SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Substance
Physical state : Solid
Substance name : CALCIUM SILICIDE, tech-95, powder
Product code : SIC2054.0
Formula : CaSi2
Synonyms : CALCIUM SILICON ALLOY; CALCIUM DISILICIDE
Chemical family : METAL SILICIDE

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

Use of the substance/mixture : Chemical intermediate
For research and industrial use only

1.3. Details of the supplier of the safety data sheet

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: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)
Water-react. 3 H261
Aquatic Acute 3 H402

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labelling
Hazard pictograms (GHS-US) : GHS02

Signal word (GHS-US) : Warning
Hazard statements (GHS-US) : H261 - In contact with water releases flammable gases
H402 - Harmful to aquatic life
Precautionary statements (GHS-US) : P280 - Wear protective gloves/protective clothing/eye protection/face protection
P231+P232 - Handle under inert gas. Protect from moisture
P273 - Avoid release to the environment
P370+P378 - In case of fire: Use extinguishing powder to extinguish
P402+P404 - Store in a dry place. Store in a closed container
P501 - Dispose of contents/container to licensed waste disposal facility.

2.3. Other hazards
No additional information available

2.4. Unknown acute toxicity (GHS US)
No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

Substance type : Multi-constituent
Name : CALCIUM SILICIDE, tech-95, powder
CAS No : 12013-56-8
CALCIUM SILICIDE, tech-95, powder
Safety Data Sheet

EC no : 234-588-7

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium silicon</td>
<td>(CAS No) 12013-56-8</td>
<td>93 - 100</td>
<td>Water-react. 3, H261</td>
</tr>
<tr>
<td>Iron</td>
<td>(CAS No) 7439-89-6</td>
<td>0 - 7</td>
<td>Acute Tox. 4 (Oral), H302 Aquatic Acute 2, H401</td>
</tr>
</tbody>
</table>

3.2. Mixture
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, both acute and delayed
Symptoms/injuries after inhalation : May cause irritation to the respiratory tract.
Symptoms/injuries after skin contact : May cause skin irritation.
Symptoms/injuries after eye contact : May cause eye irritation.
Symptoms/injuries after ingestion : May be harmful if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media : Not combustible.
Unsuitable extinguishing media : None known.

5.2. Special hazards arising from the substance or mixture
Fire hazard : In contact with water slowly liberates highly flammable hydrogen gas.
Explosion hazard : Air-borne dust presents fire/explosive potential.

5.3. Advice for firefighters
Firefighting instructions : Exercise caution when fighting any chemical fire.
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
General measures : Avoid contact with water.

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
No additional information available
CALCIUM SILICIDE, tech-95, powder
Safety Data Sheet

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Additional hazards when processed: Flammable gas. In contact with water emits flammable hydrogen gas.
Precautions for safe handling: Avoid contact with skin and eyes. Do not breathe dust. Do not allow contact with water. Provide local exhaust or general room ventilation to minimize exposure to dust. Avoid dust formation. Handle under inert gas. Protect from moisture.

7.2. Conditions for safe storage, including any incompatibilities
Storage conditions: Keep container tightly closed. Avoid contact with water. Store in a dry place. Store in a closed container.
Storage area: Keep container tightly closed. Store in a well-ventilated place.

7.3. Specific end use(s)
No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th></th>
<th>USA ACGIH</th>
<th>USA OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron (7439-89-6)</td>
<td>ACGIH TWA (mg/m³)</td>
<td>OSHA PEL (TWA) (mg/m³)</td>
</tr>
<tr>
<td></td>
<td>1 mg/m³ Fe</td>
<td>1 mg/m³ Fe</td>
</tr>
</tbody>
</table>

**Calcium silicon (12013-56-8)**

<table>
<thead>
<tr>
<th></th>
<th>USA OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium silicon</td>
<td>OSHA PEL (TWA) (mg/m³)</td>
</tr>
<tr>
<td></td>
<td>15 mg/m³ nuisance dust</td>
</tr>
</tbody>
</table>

8.2. Exposure controls
Appropriate engineering controls: Provide local exhaust or general room ventilation.
Personal protective equipment: Avoid all unnecessary exposure.
Materials for protective clothing: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Hand protection: Rubbers. 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: Solid.
Molecular mass: 96.25 g/mol
Color: Gray-black.
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: > 700 °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): Flammable gas
Vapor pressure: < 0.01 mm Hg @ 20°C
Relative vapor density at 20 °C: No data available
Relative density: 2.5
VOC content: 0 %
Solubility: Reacts with water.
Log Pow: No data available
CALCIUM SILICIDE, tech-95, powder
Safety Data Sheet

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

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
No additional information available

10.4. Conditions to avoid
Heat. Open flame. Sparks.

10.5. Incompatible materials

10.6. Hazardous decomposition products
Calcium oxide fumes. Hydrogen. Silicon oxides.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Iron (7439-89-6)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>750 mg/kg</td>
</tr>
<tr>
<td>ATE US (oral)</td>
<td>750.000 mg/kg body weight</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>Respiratory or skin sensitization</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (repeated exposure)</td>
<td>Not classified</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Not classified</td>
</tr>
<tr>
<td>Symptoms/injuries after inhalation</td>
<td>May cause irritation to the respiratory tract.</td>
</tr>
<tr>
<td>Symptoms/injuries after skin contact</td>
<td>May cause skin irritation.</td>
</tr>
<tr>
<td>Symptoms/injuries after eye contact</td>
<td>May cause eye irritation.</td>
</tr>
<tr>
<td>Symptoms/injuries after ingestion</td>
<td>May be harmful if swallowed.</td>
</tr>
</tbody>
</table>

SECTION 12: Ecological information

12.1. Toxicity
Ecology - general : Harmful to aquatic life.

Iron (7439-89-6)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 Daphnia 1</td>
<td>4400 μg/l 48H</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
No additional information available

12.4. Mobility in soil
No additional information available
### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

- **Sewage disposal recommendations**: Do not dispose of waste into sewer.
- **Waste disposal recommendations**: Landfill. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.
- **Ecology - waste materials**: Avoid release to the environment.

### SECTION 14: Transport information

#### 14.1. UN number

| UN-No.(DOT) | 1405 |
| DOT NA no. | UN1405 |

#### 14.2. UN proper shipping name

- **Proper Shipping Name (DOT)**: Calcium silicide
- **Department of Transportation (DOT) Hazard Classes**: 4.3 - Class 4.3 - Dangerous when wet material 49 CFR 173.124
- **Hazard labels (DOT)**: 4.3 - Dangerous when wet

#### 14.3. Additional information

- **Other information**: No supplementary information available.

**Transport by sea**

- **DOT Vessel Stowage Location**: B - (i) The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) “On deck only” on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.
- **DOT Vessel Stowage Other**: 52 - Stow “separated from” acids,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

- **Iron (7439-89-6)**
  - Listed on the United States TSCA (Toxic Substances Control Act) inventory
- **Calcium silicon (12013-56-8)**
  - Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### 15.2. International regulations
Iron (7439-89-6)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on the Canadian DSL (Domestic Substances List)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Korean ECL (Existing Chemicals List)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on INSQ (Mexican national Inventory of Chemical Substances)

Calcium silicon (12013-56-8)
Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on the Canadian NDSL (Non-Domestic Substances List)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Korean ECL (Existing Chemicals List)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

15.3. US State regulations

CALCIUM SILICIDE, tech-95, powder(12013-56-8)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron (7439-89-6)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Calcium silicon (12013-56-8)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

SECTION 16: Other information

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.

Full text of H-phrases:
- Acute Tox. 4 (Oral)
- Aquatic Acute 2
- Aquatic Acute 3
- Water-react. 3
- H261
- H302
- H401
- H402

HMIS III Rating:
- Health: 1 Slight Hazard - Irritation or minor reversible injury possible
CALCIUM SILICIDE, tech-95, powder
Safety Data Sheet

<table>
<thead>
<tr>
<th>Property</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>1 Slight Hazard</td>
</tr>
<tr>
<td>Physical</td>
<td>1 Slight Hazard</td>
</tr>
</tbody>
</table>

Prepared by safety and environmental affairs.

Date of issue: 09/24/2015  Version: 1.0

SDS US (GHS HazCom 2012) - Custom
According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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 therefore. Information on this safety data sheet is not intended to constitute a basis for product specifications.

© 2015 Gelest Inc. Morrisville, PA 19067