SECTION 1: Identification

1.1. Identification

Product name: FERROSILICON
Product code: SIF4910.0
Product form: Substance
Physical state: Solid
Formula: FeSi2
Synonyms: IRON SILICIDE
Chemical family: INORGANIC SILICATE

1.2. Recommended use and restrictions on use

Recommended use: Chemical intermediate

1.3. Supplier

GELEST, INC.
11 East Steel Road
Morrisville, PA 19067
USA
T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST
info@gelest.com - www.gelest.com

1.4. Emergency telephone number

Emergency number: CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification
Substances and mixtures which in contact with water emit flammable gases Category 3 H261 - In contact with water releases flammable gas
Acute toxicity (inhalation:dust,mist) Category 3 H331 - Toxic if inhaled

Full text of H statements: see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling
Hazard pictograms (GHS US)

Signal word (GHS US): Danger

Hazard statements (GHS US): H261 - In contact with water releases flammable gas
                               H331 - Toxic if inhaled

Precautionary statements (GHS US): P280 - Wear protective gloves/protective clothing/eye protection/face protection.
                                   P231+P232 - Handle under inert gas. Protect from moisture
                                   P261 - Avoid breathing dust.
                                   P271 - Use only outdoors or in a well-ventilated area.
                                   P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
                                   P311 - Call a doctor
                                   P321 - Specific treatment (see first aid instructions on this label)
                                   P370+P378 - In case of fire: Use media other than water to extinguish.
                                   P402+P404 - Store in a dry place. Store in a closed container.
                                   P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
                                   P405 - Store locked up.
                                   P501 - Dispose of contents/container to licensed waste disposal facility.

2.3. Hazards not otherwise classified (HNOC)

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type: Mono-constituent
Name: FERROSILICON
CAS-No.: 8049-17-0

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferrosilicon</td>
<td>(CAS-No.) 8049-17-0</td>
<td>97 - 100</td>
<td>Water-react. 3, H261 Acute Tox. 3 (Inhalation), H331</td>
</tr>
</tbody>
</table>

Full text of hazard classes and H-statements: see section 16

3.2. Mixtures
Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general: Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.

First-aid measures after inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact: Wash with plenty of soap and water. Get medical advice/attention.

First-aid measures after eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

First-aid measures after ingestion: Never give anything by mouth to an unconscious person. Get medical advice/attention.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation: Toxic if inhaled. Danger of serious damage to health by prolonged exposure through inhalation. May cause irritation to the respiratory tract.

Symptoms/effects after skin contact: May cause skin irritation. May be harmful in contact with skin.

Symptoms/effects after eye contact: May cause eye irritation.

Symptoms/effects after ingestion: May be harmful if swallowed.

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Not combustible.

Unsuitable extinguishing media: Do not use straight streams.

5.2. Specific hazards arising from the chemical

Fire hazard: In contact with water releases flammable gas.

5.3. Special protective equipment and precautions for fire-fighters

Protection during firefighting: Do not enter fire area without proper protective equipment, including respiratory protection. Avoid contact with skin and eyes. Do not breathe dust.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment: Wear protective equipment as described in Section 8.

Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment: Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

Methods for cleaning up: Sweep or shovel spills into appropriate container for disposal.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.
**SECTION 7: Handling and storage**

### 7.1. Precautions for safe handling

- **Additional hazards when processed**: While not flammable, the ability of particles to generate static charge may present a hazard when used in combination with flammable liquids.
- **Precautions for safe handling**: Avoid contact with skin and eyes. Do not breathe dust. Avoid dust formation. Handle under inert gas. Protect from moisture. Use only outdoors or in a well-ventilated area.
- **Hygiene measures**: Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

### 7.2. Conditions for safe storage, including any incompatibilities

- **Storage conditions**: Keep container tightly closed. Store locked up. Store in a dry place. Store in a closed container.
- **Incompatible materials**: Acids.
- **Storage area**: Store in a well-ventilated place. Store away from heat.

**SECTION 8: Exposure controls/personal protection**

### 8.1. Control parameters

<table>
<thead>
<tr>
<th>Ferrosilicon (8049-17-0)</th>
<th>OSHA</th>
<th>OSHA PEL (TWA) (mg/m³)</th>
<th>10 mg/m³ total dust</th>
</tr>
</thead>
</table>

### 8.2. Appropriate engineering controls

Appropriate engineering controls: Handle in an enclosing hood with exhaust ventilation.

### 8.3. Individual protection measures/Personal protective equipment

**Personal protective equipment:**
Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

- **Hand protection:** Neoprene or nitrile rubber gloves
- **Eye protection:** Chemical goggles. Contact lenses should not be worn
- **Skin and body protection:** Wear suitable protective clothing
- **Respiratory protection:** Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified dust and mist (orange cartridge) respirator.

**SECTION 9: Physical and chemical properties**

### 9.1. Information on basic physical and chemical properties

- **Physical state**: Solid
- **Appearance**: Coarse. Powder.
- **Molecular mass**: 112.02 g/mol
- **Color**: Silver-gray.
- **Odor**: No data available
- **Odor threshold**: No data available
- **Refractive index**: No data available
- **pH**: No data available
- **Relative evaporation rate (butyl acetate=1)**: No data available
- **Melting point**: 1360 °C
- **Freezing point**: No data available
- **Boiling point**: No data available
- **Flash point**: No data available
- **Auto-ignition temperature**: No data available
- ** Decomposition temperature**: No data available
- **flammability (solid, gas)**: No data available
- **Vapor pressure**: < 0.01 mm Hg @ 20°C
- **Relative vapor density at 20 °C**: No data available
Relative density : 4.75
\% Volatiles : 100 \%
Solubility : Insoluble in water.
Log Pow : No data available
Log Kow : No data available
Viscosity, kinematic : No data available
Viscosity, dynamic : No data available
Explosive properties : No data available
Oxidizing properties : No data available
Explosion limits : No data available

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
No additional information available

10.2. Chemical stability
Stable.

10.3. Possibility of hazardous reactions
Dry mixtures with sodium hydroxide react incandescently when water is added. Reacts with acids liberating hydrogen.

10.4. Conditions to avoid
No additional information available

10.5. Incompatible materials
Acids.

10.6. Hazardous decomposition products
None known.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity : Not classified

FERROSILICON (8049-17-0)
ATE US (dust, mist) 0.5 mg/l/4h
Toxicity information 194 mg/m³ TOXICITY- Inhalation toxicity-rat: TOLo 6H/26W-i: LUNGS, THORAX, OR RESPIRATION: Other changes; LUNGS, THORAX, OR RESPIRATION: Changes in lung weight; BIOCHEMICAL: Metabolism (intermediary): Lipids, including transport;

Ferrosilicon (8049-17-0)
LD50 dermal rabbit > 20 g/kg
ATE US (gases) 700 ppmV/4h
ATE US (vapors) 3 mg/l/4h
ATE US (dust, mist) 0.5 mg/l/4h

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
Specific target organ toxicity – single exposure : Not classified
Specific target organ toxicity – repeated exposure : Not classified
Aspiration hazard : Not classified
Symptoms/effects after inhalation : Toxic if inhaled. Danger of serious damage to health by prolonged exposure through inhalation. May cause irritation to the respiratory tract.
Symptoms/effects after skin contact : May cause skin irritation. May be harmful in contact with skin.
Symptoms/effects after eye contact : May cause eye irritation.
Symptoms/effects after ingestion : May be harmful if swallowed.
### SECTION 12: Ecological information

<table>
<thead>
<tr>
<th>12.1.</th>
<th>Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No additional information available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12.2.</th>
<th>Persistence and degradability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No additional information available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12.3.</th>
<th>Bioaccumulative potential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No additional information available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12.4.</th>
<th>Mobility in soil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No additional information available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12.5.</th>
<th>Other adverse effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other adverse effects</td>
<td>This substance may be hazardous to the environment.</td>
</tr>
<tr>
<td>Effect on the ozone layer</td>
<td>No additional information available</td>
</tr>
</tbody>
</table>

### SECTION 13: Disposal considerations

<table>
<thead>
<tr>
<th>13.1.</th>
<th>Disposal methods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sewage disposal recommendations</td>
</tr>
<tr>
<td></td>
<td>Do not dispose of waste into sewer.</td>
</tr>
</tbody>
</table>

|        | Product/Packaging disposal recommendations  |
|        | Landfill. Dispose in a safe manner in accordance with local/national regulations. |

|        | Ecology - waste materials                    |
|        | Avoid release to the environment.           |

### SECTION 14: Transport information

<table>
<thead>
<tr>
<th>14.1.</th>
<th>UN number</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN-No.(DOT)</td>
<td>1408</td>
</tr>
<tr>
<td>DOT NA no.</td>
<td>UN1408</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14.2.</th>
<th>UN proper shipping name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport document description</td>
<td>UN1408 Ferrosilicon (with 30 percent or more but less than 90 percent silicon), 4.3 (6.1), III</td>
</tr>
<tr>
<td>Proper Shipping Name (DOT)</td>
<td>Ferrosilicon with 30 percent or more but less than 90 percent silicon</td>
</tr>
<tr>
<td>Class (DOT)</td>
<td>4.3 - Class 4.3 - Dangerous when wet material 49 CFR 173.124</td>
</tr>
<tr>
<td>Packing group (DOT)</td>
<td>III - Minor Danger</td>
</tr>
<tr>
<td>Hazard labels (DOT)</td>
<td>4.3 - Dangerous when wet, 6.1 - Poison</td>
</tr>
</tbody>
</table>

|        | DOT Packaging Non Bulk (49 CFR 173.xxx)     |
|        | 213                                          |

|        | DOT Packaging Bulk (49 CFR 173.xxx)         |
|        | 240                                          |

|        | DOT Packaging Exceptions (49 CFR 173.xxx)   |
|        | 151                                          |

<table>
<thead>
<tr>
<th>14.3.</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Response Guide (ERG) Number</td>
<td>139</td>
</tr>
<tr>
<td>Other information</td>
<td>No supplementary information available.</td>
</tr>
</tbody>
</table>

**Transport by sea**

| DOT Vessel Stowage Location | A - The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel. |
| DOT Vessel Stowage Other    | 13 - Keep as dry as reasonably practicable, 40 - Stow “clear of living quarters”, 52 - Stow “separated from” acids, 53 - Stow “separated from” alkaline compounds, 85 - Under deck stowage must be in mechanically ventilated space, 103 - Only to be loaded under dry weather conditions |

**Air transport**

| DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) | 25 kg |
| DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)    | 100 kg |
SECTION 15: Regulatory information

15.1. US Federal regulations

FERROSILICON (8049-17-0)
TSCA Exemption/Exclusion
CAUTION: This material is supplied for research and development purposes subject to the R&D exemption under TSCA, 40 CFR 720.36, and must meet the requirements of the exemption, including supervision by a "technically qualified individual" as defined by 40 CFR 720.3(ee). The use of this material for "commercial purposes" as defined by 40 CFR 720.3(r) is not permitted in the United States.

Ferrosilicon (8049-17-0)
Not listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA
Ferrosilicon (8049-17-0)
Listed on the Canadian DSL (Domestic Substances List)
WHMIS Classification
Class B Division 6 - Reactive Flammable Material
Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects

EU-Regulations
No additional information available

National regulations
Ferrosilicon (8049-17-0)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm
Ferrosilicon (8049-17-0)
U.S. - New Jersey - Right to Know Hazardous Substance List

SECTION 16: Other information

Full text of H-phrases:
H261 In contact with water releases flammable gas
H331 Toxic if inhaled

Abbreviations and acronyms
Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor.

Hazard Rating
Health
3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability
3 Serious Hazard - Materials capable of ignition under almost all normal temperature conditions. Includes flammable liquids with flash points below 73 F and boiling points above 100 F. as well as liquids with flash points between 73 F and 100 F. (Classes IB & IC)
Physical
1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

Prepared by safety and environmental affairs.
Date of issue: 05/23/2016 Version: 1.0
The information contained in this document has been gathered from reference materials and/or Gelest, Inc. test data and is to the best knowledge and belief of Gelest, Inc. accurate and reliable. Such information is offered solely for your consideration, investigation and verification. It is not suggested or guaranteed that the hazard precautions or procedures described are the only ones which exist. Gelest, Inc. makes no warranties, express or implied, with respect to the use of such information and assumes no responsibility therefor. Information on this safety data sheet is not intended to constitute a basis for product specifications.

© 2019 Gelest Inc. Morrisville, PA 19067