SAFETY DATA SHEET

Issue Date 28-May-2015 **Revision Date** 13-Jan-2016 **Version** 5

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

Product identifier

Product Name Nickel / Cobalt Alloy Respirable Powder

Other means of identification

Product Code PM001
UN/ID No. 3288
Synonyms Alloy 10 Powder, Alloy 230 Powder, Alloy 230B Powder, Alloy 625 Powder, Alloy 625B Powder, Alloy 720 Powder, Alloy 725 Powder

Recommended use of the chemical and restrictions on use

Recommended Use Nickel 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

Emergency Telephone 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)

Acute toxicity - Oral	Category 4
Acute toxicity - Inhalation (Dusts/Mists)	Category 2
Respiratory sensitization	Category 1B
Skin sensitization	Category 1
Carcinogenicity	Category 1B
Reproductive toxicity	Category 2
Specific target organ toxicity (repeated exposure)	Category 1
Acute aquatic toxicity	Category 1
Chronic aquatic toxicity	Category 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
Very toxic to aquatic life
Toxic to aquatic life with long lasting effects
Fatal if inhaled

Appearance Powder **Physical state** Solid **Odor** Odorless

Precautionary Statements - Prevention
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wear protective gloves
Wash hands thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
Avoid release to the environment
Wear respiratory protection

Precautionary Statements - Response
Collect spillage
If Inhaled: Immediately call a POISON CENTER or doctor/ physician
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse
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 - Storage
Store in a well-ventilated place. Keep container tightly closed

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: Titanium dioxide an IARC Group 2B carcinogen, 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 Alloy 10 Powder, Alloy 230 Powder, Alloy 230B Powder, Alloy 625 Powder, Alloy 625B Powder, Alloy 720 Powder, Alloy 725 Powder.

Chemical Name	CAS No.	Weight-%
Nickel	7440-02-0	49-68
Chromium	7440-47-3	8-22
Cobalt	7440-48-4	0 - 20
Iron	7439-89-6	0-19
Molybdenum	7439-98-7	0 - 10
Tungsten	7440-33-7	0 - 10
Aluminum	7429-90-5	0 - 5.5
Titanium	7440-32-6	0 - 5.3
Niobium (Columbium)	7440-03-1	0 - 4.2
Tantalum	7440-25-7	0 - 3.5

Hafnium	7440-58-6	0-1

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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. Wash off immediately with soap and plenty of water.

Inhalation If excessive amounts of vapors, smoke, fume, or particles are inhaled during processing, remove to fresh air and consult a qualified health professional. In the case of asthma symptoms or breathing difficulties call a physician:

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

Most important symptoms and effects, both acute and delayed

Symptoms May cause allergic skin reaction. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
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 Titanium dioxide an IARC Group 2B carcinogen, 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
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. Follow Emergency Response Guidebook,

Guide No. 152, EXCEPT for FIRE follow Emergency Response Guidebook, Guide No. 170.

Environmental precautions

Environmental precautions Collect spillage to prevent release to the environment.

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.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on 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

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. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Chemical Name	ACGIH TLV	OSHA PEL
Nickel 7440-02-0	TWA: 1.5 mg/m³ inhalable fraction	TWA: 1 mg/m³
Chromium 7440-47-3	TWA: 0.5 mg/m³	TWA: 1 mg/m³
Cobalt 7440-48-4	TWA: 0.02 mg/m³ TWA: 0.02 mg/m³ Co	TWA: 0.1 mg/m³ dust and fume
Iron 7439-89-6	-	-
Molybdenum 7439-98-7	TWA: 10 mg/m³ inhalable fraction TWA: 3 mg/m³ respirable fraction	-
Tungsten 7440-33-7	STEL: 10 mg/m³ STEL: 10 mg/m³ W TWA: 5 mg/m³ TWA: 5 mg/m³ W	(vacated) STEL: 10 mg/m³ (vacated) STEL: 10 mg/m³ W
Aluminum 7429-90-5	TWA: 1 mg/m³ respirable fraction	TWA: 15 mg/m³ total dust TWA: 5 mg/m³ respirable fraction
Titanium 7440-32-6	-	-
Niobium (Columbium) 7440-03-1	-	-
Tantalum 7440-25-7	-	TWA: 5 mg/m³
Hafnium 7440-58-6	TWA: 0.5 mg/m³ TWA: 0.5 mg/m³ Hf	TWA: 0.5 mg/m³

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.
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 contaminat 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

Physical state	Solid		
Appearance	Powder	**Odor**	Odorless
Color	metallic Grey silver	**Odor threshold**	Not applicable

Property	**Values**	**Remarks • Method**
pH	Not Applicable	
Melting point/freezing point	1320-1400 °C / 2560-2800 °F	
Boiling point / boiling range	-	
Flash point	-	
Evaporation rate	-	Not applicable
Flammability (solid, gas)	-	Not flammable in the form of this product as distributed, flammable as finely divided particles or pieces resulting from processing of this product
Flammability Limit in Air		Not applicable
Upper flammability limit:	Not Applicable	
Lower flammability limit:	Not Applicable	
Vapor pressure	-	Not applicable
Vapor density	-	Not applicable
Specific Gravity	8.0-8.5 -	
Water solubility	Insoluble	
Solubility in other solvents	-	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	
Oxidizing properties	Not applicable	

Other Information

Softening point	Not Applicable
Molecular weight	Not Applicable
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. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.
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. Titanium dioxide an IARC Group 2B carcinogen. 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 May cause cancer by inhalation. Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled. Cobalt-containing alloys may cause sensitization by inhalation. Cobalt-containing powders may be fatal if inhaled.

Eye contact Product not classified.

Skin Contact Nickel or Cobalt containing alloys may cause sensitization by skin contact.

Ingestion Harmful if swallowed.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Nickel 7440-02-0	> 9000 mg/kg bw	-	> 10.2 mg/L
Chromium 7440-47-3	> 3400 mg/kg bw	-	> 5.41 mg/L
Cobalt 7440-48-4	550 mg/kg bw	>2000 mg/kg bw	<0.05 mg/L
Iron 7439-89-6	98,600 mg/kg bw	-	> 0.25 mg/L
Tungsten 7440-33-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.4 mg/L
Molybdenum 7439-98-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.10 mg/L
Aluminum 7429-90-5	15,900 mg/kg bw	-	> 1 mg/L
Titanium 7440-32-6	> 5000 mg/kg bw	-	-
Niobium (Columbium) 7440-03-1	> 10,000 mg/kg bw	> 2000 mg/kg bw	-
Tantalum 7440-25-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.18 mg/L
Hafnium 7440-58-6	-	-	>4.3mg/L

Information on toxicological effects

Symptoms Nickel or Cobalt containing alloys 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 Nickel or Cobalt containing alloys 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.

Chemical Name	ACGIH	IARC	NTP	OSHA
Nickel 7440-02-0		Group 1 Group 2B	Known Reasonably Anticipated	X
Chromium 7440-47-3		Group 3		
Cobalt 7440-48-4	A3	Group 2A Group 2B	Known	X

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 This product as shipped is classified for aquatic acute toxicity

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Nickel 7440-02-0	NOEC/EC10 values range from 12.3 µg/l for Scenedesmus accuminatus to 425 µg/l for Pseudokirchneriella subcapitata.	The 96h LC50s values range from 0.4 mg Ni/L for Pimephales promelas to 320 mg Ni/L for Brachydanio rerio.	The 30 min EC50 of nickel for activated sludge was 33 mg Ni/L.	The 48h LC50s values range from 0.013 mg Ni/L for Ceriodaphnia dubia to 4970 mg Ni/L for Daphnia magna.
Chromium 7440-47-3	-	-	-	-
Cobalt 7440-48-4	The 72 h EC50 of cobalt dichloride to Pseudokirchneriella subcapitata was 144 ug of Co/L.	The 96h LC50 of cobalt dichloride ranged from 1.5 mg Co/L for Oncorhynchus mykiss to 85 mg Co/L for Danio rerio.	The 3 h EC50 of cobalt dichloride for activated sludge was 120 mg of Co/L.	The 48 h LC50 of cobalt dichloride ranged from 0.61 mg Co/L for Ceriodaphnia dubia tested in soft, DOM-free water to >1800mg Co/L for Tubifex tubifex in very hard water.
Iron 7439-89-6	-	The 96 h LC50 of 50% iron oxide black in water to Danio rerio was greater than 10,000 mg/L.	The 3 h EC50 of iron oxide for activated sludge was greater than 10,000 mg/L.	The 48 h EC50 of iron oxide to Daphnia magna was greater than 100 mg/L.
Molybdenum 7439-98-7	The 72 h EC50 of sodium molybdate dihydrate to Pseudokirchneriella subcapitata was 362.9 mg of Mo/L.	The 96 h LC50 of sodium molybdate dihydrate to Pimephales promelas was 644.2 mg/L	The 3 h EC50 of molybdenum trioxide for activated sludge was 820 mg/L.	The 48 h LC50 of sodium molybdate dihydrate to Ceriodaphnia dubia was 1,015 mg/L. The 48 h LC50 of sodium molybdate dihydrate to Daphnia magna was greater than 1,727.8 mg/L.
Tungsten 7440-33-7	The 72 h EC50 of sodium tungstate to Pseudokirchnerella subcapitata was 31.0 mg of W/L.	The 96 h LC50 of sodium tungstate to Danio rerio was greater than 106 mg of W/L.	The 30 min EC50 of sodium tungstate for activated sludge were greater than 1000 mg/L.	The 48 h EC50 of sodium tungstate to Daphnia magna was greater than 96 mg of W/L.
Aluminum 7429-90-5	The 96-h EC50 values for reduction of biomass of Pseudokirchneriella	The 96 h LC50 of aluminum to Oncorhynchus mykiss was 7.4 mg of Al/L at pH 6.5	-	The 48-hr LC50 for Ceriodaphnia dubia exposed to Aluminium chloride

	subcapitata in AAP-Medium at pH 6, 7, and 8 were estimated as 20.1, 5.4, and 150.6 µg/L, respectively, for dissolved Al.	and 14.6 mg of Al/L at pH 7.5		increased from 0.72 to greater than 99.6 mg/L with water hardness increasing from 25 to 200 mg/L.
Titanium 7440-32-6	The 72 h EC50 of titanium dioxide to Pseudokirchnerella subcapitata was 61 mg of TiO2/L.	The 96 h LC50 of titanium dioxide to Cyprinodon variegatus was greater than 10,000 mg of TiO2/L. The 96 h LC50 of titanium dioxide to Pimephales promelas was greater than 1,000 mg of TiO2/L .	The 3 h EC50 of titanium dioxide for activated sludge were greater than 1000 mg/L.	The 48 h EC50 of titanium dioxide to Daphnia Magna was greater than 1000 mg of TiO2/L.
Niobium (Columbium) 7440-03-1	-	-	-	-
Tantalum 7440-25-7	-	-	-	-
Hafnium 7440-58-6	The 72 h EC50 of hafnium to Pseudokirchneriella subcapitata was great than 8 ug of Hf/L (100% saturated solution).	The 96 h LC50 of Hafnium dioxide in water to Danio rerio was greater than the solubility limit of 0.007 mg Hf/L .	-	The 48 h EC50 of Hafnium dioxide to Daphnia magna was greater than the solubility limit of 0.007 mg Hf/L.

Persistence and degradability

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Bioaccumulation

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

Chemical Name	RCRA - D Series Wastes
Chromium 7440-47-3	5.0 mg/L regulatory level

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

14. TRANSPORT INFORMATION

DOT Regulated

UN/ID No. 3288

Proper shipping name 3288 - Toxic solid, inorganic, n.o.s. (Nickel/cobalt alloy powder)

Hazard Class 6.1

Packing Group II

Reportable Quantity (RQ) "(RQ)", if quantity with particles smaller than 100 micrometers (0.004 inches) in an individual package equals or exceeds the Reportable Quantity (RQ) of 5000 pounds of chromium.

Special Provisions Follow Emergency Response Guidebook, Guide No. 152, Except for Fire follow Emergency Response Guidebook, Guide No. 170

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

Chemical Name	CAS No.	Weight-%	SARA 313 - Threshold Values %
Nickel - 7440-02-0	7440-02-0	49-68	0.1
Chromium - 7440-47-3	7440-47-3	8-22	1.0
Cobalt - 7440-48-4	7440-48-4	0 - 20	0.1

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)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Nickel 7440-02-0		X	X	
Chromium 7440-47-3		X	X	

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)

Chemical Name	Hazardous Substances RQs
Nickel 7440-02-0	100 lb
Chromium 7440-47-3	5000 lb

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals

Chemical Name	California Proposition 65
Nickel - 7440-02-0	Carcinogen
Cobalt - 7440-48-4	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Nickel 7440-02-0	X	X	X
Chromium 7440-47-3	X	X	X
Cobalt 7440-48-4	X	X	X
Tungsten 7440-33-7	X	X	X
Molybdenum 7439-98-7	X	X	X
Aluminum 7429-90-5	X	X	X
Titanium 7440-32-6	X		
Tantalum 7440-25-7	X	X	X
Hafnium 7440-58-6	X	X	X

U.S. EPA Label Information
EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

NFPA **Health hazards** 2 **Flammability** 0 **Instability** 0 **Physical and Chemical Properties** -

HMIS **Health hazards** 3* **Flammability** 1 **Physical hazards** 0 **Personal protection** X

Chronic Hazard Star Legend ** = Chronic Health Hazard*

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Revision Note
Updated Section 14

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