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

1.1. Product identifier

Product Code  FRP002
Product Name  Cobalt Alloy
Synonyms  ATI 188™, ATI L605™, ATI 6230™

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

Recommended Use  Cobalt alloy product manufacture
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

This product is an article and, as such, does not present a hazard to human health by inhalation or ingestion.

2.1. Classification of the substance or mixture

Regulation (EC) No 1272/2008

<table>
<thead>
<tr>
<th>Classification</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity - Oral</td>
<td>Category 4</td>
</tr>
<tr>
<td>Respiratory sensitisation</td>
<td>Category 1B</td>
</tr>
<tr>
<td>Skin sensitisation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Category 1B</td>
</tr>
<tr>
<td>Reproductive toxicity</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 4</td>
</tr>
</tbody>
</table>

2.2. Label elements

<table>
<thead>
<tr>
<th>Hazard statements</th>
<th>Emergency Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard statements</td>
<td>Emergency Overview</td>
</tr>
<tr>
<td>Harmful if swallowed</td>
<td>May cause allergy or asthma symptoms or breathing difficulties if inhaled</td>
</tr>
<tr>
<td>May cause allergy or asthma symptoms or breathing difficulties if inhaled</td>
<td>May cause an allergic skin reaction</td>
</tr>
<tr>
<td>May cause an allergic skin reaction</td>
<td>May cause cancer</td>
</tr>
<tr>
<td>May cause cancer</td>
<td>Suspected of damaging fertility or the unborn child</td>
</tr>
<tr>
<td>Suspected of damaging fertility or the unborn child</td>
<td>Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled</td>
</tr>
<tr>
<td>Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled</td>
<td>May cause long lasting harmful effects to aquatic life</td>
</tr>
</tbody>
</table>
FRP002 Cobalt Alloy

Precautionary Statements - Prevention
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wear protective gloves
If skin irritation occurs: Get medical advice/attention
If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

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

2.3 Hazards not otherwise classified (HNOC)
Not applicable

Other Information
When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated: Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
ATI 188™, ATI L605™, ATI 6230™.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>EC No</th>
<th>CAS No</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt</td>
<td>213-158-0</td>
<td>7440-48-4</td>
<td>47-57</td>
</tr>
<tr>
<td>Nickel</td>
<td>231-111-4</td>
<td>7440-02-0</td>
<td>11-24</td>
</tr>
<tr>
<td>Chromium</td>
<td>231-157-5</td>
<td>7440-47-3</td>
<td>21-24</td>
</tr>
<tr>
<td>Tungsten</td>
<td>231-143-9</td>
<td>7440-33-7</td>
<td>14-16</td>
</tr>
<tr>
<td>Iron</td>
<td>231-096-4</td>
<td>7439-89-6</td>
<td>0-3</td>
</tr>
<tr>
<td>Manganese</td>
<td>231-105-1</td>
<td>7439-96-5</td>
<td>0-2</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 irritation or allergic reactions see a doctor.

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

Ingestion
Not an expected route of exposure.
4.2. Most important symptoms and effects, both acute and delayed

Symptoms
May cause acute gastrointestinal effects if swallowed. 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 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.

Hazardous combustion products
Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer.

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
Use personal protective equipment as required.

6.2. Environmental precautions
Not applicable to massive product.

6.3. Methods and material for containment and cleaning up

Methods for containment
Not applicable to massive product.

Methods for cleaning up
Not applicable to massive product.

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 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.

7.3. Specific end use(s)

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

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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>Cobalt</td>
<td></td>
<td>STEL: 0.3 mg/m³ TWA: 0.1 mg/m³</td>
<td>-</td>
<td>TWA: 0.02 mg/m³</td>
<td>Skin</td>
</tr>
<tr>
<td>Nickel</td>
<td>-</td>
<td>STEL: 1.5 mg/m³ TWA: 0.5 mg/m³ TWA: 1 mg/m³ TWA: 1 mg/m³</td>
<td>Skin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chromium</td>
<td>TWA: 2 mg/m³</td>
<td>STEL: 1.5 mg/m³ TWA: 0.5 mg/m³ TWA: 2 mg/m³ TWA: 2 mg/m³</td>
<td>TWA: 2 mg/m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tungsten</td>
<td>-</td>
<td>STEL: 10 mg/m³ TWA: 5 mg/m³</td>
<td>-</td>
<td>STEL: 10 mg/m³ TWA: 5 mg/m³</td>
<td>-</td>
</tr>
<tr>
<td>Iron</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Manganese</td>
<td>-</td>
<td>STEL: 1.5 mg/m³ TWA: 0.5 mg/m³</td>
<td>TWA: 1 mg/m³</td>
<td>TWA: 0.2 mg/m³</td>
<td>TWA: 0.2 mg/m³</td>
</tr>
<tr>
<td>Iron</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Manganese</td>
<td>-</td>
<td>TWA: 0.2 mg/m³</td>
<td>-</td>
<td>TWA: 0.2 mg/m³ TWA: 0.1 mg/m³</td>
<td>TWA: 0.2 mg/m³</td>
</tr>
<tr>
<td>Iron</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Manganese</td>
<td>-</td>
<td>TWA: 0.2 mg/m³ TWA: 0.1 mg/m³</td>
<td>-</td>
<td>TWA: 0.2 mg/m³ TWA: 0.1 mg/m³</td>
<td>TWA: 0.2 mg/m³</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>Cobalt</td>
<td>TWA: 0.02 mg/m³</td>
<td>TWA: 0.02 mg/m³</td>
<td>TWA: 0.02 mg/m³</td>
<td>TWA: 0.02 mg/m³</td>
<td>TWA: 0.01 mg/m³</td>
</tr>
<tr>
<td>Nickel</td>
<td>TWA: 1.5 mg/m³</td>
<td>-</td>
<td>TWA: 1 mg/m³ TWA: 0.1 mg/m³</td>
<td>TWA: 0.05 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Chromium</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 0.5 mg/m³ TWA: 0.5 mg/m³ TWA: 0.5 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tungsten</td>
<td>STEL: 10 mg/m³ TWA: 5 mg/m³</td>
<td>-</td>
<td>TWA: 5 mg/m³ TWA: 5 mg/m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Manganese</td>
<td>TWA: 0.2 mg/m³</td>
<td>-</td>
<td>TWA: 0.2 mg/m³ TWA: 0.1 mg/m³</td>
<td>TWA: 0.2 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Manganese</td>
<td>TWA: 0.2 mg/m³ TWA: 0.1 mg/m³</td>
<td>-</td>
<td>TWA: 0.2 mg/m³ TWA: 0.1 mg/m³</td>
<td>TWA: 0.2 mg/m³</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>Cobalt</td>
<td>Skin</td>
<td>TWA: 0.05 mg/m³</td>
<td>TWA: 0.02 mg/m³</td>
<td>TWA: 0.02 mg/m³ TWA: 0.06 mg/m³</td>
<td>TWA: 0.1 mg/m³</td>
</tr>
<tr>
<td>Nickel</td>
<td>-</td>
<td>TWA: 0.5 mg/m³ TWA: 0.25 mg/m³</td>
<td>TWA: 0.5 mg/m³ STEL: 1.5 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Chromium</td>
<td>TWA: 2 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 0.5 mg/m³ STEL: 1.5 mg/m³</td>
<td>TWA: 2 mg/m³</td>
</tr>
<tr>
<td>Tungsten</td>
<td>STEL 10 mg/m³ TWA: 5 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td>TWA: 5 mg/m³ STEL: 10 mg/m³</td>
<td>TWA: 5 mg/m³ STEL: 10 mg/m³</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  
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 contaminate concentrations. Respiratory protection must be provided in accordance with current local regulations.

Environmental exposure controls  
Section 6: ACCIDENTAL RELEASE MEASURES.

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>Various massive product forms</td>
<td></td>
</tr>
<tr>
<td>Colour</td>
<td>metallic, grey or Silver</td>
<td></td>
</tr>
<tr>
<td>Odour</td>
<td>Odourless</td>
<td></td>
</tr>
<tr>
<td>Odour 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>1260-1430 °C 2300-2600 °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>Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product</td>
</tr>
</tbody>
</table>

Flammability Limit in Air

Upper flammability limit: -

Lower flammability limit: -

Vapour pressure: - Not applicable

Vapour density: - Not applicable

Specific Gravity: 7-9

Water solubility: Insoluble

Solubility(ies): Not applicable

Partition coefficient: - Not applicable

Autoignition temperature: - Not applicable

Decomposition temperature: - Not applicable

Kinematic viscosity: - Not applicable

Dynamic viscosity: - Not applicable

Explosive properties: Not applicable

Oxidising properties: Not applicable
9.2. Other information

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

---

**Section 10: STABILITY AND REACTIVITY**

10.1. Reactivity

Not applicable.

10.2. Chemical stability

Stable under normal conditions.

**Explosion data**

- Sensitivity to Mechanical Impact: None.
- Sensitivity to Static Discharge: None.

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

When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated: Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer.

---

**Section 11: TOXICOLOGICAL INFORMATION**

11.1. Information on toxicological effects

**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 sensitisation 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>Cobalt</td>
<td>550 mg/kg bw</td>
<td>&gt;2000 mg/kg bw</td>
<td>&lt;0.05 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>
<tr>
<td>Chromium</td>
<td>&gt; 3400 mg/kg bw</td>
<td>-</td>
<td>&gt; 5.41 mg/L</td>
</tr>
<tr>
<td>Tungsten</td>
<td>&gt; 2000 mg/kg bw</td>
<td>&gt; 2000 mg/kg bw</td>
<td>&gt; 5.4 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>Manganese</td>
<td>&gt;2000 mg/kg bw</td>
<td>-</td>
<td>&gt;5.14 mg/L</td>
</tr>
</tbody>
</table>
Information on toxicological effects

Symptoms
May cause sensitisation by skin contact. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause acute gastrointestinal effects if swallowed.

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

Acute toxicity
Harmful if swallowed. Cobalt-containing powders may be fatal if inhaled.

Skin corrosion/irritation
Product not classified.

Serious eye damage/eye irritation
Product not classified.

Sensitisation
May cause sensitisation by skin contact. Cobalt-containing alloys may cause sensitization by inhalation.

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>Cobalt</td>
<td>A3</td>
<td>Group 2A</td>
<td>Known</td>
<td>X</td>
</tr>
<tr>
<td>7440-48-4</td>
<td></td>
<td>Group 2B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td></td>
<td>Group 1</td>
<td>Known</td>
<td>X</td>
</tr>
<tr>
<td>7440-02-0</td>
<td></td>
<td>Group 2B</td>
<td>Reasonably Anticipated</td>
<td></td>
</tr>
<tr>
<td>Chromium</td>
<td></td>
<td>Group 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7440-47-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reproductive toxicity
Possible risk of impaired fertility.

STOT - single exposure
Product not classified.

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

Aspiration hazard
Product not classified.

Section 12: ECOLOGICAL INFORMATION

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>Cobalt</td>
<td>The 72 h EC50 of cobalt dichloride to <em>Pseudokirchneriella subcapitata</em> was 144 µg of Co/L.</td>
<td>The 96h LC50 of cobalt dichloride ranged from 1.5 mg Co/L for Oncorhynchus mykiss to 85 mg Co/L for Danio rerio.</td>
<td>The 3 h EC50 of cobalt dichloride for activated sludge was 120 µg of Co/L.</td>
<td>The 48 h LC50 of cobalt dichloride ranged from 0.61 mg Co/L for Ceriodaphnia dubia tested in soft, DOM-free water to &gt;1800 mg Co/L for Tubifex tubifex in very hard water.</td>
</tr>
<tr>
<td>Nickel</td>
<td>NOEC/EC10 values range from 12.3 µg/l for <em>Scenedesmus acuminate</em> to 425 µg/l for <em>Pseudokirchneriella subcapitata</em>.</td>
<td>The 96h LC50s values range from 0.4 mg Ni/L for <em>Pimephales promelas</em> to 320 mg Ni/L for <em>Brachydanio rerio</em>.</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 <em>Ceriodaphnia dubia</em> to 4970 mg Ni/L for <em>Daphnia magna</em>.</td>
</tr>
<tr>
<td>Chromium</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tungsten</td>
<td>The 72 h EC50 of sodium tungstate to <em>Pseudokirchneriella subcapitata</em> was 31.0 mg of W/L.</td>
<td>The 96 h LC50 of sodium tungstate to Danio rerio was greater than 106 mg of W/L.</td>
<td>The 30 min EC50 of sodium tungstate for activated sludge were greater than 1000 mg/L.</td>
<td>The 48 h EC50 of sodium tungstate to <em>Daphnia magna</em> was greater than 96 mg of W/L.</td>
</tr>
<tr>
<td>Iron</td>
<td>-</td>
<td>The 96 h LC50 of 50% iron</td>
<td>The 3 h EC50 of iron oxide</td>
<td>The 48 h EC50 of iron</td>
</tr>
</tbody>
</table>
oxide black in water to Danio rerio was greater than 10,000 mg/L.

for activated sludge was greater than 10,000 mg/L.

oxide to Daphnia magna was greater than 100 mg/L.

| Manganese | The 72 h EC50 of manganese to Desmodesmus subspicatus was 2.8 mg of Mn/L. | The 96 h LC50 of manganese to Oncorhynchus mykiss was greater than 3.6 mg of Mn/L. | The 3 h EC50 of manganese for activated sludge was greater than 1000 mg/L. | The 48 h EC50 of manganese to Daphnia magna was greater than 1.6 mg/L. |

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

This product as shipped is not classified for acute environmental endpoints. However, when subjected to sawing or grinding, particles may be generated that are classified for aquatic acute toxicity.

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: None anticipated.

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
### 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>
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<tbody>
<tr>
<td>Cobalt</td>
<td>RG 65, RG 70, RG 70bis, RG 70ter</td>
<td>-</td>
</tr>
<tr>
<td>Nickel</td>
<td>RG 37ter</td>
<td>-</td>
</tr>
<tr>
<td>Chromium</td>
<td>RG 10</td>
<td>-</td>
</tr>
<tr>
<td>Tungsten</td>
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<td>-</td>
</tr>
<tr>
<td>Iron</td>
<td>RG 44, RG 44bis, RG 94</td>
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<tr>
<td>Manganese</td>
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</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**

- **TSCA**: Complies
- **DSL/NDSL**: Complies
- **EINECS/ELINCS**: Complies
- **ENCS**: Complies
- **IECSC**: Complies
- **KECL**: Complies
- **PICCS**: Complies
- **AICS**: Complies

**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
15.2. Chemical safety assessment

No chemical safety assessment has been performed for this product.

Section 16: OTHER INFORMATION

<table>
<thead>
<tr>
<th>Issue Date</th>
<th>28-May-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revision Date</td>
<td>09-Sep-2018</td>
</tr>
<tr>
<td>Revision Note</td>
<td>Updated Section(s): 5, 7, 9, 15.</td>
</tr>
</tbody>
</table>

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