Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Code PM031
Product Name Nickel Braze Alloy
Synonyms Nickel Braze Alloy Powder, including but not limited to: Ni-Si-B-Fe
Contains Nickel

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

Recommended Use Brazing
Uses advised against

1.3. Details of the supplier of the safety data sheet

Manufacturer ATI, 1000 Six PPG Place, Pittsburgh, PA 15222 USA

1.4. Emergency telephone number

Emergency Telephone Chemtrec: +1-703-741-5970

Section 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Regulation (EC) No 1272/2008

<table>
<thead>
<tr>
<th>Property</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin sensitisation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Category 2</td>
</tr>
<tr>
<td>Specific target organ toxicity — repeated exposure</td>
<td>Category 1</td>
</tr>
<tr>
<td>Chronic aquatic toxicity</td>
<td>Category 3</td>
</tr>
</tbody>
</table>

2.2. Label elements

Emergency Overview

Danger

Hazard statements
May cause an allergic skin reaction
Suspected of causing cancer
Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled
Harmful to aquatic life with long lasting effects

![Hazard Symbols]
Precautionary Statements - Prevention
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wear protective gloves
Avoid breathing dust/fume
Avoid release to the environment
Wash contaminated clothing before reuse
If skin irritation or rash occurs: Get medical advice/attention
Contaminated clothing should not be allowed out of the workplace.
IF ON SKIN: Wash with plenty of soap and water

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

2.3 Hazards not otherwise classified (HNOC)
Not applicable

Other Information

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Nickel Braze Alloy Powder, including but not limited to: Ni-Si-B-Fe.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>EC No</th>
<th>CAS No</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>231-111-4</td>
<td>7440-02-0</td>
<td>62 - 67</td>
</tr>
<tr>
<td>Silicon</td>
<td>231-130-8</td>
<td>7440-21-3</td>
<td>14 - 16</td>
</tr>
<tr>
<td>Iron</td>
<td>231-096-4</td>
<td>7439-89-6</td>
<td>9 - 11</td>
</tr>
<tr>
<td>Boron</td>
<td>231-151-2</td>
<td>7440-42-8</td>
<td>10 - 11</td>
</tr>
</tbody>
</table>

Section 4: FIRST AID MEASURES

4.1. Description of first aid measures

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

Skin Contact
In the case of skin allergic reactions see a doctor. Wash off immediately with soap and plenty of water.

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

Ingestion
IF SWALLOWED. Call a POISON CENTER or doctor/physician if you feel unwell.

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

Symptoms
May cause allergic skin reaction.

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

Note to doctors
Treat symptomatically.
Section 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media
Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product. Isolate large fires and allow to burn out. Smother small fires 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.

5.2. Special hazards arising from the substance or mixture

Intense heat WARNING: Fine particles 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 minimise combustible dust hazard.

Hazardous combustion products Not applicable.

5.3. Advice for firefighters

Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions
Use personal protective equipment as required.

For emergency responders

6.2. Environmental precautions

Collect spillage to prevent release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for containment
Prevent further leakage or spillage if safe to do so.

Methods for cleaning up
Sweep or shovel material into dry containers. Avoid creating uncontrolled dust.

6.4. Reference to other sections

See Section 12: ECOLOGICAL INFORMATION.

Section 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Advice on safe handling
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 minimise combustible dust hazard.

General Hygiene Considerations
Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions
Keep 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.

### 7.3. Specific end use(s)

#### Risk Management Methods (RMM)
The information required is contained in this Safety Data Sheet.

#### Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

**8.1. Control parameters**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>European Union</th>
<th>United Kingdom</th>
<th>France</th>
<th>Spain</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td></td>
<td></td>
<td>STEL: 1.5 mg/m³ TWA: 0.5 mg/m³ TWA: 1 mg/m³</td>
<td>TWA: 1 mg/m³</td>
<td>Skin</td>
</tr>
<tr>
<td>Silicon</td>
<td></td>
<td></td>
<td>STEL: 30 ppm STEL: 12 mg/m³ TWA: 10 mg/m³ TWA: 4 mg/m³</td>
<td>TWA: 10 mg/m³</td>
<td>-</td>
</tr>
<tr>
<td>Iron</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boron</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Italy</th>
<th>Portugal</th>
<th>Netherlands</th>
<th>Finland</th>
<th>Denmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>TWA: 1.5 mg/m³</td>
<td>-</td>
<td>-</td>
<td>TWA: 0.15 mg/m³</td>
<td>TWA: 0.05 mg/m³</td>
</tr>
<tr>
<td>Silicon</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>TWA: 10 mg/m³</td>
</tr>
<tr>
<td>Iron</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Boron</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Austria</th>
<th>Switzerland</th>
<th>Poland</th>
<th>Norway</th>
<th>Ireland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 0.25 mg/m³</td>
<td>TWA: 0.05 mg/m³ STEL: 0.15 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Silicon</td>
<td>TWA: 3 mg/m³</td>
<td>-</td>
<td>TWA: 10 mg/m³ STEL: 20 mg/m³</td>
<td>TWA: 10 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Boron</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Derived No Effect Level (DNEL)** No DNELs are available for this product as a whole

**Predicted No Effect Concentration (PNEC)** No PNECs are available for this product as a whole.

**8.2. Exposure controls**

**Engineering Controls**
Avoid generation of uncontrolled particles.

**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**
Wear protective gloves. Fire/flame resistant/retardant clothing may be appropriate during hot work with the product.

**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 contaminate concentrations. Respiratory protection must be provided in accordance with current local regulations.
Environmental exposure controls

Section 6: ACCIDENTAL RELEASE MEASURES.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. 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>Powder</td>
<td></td>
</tr>
<tr>
<td>Colour</td>
<td>metallic grey or Silver</td>
<td>Odour Odourless</td>
</tr>
<tr>
<td>pH</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Melting point / freezing point</td>
<td>1400-1540 °C / 2560-2800 °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>Flammability Limit in Air</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper flammability limit</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Lower flammability limit</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Vapour density</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>8.0-8.5</td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>Insoluble</td>
<td></td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Dynamic viscosity</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

9.2. Other information

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks • Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softening point</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>

Section 10: STABILITY AND REACTIVITY

10.1. Reactivity

Not applicable

10.2. Chemical stability

Stable under normal conditions.

Explosion data

<table>
<thead>
<tr>
<th>Sensitivity to Mechanical Impact</th>
<th>None.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity to Static Discharge</td>
<td>None.</td>
</tr>
</tbody>
</table>

10.3. Possibility of hazardous reactions

Hazardous polymerisation

Hazardous polymerisation does not occur.

Possibility of Hazardous Reactions
None under normal processing.

10.4. Conditions to avoid  
Dust formation and dust accumulation.

10.5. Incompatible materials  
Dissolves in hydrofluoric acid.

10.6. Hazardous decomposition products  
Not applicable.

Section 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Product Information

Inhalation  
Suspected of causing cancer if inhaled. Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled.

Eye contact  
Product not classified.

Skin Contact  
May cause sensitisation by skin contact.

Ingestion  
Product not classified.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>&gt; 9000 mg/kg bw</td>
<td>-</td>
<td>&gt; 10.2 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>Iron</td>
<td>98,600 mg/kg bw</td>
<td>-</td>
<td>&gt; 0.25 mg/L</td>
</tr>
<tr>
<td>Boron</td>
<td>&gt; 2000 mg/kg bw</td>
<td>-</td>
<td>&gt; 5.08 mg/L</td>
</tr>
</tbody>
</table>

Information on toxicological effects

Symptoms  
May cause sensitisation 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.

Sensitisation  
May cause sensitisation by skin contact.

Germ cell mutagenicity  
Product not classified.

Carcinogenicity  
May cause cancer by inhalation.

<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 7440-02-0</td>
<td></td>
<td>Group 1</td>
<td>Known</td>
<td>X</td>
</tr>
</tbody>
</table>

Reproductive toxicity  
Product not classified.

STOT - single exposure  
Product not classified.

STOT - repeated exposure  
Causes disorder and damage to the: Respiratory System.

Aspiration hazard  
Product not classified.
12.1. Toxicity

This product as shipped is classified for aquatic chronic 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>Nickel</td>
<td>NOEC/EC10 values range from 12.3 µg/l for Scenedesmus accuminatus to 425 µg/l for Pseudokirchneriella subcapitata.</td>
<td>The 96h LC50s values range from 0.4 mg Ni/L for Pimephales promelas to 320 mg Ni/L for Brachydanio rerio.</td>
<td>The 30 min EC50 of nickel for activated sludge was 33 mg Ni/L.</td>
<td>The 48h LC50s values range from 0.013 mg Ni/L for Ceriodaphnia dubia to 4970 mg Ni/L for Daphnia magna.</td>
</tr>
<tr>
<td>Silicon</td>
<td>The 72 h EC50 of sodium metasilicate pentahydrate to Pseudokirchneriella subcapitata was greater than 250 mg/L.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<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>Boron</td>
<td>The 72-h EC50 value for reduction of biomass of Pseudokirchneriella subcapitata exposed to Boric acid at pH 7.5 to 8.3 was 40.2 mg/L.</td>
<td>The 96-hr LC50 for Pimephales promelas exposed to Boric acid (82%)/borax (18%) mixture was 79.7 mg/L with water hardness of 91 mg/L and water pH of 8.0.</td>
<td>The 3 h NOEC of boric acid for activated sludge ranged from 17.5 to 20 mg/L.</td>
<td>The 48-hr LC50 for Ceriodaphnia dubia exposed to Boric acid/borax mixture ranged from 91 to 165 mg/L with pH ranging from 6.7 to 8.4.</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability

12.3. Bioaccumulative potential

12.4. Mobility in soil

12.5. Results of PBT and vPvB assessment

The PBT and vPvB criteria do not apply to inorganic substances.

12.6. Other adverse effects

Section 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from residues/unused products Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14: TRANSPORT INFORMATION

IMDG
14.1  UN/ID no Not regulated
14.2 Proper shipping name
Not regulated
14.3 Hazard Class
Not regulated
14.4 Packing Group
Not regulated
14.5 Marine pollutant
Not applicable
14.6 Special Provisions
None
14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code
Not applicable

RID
14.1 UN/ID no
Not regulated
14.2 Proper shipping name
Not regulated
14.3 Hazard Class
Not regulated
14.4 Packing Group
Not regulated
14.5 Environmental hazard
Not applicable
14.6 Special Provisions
None

ADR
14.1 UN/ID no
Not regulated
14.2 Proper shipping name
Not regulated
14.3 Hazard Class
Not regulated
14.4 Packing Group
Not regulated
14.5 Environmental hazard
Not applicable
14.6 Special Provisions
None

ICAO (air)
14.1 UN/ID no
Not regulated
14.2 Proper shipping name
Not regulated
14.3 Hazard Class
Not regulated
14.4 Packing Group
Not applicable
14.5 Environmental hazard
Not applicable
14.6 Special Provisions
None

IATA
14.1 UN/ID no
Not regulated
14.2 Proper shipping name
Not regulated
14.3 Hazard Class
Not regulated
14.4 Packing Group
Not applicable
Description
Not applicable
14.5 Environmental hazard
Not applicable
14.6 Special Provisions
None

Section 15: REGULATORY INFORMATION

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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>French RG number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>RG 37ter</td>
<td>-</td>
</tr>
<tr>
<td>7440-02-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicon</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7440-21-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>RG 44,RG 44bis,RG 94</td>
<td>-</td>
</tr>
<tr>
<td>7439-89-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boron</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7440-42-8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

European Union
Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
Authorisations and/or restrictions on use:
This product does not contain substances subject to authorisation (Regulation (EC) No. 1907/2006 (REACH), Annex XIV). This product does not contain substances subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII).

International Inventories

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

15.2. Chemical safety assessment

No chemical safety assessment has been performed for this product.

Section 16: OTHER INFORMATION

Issue Date 10-Jun-2019
Revision Date 16-Jul-2019
Revision Note SDS sections updated, 1, 3.

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Note:
The information provided in this Material 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.

Additional information available from:
- Safety data sheets and labels available at ATImetals.com

End of Safety Data Sheet