refining process.
  - Used in the CAS-OB process.
  - Smelting of cast iron and alloys (casting); Processing and grafting of smelted iron in iron foundries; pig iron production.
  - Silicothermal reduction of refractory metals (Cr, V, Mo) and others (Nb, W).
  - Used as a raw material for FeSiMn or FeS production.
  - Production of steel of high permeability (for electrical transformers).
  - Used as a metal filler.
  - Used for surface processing of metals.
  - Used as a chemical agent in BOF (Basic Oxygen Furnace), as metal load (steel industry).
  - Used in production of magnesium of dolomite in the Pidgeon process, in electric furnaces.
- Refractories, ceramic formulations, other special products - SU0; PC 14, PROC 3, 4, 5, 8a&b, 9, 14, 22, 23, 24, 25; AC 7, ERC 3, 5):
  - FeSi dust is used in refractories production.
  - Production of exothermic products.
- Manufacture of fabricated metal products, except machinery and equipment (SU 15, PC 7, PROC 1, 3, 4, 5, 8a, 8b, 9, 13, 14, 15, 21, 22, 23, 24, 25, 27a&b; AC7; ERC 3, 5, 12a&b).
  - Additive and grafting of smelted iron in iron foundries. FeSi bricks production.
  - Used as a powder in wires with drilling production.
  - Addition in steel production, special steel production, and alloy baths included in steel and alloys matrix.
  - Addition in steel production, special steel production and alloys powder obtained by atomisation.
- General production - e.g. machines, equipment, vehicles, and other means of transport (SU17; PC 38; PROC 5, 9, 8b, 25, 26).
  - Used in arc welding.
- Mining (without branches operating at sea) (SU2a, PC0, PROC 26, ERC 4).
  - used as a flotation agent for separation of metals in thick media processes, as well as in welding products.
- Electricity, steam, provision of water and gas, sewage treatment (SU 10, PROC 5, 8b, 9, 26; ERC 4, 5).
  - Used in casting industry.
  - Used as a flotation agent for separation of metals in thick media processes.

