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

Product identifier
Product Name Grain-Oriented Electrical Steel (GOES)

Other means of identification
Product Code FRP004
Synonyms Grain-Oriented Electrical Steel (GOES): RELAY NO. 5, SILECTRON ®, SILECTRON ® M-2, SILECTRON ® M-3, SILECTRON ® M-4, SILECTRON ® M-5, SILECTRON ® M-6, SIMIS, ORIENTED SILICON SX11/SX15, RELAY STEEL SX22

Recommended use of the chemical and restrictions on use
Recommended Use Grain-Oriented Electrical Steel product manufacture.
Uses advised against

Details of the supplier of the safety data sheet
Manufacturer Address ATI, 1000 Six PPG Place, Pittsburgh, PA 15222 USA
Emergency telephone number Chemtrec: 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label elements
Emergency Overview

Appearance Various massive product forms
Physical state Solid
Odor Odorless

Hazards not otherwise classified (HNOC)
Not applicable
Other Information

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms Grain-Oriented Electrical Steel (GOES): RELAY NO. 5, SILECTRON ®, SILECTRON ® M-2, SILECTRON ® M-3, SILECTRON ® M-4, SILECTRON ® M-5, SILECTRON ® M-6, SIMIS, ORIENTED SILICON SX11/SX15, RELAY STEEL SX22.
### 4. FIRST AID MEASURES

**First aid measures**

**Eye contact**

In the case of particles coming in contact with eyes during processing, treat as with any foreign object.

**Skin Contact**

In the case of skin irritation or allergic reactions see a physician.

**Inhalation**

If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.

**Ingestion**

Not an expected route of exposure.

**Most important symptoms and effects, both acute and delayed**

**Symptoms**

May cause allergic skin reaction.

**Indication of any immediate medical attention and special treatment needed**

**Note to physicians**

Treat symptomatically.

### 5. FIRE-FIGHTING MEASURES

**Suitable extinguishing media**

Not flammable in the form of this product as distributed, flammable as finely divided particles or pieces resulting from processing of this product. Smother with salt (NaCl) or class D dry powder fire extinguisher.

**Unsuitable extinguishing media**

Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with the burning material.

**Specific hazards arising from the chemical**

Intense heat. Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. WARNING: Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

**Hazardous combustion products**

Not applicable.

**Explosion data**

Sensitivity to Mechanical Impact: None.

Sensitivity to Static Discharge: None.

**Protective equipment and precautions for firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH approved (or equivalent) respirator and full protective gear.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions, protective equipment and emergency procedures**

**Personal precautions**

Use personal protective equipment as required.

**For emergency responders**

Use personal protective equipment as required.
Environmental precautions
Not applicable to massive product.

Methods and material for containment and cleaning up
Not applicable to massive product.

7. HANDLING AND STORAGE

Precautions for safe handling
Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. WARNING: Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

Conditions for safe storage, including any incompatibilities
Keep chips, turnings, dust, and other small particles away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity).

Incompatible materials
Dissolves in hydrofluoric acid.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron 7439-89-6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Silicon 7440-21-3</td>
<td>-</td>
<td>TWA: 15 mg/m³ total dust TWA: 5 mg/m³ respirable fraction</td>
</tr>
<tr>
<td>Nickel 7440-02-0</td>
<td>TWA: 1.5 mg/m³ inhalable fraction</td>
<td>TWA: 1 mg/m³</td>
</tr>
</tbody>
</table>

Appropriate engineering controls
Avoid generation of uncontrolled particles.

Individual protection measures, such as personal protective equipment

Eye/face protection
When airborne particles may be present, appropriate eye protection is recommended. For example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.

Skin and body protection
Fire/flame resistant/retardant clothing may be appropriate during hot work with the product. Cut-resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present.

Respiratory protection
When particulates/fumes/gases are generated and if exposure limits are exceeded or irritation is experienced, proper approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations
Handle in accordance with good industrial hygiene and safety practice.
### 9. PHYSICAL AND CHEMICAL PROPERTIES

**Information on basic physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks • Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
<td></td>
</tr>
<tr>
<td>Appearance</td>
<td>Various massive product forms</td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>metallic, gray or silver</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
<td></td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>1480-1540 °C / 2700-2800 °F</td>
<td></td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Molecular weight</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>VOC Content (%)</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Bulk density</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**Other Information**

- Softening point: -
- Molecular weight: -
- VOC Content (%): Not applicable
- Density: -
- Bulk density: -

### 10. STABILITY AND REACTIVITY

**Reactivity**

Not applicable

**Chemical stability**

Stable under normal conditions.

**Possibility of Hazardous Reactions**

None under normal processing.

- **Hazardous polymerization**
  
  Hazardous polymerization does not occur.

**Conditions to avoid**

Dust formation and dust accumulation;

**Incompatible materials**

Dissolves in hydrofluoric acid.

**Hazardous Decomposition Products**

...
11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

- **Inhalation**
  Not an expected route of exposure for product in massive form.

- **Eye contact**
  Not an expected route of exposure for product in massive form.

- **Skin Contact**
  May cause sensitization by skin contact.

- **Ingestion**
  Not an expected route of exposure for product in massive form.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>98,600 mg/kg bw</td>
<td>-</td>
<td>&gt; 0.25 mg/L</td>
</tr>
<tr>
<td>Silicon</td>
<td>&gt; 5000 mg/kg bw</td>
<td>&gt; 5000 mg/kg bw</td>
<td>&gt; 2.08 mg/L</td>
</tr>
<tr>
<td>Nickel</td>
<td>&gt; 9000 mg/kg bw</td>
<td>-</td>
<td>&gt; 10.2 mg/L</td>
</tr>
</tbody>
</table>

Information on toxicological effects

- **Symptoms**
  May cause sensitization by skin contact.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

- **Acute toxicity**
  Product not classified.

- **Skin corrosion/irritation**
  Product not classified.

- **Serious eye damage/eye irritation**
  Product not classified.

- **Sensitization**
  May cause sensitization by skin contact.

- **Germ cell mutagenicity**
  Product not classified.

- **Carcinogenicity**
  Product not classified.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>Group 1</td>
<td>Group 2B</td>
<td>Known</td>
<td>X</td>
</tr>
</tbody>
</table>

- **Reproductive toxicity**
  Product not classified.

- **STOT - single exposure**
  Product not classified.

- **STOT - repeated exposure**
  Product not classified.

- **Aspiration hazard**
  Product not classified.

12. ECOLOGICAL INFORMATION

Ecotoxicity

This product as shipped is not classified for aquatic toxicity.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Algae/aquatic plants</th>
<th>Fish</th>
<th>Toxicity to microorganisms</th>
<th>Crustacea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>-</td>
<td>The 96 h LC50 of 50% iron oxide black in water to Danio rerio was greater than 10,000 mg/L.</td>
<td>The 3 h EC50 of iron oxide for activated sludge was greater than 10,000 mg/L.</td>
<td>The 48 h EC50 of iron oxide to Daphnia magna was greater than 100 mg/L.</td>
</tr>
<tr>
<td>Silicon</td>
<td>The 72 h EC50 of sodium metasilicate pentahydrate to Pseudokirchnerella subcapitata was greater than 250 mg/L.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Persistence and degradability

Bioaccumulation

Other adverse effects

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes
Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging
None anticipated.

This product contains one or more substances that are listed with the State of California as a hazardous waste.

14. TRANSPORT INFORMATION

DOT
Not regulated

15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Inventory</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSCA</td>
<td>Complies</td>
</tr>
<tr>
<td>DSL/NDSL</td>
<td>Complies</td>
</tr>
<tr>
<td>EINECS/ELINCS</td>
<td>Complies</td>
</tr>
<tr>
<td>ENCS</td>
<td>Complies</td>
</tr>
<tr>
<td>IECSC</td>
<td>Complies</td>
</tr>
<tr>
<td>KECL</td>
<td>Complies</td>
</tr>
<tr>
<td>PICCS</td>
<td>Complies</td>
</tr>
<tr>
<td>AICS</td>
<td>Complies</td>
</tr>
</tbody>
</table>

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372: Chromium (Cr)
FRP004 Grain-Oriented Electrical Steel (GOES)  

**Chemical Name** | **CAS No.** | **Weight-%** | **SARA 313 - Threshold Values %**
--- | --- | --- | ---
Nickel - 7440-02-0 | 7440-02-0 | <1.0 | 0.1

**SARA 311/312 Hazard Categories**

| Health Hazards | No |
| Chronic Health Hazard | No |
| Fire hazard | No |
| Sudden release of pressure hazard | No |
| Reactive Hazard | No |

**CWA (Clean Water Act)**

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CWA - Reportable Quantities</th>
<th>CWA - Toxic Pollutants</th>
<th>CWA - Priority Pollutants</th>
<th>CWA - Hazardous Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel - 7440-02-0</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

**CERCLA**

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Hazardous Substances RQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel - 7440-02-0</td>
<td>100 lb</td>
</tr>
</tbody>
</table>

**US State Regulations**

**California Proposition 65**

This product contains the following Proposition 65 chemicals

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>California Proposition 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel - 7440-02-0</td>
<td>Carcinogen</td>
</tr>
</tbody>
</table>

**U.S. State Right-to-Know Regulations**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon - 7440-21-3</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Nickel - 7440-02-0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**U.S. EPA Label Information**

EPA Pesticide Registration Number Not applicable

**16. OTHER INFORMATION**

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health hazards</th>
<th>Flammability</th>
<th>Instability</th>
<th>Physical and Chemical Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HMIS</th>
<th>Health hazards</th>
<th>Flammability</th>
<th>Physical hazards</th>
<th>Personal protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Hazard Star Legend</td>
<td>1*</td>
<td>0</td>
<td>0</td>
<td>X</td>
</tr>
</tbody>
</table>

* = Chronic Health Hazard

**Issue Date** 28-May-2015  
**Revision Date** 27-May-2016  
**Revision Note** Updated Section(s): 1, 3, 7

**Note:**
The information provided in this safety data sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
End of Safety Data Sheet

Additional information available from:

Safety data sheets and labels available at ATImetals.com