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

Product identifier
Product Name Cobalt-Base Alloy

Other means of identification
Product Code SM002
Synonyms Non-powder forms of ATI 35N, ATI L-605, and ATI TJA-1537®

Recommended use of the chemical and restrictions on use
Recommended Use Cobalt alloy 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 considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200) This product is an article and, as such, does not present a hazard to human health by inhalation or ingestion

<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 sensitization</td>
<td>Category 1B</td>
</tr>
<tr>
<td>Skin sensitization</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</td>
<td>Category 1</td>
</tr>
<tr>
<td>(repeated exposure)</td>
<td></td>
</tr>
<tr>
<td>Chronic aquatic toxicity</td>
<td>Category 4</td>
</tr>
</tbody>
</table>

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

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.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Weight-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt</td>
<td>7440-48-4</td>
<td>35-70</td>
</tr>
<tr>
<td>Chromium</td>
<td>7440-47-3</td>
<td>20-30</td>
</tr>
<tr>
<td>Nickel</td>
<td>7440-02-0</td>
<td>0-25</td>
</tr>
<tr>
<td>Tungsten</td>
<td>7440-33-7</td>
<td>0 - 15</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>7439-98-7</td>
<td>0 - 10</td>
</tr>
<tr>
<td>Iron</td>
<td>7439-89-6</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Manganese</td>
<td>7439-96-5</td>
<td>0 - 5</td>
</tr>
</tbody>
</table>

### 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. May cause acute gastrointestinal effects if swallowed.

Indication of any immediate medical attention and special treatment needed

Note to physicians
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

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.

Specific hazards arising from the chemical
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 minimize 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.

Explosion data
Sensitivity to Mechanical Impact
None.
Sensitivity to Static Discharge
None.

Protective equipment and precautions for firefighters
Firefighters should wear self-contained breathing apparatus and full firefighting turnout 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

Environmental precautions
Not applicable to massive product.

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.

7. HANDLING AND STORAGE

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 minimize combustible dust hazard.

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.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### Control parameters

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt 7440-48-4</td>
<td>TWA: 0.02 mg/m³ TWA: 0.02 mg/m³ Co</td>
<td>TWA: 0.1 mg/m³ dust and fume</td>
</tr>
<tr>
<td>Chromium 7440-47-3</td>
<td>TWA: 0.5 mg/m³</td>
<td>TWA: 1 mg/m³</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>
<tr>
<td>Tungsten 7440-33-7</td>
<td>STEL: 10 mg/m³ STEL: 10 mg/m³ W TWA: 5 mg/m³ TWA: 5 mg/m³ W</td>
<td>(vacated) STEL: 10 mg/m³ (vacated) STEL: 10 mg/m³ W</td>
</tr>
<tr>
<td>Molybdenum 7439-98-7</td>
<td>TWA: 10 mg/m³ inhalable fraction TWA: 3 mg/m³ respirable fraction</td>
<td>-</td>
</tr>
<tr>
<td>Manganese 7439-96-5</td>
<td>TWA: 0.1 mg/m³ inhalable fraction TWA: 0.02 mg/m³ Mn TWA: 0.1 mg/m³ Mn</td>
<td>(vacated) STEL: 3 mg/m³ fume (vacated) Ceiling: 5 mg/m³ Ceiling: 5 mg/m³ fume Ceiling: 5 mg/m³ Mn</td>
</tr>
<tr>
<td>Iron 7439-89-6</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Appropriate engineering controls

**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 Grey silver</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
<td>Odor 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>
</tbody>
</table>
Flammability (solid, gas) -  
Flammability Limit in Air  
  Upper flammability limit: -  
  Lower flammability limit: -  
Vapor pressure -  
Vapor density -  
Specific Gravity 7-9  
Water solubility Insoluble  
Solubility in other solvents -  
Partition coefficient -  
Autoignition temperature -  
Decomposition temperature -  
Kinematic viscosity -  
Dynamic viscosity -  
Explosive properties Not applicable  
Oxidizing properties Not applicable

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  
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.

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>Cobalt 7440-48-4</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 7440-47-3</td>
<td>&gt; 3400 mg/kg bw</td>
<td>-</td>
<td>&gt; 5.41 mg/L</td>
</tr>
<tr>
<td>Nickel 7440-02-0</td>
<td>&gt; 9000 mg/kg bw</td>
<td>-</td>
<td>&gt; 10.2 mg/L</td>
</tr>
<tr>
<td>Tungsten 7440-33-7</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 7439-98-7</td>
<td>&gt; 2000 mg/kg bw</td>
<td>&gt; 2000 mg/kg bw</td>
<td>&gt; 5.10 mg/L</td>
</tr>
<tr>
<td>Manganese 7439-96-5</td>
<td>&gt;2000 mg/kg bw</td>
<td>-</td>
<td>&gt;5.14 mg/L</td>
</tr>
<tr>
<td>Iron 7439-89-6</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 sensitization 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.

**Sensitization**  
May cause sensitization 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>Group 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickel 7440-02-0</td>
<td>Group 1</td>
<td>Group 2B</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.

### 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

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 7440-48-4</td>
<td>The 72 h EC50 of cobalt dichloride to Pseudokircheriella 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>
</tbody>
</table>
Persistence and degradability

Bioaccumulation

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.

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.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>RCRA - D Series Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium 7440-47-3</td>
<td>5.0 mg/L regulatory level</td>
</tr>
</tbody>
</table>

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

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
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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Weight-%</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt</td>
<td>7440-48-4</td>
<td>35-70</td>
<td>0.1</td>
</tr>
<tr>
<td>Chromium</td>
<td>7440-47-3</td>
<td>20-30</td>
<td>1.0</td>
</tr>
<tr>
<td>Nickel</td>
<td>7440-02-0</td>
<td>0-25</td>
<td>0.1</td>
</tr>
<tr>
<td>Manganese</td>
<td>7439-96-5</td>
<td>0 - 5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazard Categories

- Acute health hazard: Yes
- Chronic Health Hazard: Yes
- 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>Chromium</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Nickel</td>
<td>X</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>Chromium</td>
<td>5000 lb</td>
</tr>
<tr>
<td>Nickel</td>
<td>100 lb</td>
</tr>
</tbody>
</table>

US State Regulations

California Proposition 65
This product contains the Proposition 65 chemicals listed below. Proposition 65 warning label available at ATImetals.com.
SM002 Cobalt-Base Alloy

California Proposition 65

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>California Proposition 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt - 7440-48-4</td>
<td>Carcinogen</td>
</tr>
<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>Cobalt</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Chromium</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Nickel</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tungsten</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Manganese</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>1</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></td>
<td>2*</td>
<td>0</td>
<td>0</td>
<td>X</td>
</tr>
</tbody>
</table>

Chronic Hazard Star Legend

* = Chronic Health Hazard

Issue Date 28-May-2015
Revision Date 05-Aug-2018
Revision Note Updated Section(s): 5, 7, 9, 15

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