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

1.1. Product identifier

Product Code  SM002
Product Name  Cobalt-Base Alloy

Synonyms  Non-powder forms of ATI 35N, ATI L-605, and ATI TJA-1537®
Contains Cobalt, Nickel

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>Hazard Category</th>
<th>Acute toxicity - Oral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Respiratory sensitisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1B</td>
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</tr>
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</table>

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Skin sensitisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Carcinogenicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1B</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Reproductive toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 2</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Specific target organ toxicity — repeated exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Chronic aquatic toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 4</td>
<td></td>
</tr>
</tbody>
</table>

2.2. Label elements

Emergency Overview

Danger

Hazard statements
Harmful if swallowed
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction
May cause cancer
Suspected of damaging fertility or the unborn child
Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled
May cause long lasting harmful effects to aquatic life
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 or rash 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, Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Synonyms
Non-powder forms of ATI 35N, ATI L-605, and ATI TJA-1537®.

<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>35-70</td>
</tr>
<tr>
<td>Chromium</td>
<td>231-157-5</td>
<td>7440-47-3</td>
<td>20-30</td>
</tr>
<tr>
<td>Nickel</td>
<td>231-111-4</td>
<td>7440-02-0</td>
<td>0-25</td>
</tr>
<tr>
<td>Tungsten</td>
<td>231-143-9</td>
<td>7440-33-7</td>
<td>0 - 15</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>231-107-2</td>
<td>7439-98-7</td>
<td>0 - 10</td>
</tr>
<tr>
<td>Manganese</td>
<td>231-105-1</td>
<td>7439-96-5</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Iron</td>
<td>231-096-4</td>
<td>7439-89-6</td>
<td>0 - 5</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 allergic skin reaction. May cause acute gastrointestinal effects if swallowed.

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. Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

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.

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 7440-48-4</td>
<td>-</td>
<td>STEL: 0.3 mg/m³</td>
<td>TWA: 0.1 mg/m³</td>
<td>-</td>
<td>TWA: 0.02 mg/m³</td>
</tr>
<tr>
<td>Chromium 7440-47-3</td>
<td>TWA: 2 mg/m³</td>
<td>STEL: 1.5 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 2 mg/m³</td>
<td>TWA: 2 mg/m³</td>
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<tr>
<td>Nickel 7440-02-0</td>
<td>-</td>
<td>STEL: 1.5 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 1 mg/m³</td>
<td>TWA: 1 mg³</td>
</tr>
<tr>
<td>Tungsten 7440-33-7</td>
<td>-</td>
<td>STEL: 10 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td>-</td>
<td>STEL: 10 mg/m³</td>
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<tr>
<td>Molybdenum 7439-98-7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>TWA: 10 mg/m³</td>
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<tr>
<td>Manganese 7439-96-5</td>
<td>-</td>
<td>STEL: 1.5 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 1 mg/m³</td>
<td>TWA: 0.2 mg/m³</td>
</tr>
<tr>
<td>Iron 7439-89-6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Italy</th>
<th>Portugal</th>
<th>Netherlands</th>
<th>Finland</th>
<th>Denmark</th>
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<td>TWA: 0.02 mg/m³</td>
<td>TWA: 0.02 mg/m³</td>
<td>TWA: 0.01 mg/m³</td>
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<td>TWA: 0.5 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 0.5 mg/m³</td>
</tr>
<tr>
<td>Nickel 7440-02-0</td>
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<td>TWA: 1.5 mg/m³</td>
<td>-</td>
<td>TWA: 1 mg/m³</td>
<td>TWA: 0.05 mg/m³</td>
</tr>
<tr>
<td>Tungsten 7440-33-7</td>
<td>-</td>
<td>STEL: 10 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td>-</td>
<td>TWA: 5 mg/m³</td>
</tr>
<tr>
<td>Molybdenum 7439-98-7</td>
<td>-</td>
<td>TWA: 10 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td>-</td>
<td>TWA: 0.5 mg/m³</td>
</tr>
<tr>
<td>Manganese 7439-96-5</td>
<td>-</td>
<td>TWA: 0.2 mg/m³</td>
<td>-</td>
<td>TWA: 0.2 mg/m³</td>
<td>TWA: 0.2 mg/m³</td>
</tr>
<tr>
<td>Iron 7439-89-6</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>
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</thead>
<tbody>
<tr>
<td>Cobalt 7440-48-4</td>
<td>Skin</td>
<td>Skin</td>
<td>STEL: 0.2 mg/m³</td>
<td>TWA: 0.02 mg/m³</td>
<td>TWA: 0.1 mg/m³</td>
</tr>
</tbody>
</table>
7440-48-4 TWA: 0.05 mg/m³ TWA: 0.02 mg/m³ STEL: 0.06 mg/m³
Chromium 7440-47-3 TWA: 2 mg/m³ TWA: 0.5 mg/m³ TWA: 0.5 mg/m³ TWA: 0.5 mg/m³ STEL: 1.5 mg/m³ STEL: 0.15 mg/m³ TWA: 0.5 mg/m³
Nickel 7440-02-0 - TWA: 0.5 mg/m³ TWA: 0.25 mg/m³ TWA: 0.05 mg/m³ STEL: 0.15 mg/m³ TWA: 0.5 mg/m³
Tungsten 7440-33-7 STEL 10 mg/m³ TWA: 5 mg/m³ TWA: 5 mg/m³ TWA: 5 mg/m³ TWA: 5 mg/m³ STEL: 10 mg/m³ TWA: 10 mg/m³
Molybdenum 7439-98-7 STEL 20 mg/m³ TWA: 10 mg/m³ TWA: 10 mg/m³ TWA: 10 mg/m³ TWA: 10 mg/m³ STEL: 10 mg/m³ TWA: 10 mg/m³
Manganese 7439-96-5 STEL 2 mg/m³ TWA: 0.5 mg/m³ TWA: 0.5 mg/m³ TWA: 0.5 mg/m³ TWA: 0.5 mg/m³ STEL: 3 ppm STEL: 0.3 mg/m³ STEL: 0.3 mg/m³ STEL: 10 mg/m³
Iron 7439-89-6 - - - - - - -

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.

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>Various massive product forms</td>
<td>Odour Odourless</td>
</tr>
<tr>
<td>Colour</td>
<td>metallic grey Silver</td>
<td>Odour threshold Not applicable</td>
</tr>
<tr>
<td>pH</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>1420 - 1450 °C / 2590 - 2650 °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>Not applicable</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>
<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>Not applicable</td>
</tr>
<tr>
<td>Vapour density</td>
<td>-</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>7-9</td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>Insoluble</td>
<td></td>
</tr>
</tbody>
</table>

EU; English
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, Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

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 LD&lt;sub&gt;50&lt;/sub&gt;</th>
<th>Dermal LD&lt;sub&gt;50&lt;/sub&gt;</th>
<th>Inhalation LC&lt;sub&gt;50&lt;/sub&gt;</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>Chromium</td>
<td>&gt; 3400 mg/kg bw</td>
<td></td>
<td>&gt; 5.1 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>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>Molybdenum</td>
<td>&gt; 2000 mg/kg bw</td>
<td>&gt; 2000 mg/kg bw</td>
<td>&gt; 5.1 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>
<tr>
<td>Iron</td>
<td>98,600 mg/kg bw</td>
<td></td>
<td>&gt; 0.25 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 7440-48-4</td>
<td>A3</td>
<td>Group 2A</td>
<td>Known</td>
<td>X</td>
</tr>
<tr>
<td>Chromium 7440-47-3</td>
<td></td>
<td>Group 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickel 7440-02-0</td>
<td></td>
<td>Group 1</td>
<td>Known</td>
<td>X</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 Pseudokirchneriella subcapitata was 144 ug 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 mg 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;1800mg Co/L for Tubifex tubifex in very hard water.</td>
</tr>
<tr>
<td>Chromium</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nickel</td>
<td>NOEC/EC10 values range</td>
<td>The 96h LC50s values</td>
<td>The 30 min EC50 of nickel</td>
<td>The 48h LC50s values</td>
</tr>
<tr>
<td>Element</td>
<td>72 h EC50 (sodium tungstate or molybdate dihydrate) to Pseudokirchneriella subcapitata</td>
<td>96 h LC50 (sodium tungstate or molybdate dihydrate) to Pimephales promelas</td>
<td>3 h EC50 (molybdenum trioxide) for activated sludge</td>
<td>48 h EC50 (sodium tungstate or molybdate dihydrate) to Daphnia magna</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tungsten</td>
<td>The 72 h EC50 was 31.0 mg W/L.</td>
<td>The 96 h LC50 of sodium tungstate to D. rerio was greater than 106 mg of W/L.</td>
<td>The 3 h EC50 of molybdenum trioxide for activated sludge was greater than 1000 mg/L.</td>
<td>The 48 h EC50 of sodium tungstate to D. magna was greater than 96 mg of W/L.</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>The 72 h EC50 was 54.2 mg Mo/L.</td>
<td>The 96 h LC50 of sodium molybdate dihydrate to Pimephales promelas was 644.2 mg/L.</td>
<td>The 3 h EC50 of molybdenum trioxide for activated sludge was 820 mg/L.</td>
<td>The 48 h LC50 of sodium molybdate dihydrate to C. dubia was 1.015 mg/L.</td>
</tr>
<tr>
<td>Manganese</td>
<td>The 72 h EC50 of manganese to Desmodesmus subspicatus was 2.8 mg of Mn/L.</td>
<td>The 96 h LC50 of manganese to O. mykiss was greater than 3.6 mg of Mn/L.</td>
<td>The 3 h EC50 of manganese for activated sludge was greater than 1000 mg/L.</td>
<td>The 48 h EC50 of manganese to D. magna was greater than 1.6 mg/L.</td>
</tr>
<tr>
<td>Iron</td>
<td>-</td>
<td>The 96 h LC50 of 50% iron oxide black in water to D. 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 D. magna was greater than 1000 mg/L.</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

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**

**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
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>Cobalt</td>
<td>RG 65,RG 70,RG 70bis,RG 70ter</td>
<td>-</td>
</tr>
<tr>
<td>Chromium</td>
<td>RG 10</td>
<td>-</td>
</tr>
<tr>
<td>Nickel</td>
<td>RG 37ter</td>
<td>-</td>
</tr>
<tr>
<td>Tungsten</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Manganese</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Iron</td>
<td>RG 44,RG 44bis,RG 94</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
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
- 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
- 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 28-May-2015
Revision Date 05-Aug-2018
Revision Note Updated Section(s): 5, 7, 9, 15.

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