

SAFETY DATA SHEET

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1. Product and Company Information

PRODUCT NAME	Ferrosilicon (Fe-Si alloy) Powder
PRODUCT CODE	FeSi-PO-PBF, FeSi-PO-DED
COMPANY	Solitecs Pte Ltd 22 Sin Ming Lane #06-76, Midview City Singapore 573969
EMERGENCY PHONE #	+65 9756 0818
WEBSITE	https://www.solitecs.com
EMAIL	info@solitecs.com
RECOMMENDED USE	Industrial additive manufacturing, soft magnetic component fabrication, research and development.
TYPICAL APPLICATIONS	Powder bed fusion (PBF-LB) Directed Energy Deposition (DED) Soft Magnetic Components Electrical Machines Magnetic Sensors Research & Development

2. Hazard Identification**2.1 GHS CLASSIFICATION (29 CFR 1910.1200):**

Skin irritant: Category 2

Eye irritant: Category 2

Environmental hazards: Not classified

2.2 GHS LABEL ELEMENTS:

SIGNAL WORD: Warning

HAZARD STATEMENTS:

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H335 May cause respiratory irritation.

PRECAUTIONARY STATEMENTS:

P261 Avoid breathing dust/fume/vapor

P305+P351 If in eyes: Rinse cautiously with water for several minutes.

PREVENTION PRECAUTIONARY STATEMENTS:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray.

P264: Wash thoroughly after handling.

P270: Do not eat, drink or smoke when using this product.

P272: Contaminated work clothing should not be allowed out of the workplace.

P273: Avoid release to the environment.

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

P281: Use personal protective equipment as required.

RESPONSE PRECAUTIONARY STATEMENTS:

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P314: Get medical advice/attention if you feel unwell
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P333+P313: If skin irritation or a rash occurs: Get medical advice/attention
P363: Wash contaminated clothing before reuse.
P308 + P313: IF exposed or concerned: Get medical advice/attention

DISPOSAL PRECAUTIONARY STATEMENTS

P501: Dispose of contents and container in accordance with local/regional/national/international regulations.

2.3 Description of any hazards not otherwise classified

None. See section 11 for more detailed information on health effects and symptoms.

Fine powder may form combustible dust-air mixtures under certain conditions. Avoid generation of airborne dust clouds and ignition sources.

3. Composition/Information on Ingredients

<u>Chemical name</u>	<u>CAS #</u>	<u>Content (Wt%)</u>
Iron (Fe)	7439-89-6	90-95
Silicon (Si)	7440-21-3	5-10

4. First Aid Measures

4.1 Description of first aid measures:

GENERAL MEASURES:	No special requirements
AFTER INHALATION:	If inhaled, remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
AFTER SKIN CONTACT:	Remove contaminated clothing, brush material off skin, wash affected area with soap and water. Seek medical attention if symptoms persist.
AFTER EYE CONTACT:	Flush eyes with lukewarm water, including under upper and lower eyelids, for at least 15 minutes. Seek medical attention if symptoms persist.
AFTER INGESTION:	If swallowed, wash out mouth with water provided person is conscious. Do not induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically and supportively.

5. Fire Fighting Measures

FLAMMABILITY:	Bulk material is not considered flammable. Fine powder may present a combustible dust hazard under certain conditions.
EXTINGUISHING MEDIA:	Dry sand, Class D metal fire extinguishing agents (e.g., Met-L-X®, Lith-X®), or dry chemical powder.
UNSUITABLE EXTINGUISHING MEDIA:	Do not use water, foam, CO ₂ , or other wet extinguishing agents.

SPECIAL FIRE FIGHTING PROCEDURE: Use full-face, self-contained breathing apparatus with full protective clothing to prevent contact with skin and eyes. See section 10 for decomposition products.

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SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS: Full face, self-contained breathing apparatus and full protective clothing when necessary.

ADVICE FOR FIREFIGHTERS: Evacuate personnel to safe areas. As in any fire, wear self-contained, breathing apparatus and full protective gear for firefighting.

FURTHER INFORMATION: According to the standard chemical firefighting measures, choose extinguishing method appropriate for surrounding fire. Keep fire-fighting run-off water out of sewers and water sources.

6. Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Evacuate area. Ventilate area. Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Avoid contact with skin and eyes. Wear self-contained breathing apparatus, safety glasses, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Do not create dust. Sweep up/shovel or use explosion-proof vacuum cleaner. Keep in suitable, closed containers for disposal or recycle.

ENVIRONMENTAL PRECAUTIONS:

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

7. Handling and Storage

HANDLING

Avoid creating dust. Avoid breathing dust or fumes. Provide adequate ventilation if dusts are created. Avoid contact with skin and eyes. Wash thoroughly before eating or smoking. Avoid sweeping dry powder. Ground and bond powder handling equipment to minimize static discharge. Prevent accumulation of airborne powder. See section 8 for information on personal protection equipment.

STORAGE

Keep container tightly closed. Keep away from heat, sparks and open flame. Store in a cool, dry ventilated place. See section 10 for more information on incompatible materials.

8. Exposure Controls/Personal Protection

Exposure Limits:

Parameter	OSHA PEL
Total dust	15.0 mg/m ³
Respirable dust	5.0 mg/m ³

ENGINEERING CONTROLS:

Ensure adequate ventilation to maintain exposures below occupational limits. Whenever possible the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne dust and fume to meet established occupational exposure limits. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Do not blow dust off clothing or skin with compressed air.

RESPIRATORY PROTECTION:

If permissible levels are exceeded, use NIOSH approved dust respirator.

EYE PROTECTION:

Not required under normal condition. Use face shield and safety glasses if in-eye risk exists. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

BODY PROTECTION:

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Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substances at the specific workplace.

HANDS PROTECTION:

Handle with chemical-resistant gloves. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product.

OTHER PROTECTION:

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. Physical and Chemical Properties

COLOR:	Grey
FORM:	Solid in powder form
BOILING POINT:	N/A
ODOR:	Odorless
ODOR THRESHOLD:	Not determined
pH:	N/A
MELTING POINT:	1200-1400 °C
FLASH POINT:	N/A
FLAMMABILITY:	N/A
UPPER EXPLOSIVE LIMIT % (V/V):	N/A
LOWER EXPLOSIVE LIMIT % (V/V):	N/A
VAPOR PRESSURE:	N/A
VAPOR DENSITY:	N/A
DENSITY:	6.8 - 7.2 g/cm ³
SOLUBILITY IN WATER:	Insoluble
PARTITION COEFFICIENT: N-OCTANOL/WATER:	N/A
DECOMPOSITION TEMPERATURE:	N/A
VISCOSITY:	N/A

10. Stability and Reactivity

REACTIVITY:	May react with strong oxidizing agents
CHEMICAL STABILITY:	Stable under normal conditions
POSSIBILITY OF HAZARDOUS REACTIONS:	None expected under normal conditions
CONDITIONS TO AVOID(STABILITY):	Avoid moisture, keep container tightly closed. Avoid dust generation.
INCOMPATIBILITY WITH OTHER MATERIALS:	Incompatible with strong oxidizing agents, acid. Other decomposition products- no data available. In the event of fire- see section 5.

11. Toxicological Information

LIKELY ROUTES OF EXPOSURE:	Inhalation, skin, eyes, mouth.
SYMPTOMS OF EXPOSURE:	May cause irritation.
ACUTE AND CHRONIC EFFECTS:	Acute effects – irritation.
ACUTE TOXICITY:	No data
SKIN CORROSION/IRRITATION:	May cause irritation.
SERIOUS EYE DAMAGE/EYE IRRITATION:	May cause eye irritation.
RESPIRATORY OR SKIN SENSITIZATION:	No data
GERM CELL MUTAGENICITY:	Based on available data, the classification criteria are not met.
CARCINOGENICITY:	NA
REPRODUCTIVE TOXICITY:	Based on available data, the classification criteria are not met.
SPECIFIC TARGET ORGAN TOXICITY- SINGLE EXPOSURE (GLOBALLY HARMONIZED SYSTEM):	No known human health effects upon single exposure.
SPECIFIC TARGET ORGAN TOXICITY- REPEATED EXPOSURE (GLOBALLY HARMONIZED SYSTEM):	No data
ASPIRATION HAZARD:	Based on available data, the classification criteria are not met.
POTENTIAL HEALTH EFFECTS:	

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INHALATION:
SKIN CONTACT:
EYE CONTACT:
INGESTION:

May cause respiratory irritation if inhaling fume of high temperature or dust.
May cause irritation.
May cause serious irritation.
Not an expected route of exposure. May be harmful if swallowed.

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

12. Ecological Information

12.1 Toxicity
no data available

12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
May be harmful to aquatic life with long-lasting effects.

13. Disposal Considerations

DISPOSAL

Product: Dispose of in accordance with Federal, State and Local regulations.
Packaging: Dispose of in accordance with Federal, State and Local regulations.

14. Transport Information

SHIPPING REGULATIONS: Not regulated
UN NUMBER: Not regulated
UN PROPER SHIPPING NAME: Not regulated
TRANSPORT HAZARD CLASS: Not regulated
PACKING GROUP: Not regulated
MARINE POLLUTANT: No

15. Regulatory Information (Not meant to be all-inclusive, selected regulations represented)

Sec 302 Extremely Hazardous: No
Sec 304 Reportable Quantities: N/A
Sec 313 Toxic Chemicals: No

US Regulations:

Fire Hazard: Not classified under applicable regulations. Fine powder may present combustible dust hazards.
Pressure Hazard- No
Reactivity Hazard – No

Singapore regulations:

This product should be managed in accordance with applicable Singapore workplace safety and health requirements, including the Workplace Safety and Health Act and relevant subsidiary regulations. Safety Data Sheet and hazard communication should be prepared and maintained in accordance with Singapore Standard SS 586, including SS 586 Part 2 for GHS classification and labelling

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and SS 586 Part 3 for SDS preparation. The product may be considered a hazardous substance for workplace hazard communication purposes where it is classified as an irritant, hazardous to the aquatic environment, or combustible dust. Users should conduct workplace risk assessment and ensure appropriate hazard communication, storage, handling, PPE, ventilation and emergency controls. Import, transport and storage requirements should be verified against applicable Singapore regulatory controls, including SCDF requirements for petroleum and flammable materials where the product is classified or tested as a flammable solid, and NEA requirements where the product or impurities are listed as controlled hazardous substances.

16. Additional Information

Abbreviations:

pH- Relates to hydrogen ion concentration - this value will relate to a scale of 0 - 14, where 0 is highly acidic and 14 is highly alkaline

OSHA- Occupational Safety and Health Administration

NTP- National Toxicology Program

IARC- International Agency for Research on Cancer

CAS#- Chemical Abstract Service number - used to uniquely identify chemical compounds

ACGIH- The American Conference of Governmental Industrial Hygienists

ADR- Agreement on Dangerous Goods by Road

IATA - International Air Transport Association

IMDG- International Maritime Dangerous Goods

DISCLAIMER

The information herein is believed to be accurate and is provided in good faith. However, no warranty, expressed or implied, is made regarding its accuracy or completeness. The given information is based on the available information and chemical properties of the materials and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Information provided in this SDS is meant to be used as a guide for use and handling of this product. Solitecs Pte Ltd shall not be held liable for any damage resulting from handling, contact and use of this material. Normal terms and Sales conditions apply for the use of these materials. Consult Solitecs Pte Ltd for further information.

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