



# SAFETY DATA SHEET

Issue Date 28-May-2015

Revision Date 27-May-2016

Version 4

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

### Product identifier

**Product Name** Tool Steel

### Other means of identification

**Product Code**

FRP005

**Synonyms**

Tool Steel: NON-MAGNETIC GRADE-9, AL 599 ARMOR PLATE, CRCS 1006, SAE 1006, CRCS 1008-170, SAE 1008, 52100, ATI 200 Non Magnetic, ATI 200N Non Magnetic, TOOL STEEL A2, ROLOY NO. 2, TOOL STEEL A6, TOOL STEEL A7, ATI 521™ ARMOR PLATE, HOT WORK TOOL STEEL H13, ATI K12®, ATI K12®-MIL ARMOR PLATE, TOOL STEEL L6, HIGH SPEED TOOL STEEL MUSTANG, M2, HIGH SPEED TOOL STEEL M3, TOOL STEEL O1, TOOL STEEL O2, OIL HARDENING TOOL STEEL TRUGLIDE, 06, TOOL STEEL SHOCK RESISTING S5, TOOL STEEL SHOCK RESISTING S7, TOOL STEEL - ERG, TOOL STEEL 152, Tool Steel 251, 533, Tool Steel 4335, Tool Steel 4340, 31Cr Mo V, Tool Steel A 25, TOOL STEEL A3, AL TOOL STEEL A8, AL TOOL STEEL A8 MOD, Chipper Knife, TOOL STEEL D7, HOT WORK TOOL STEEL H11, IRON, TOOL STEEL L2 MODIFIED, TOOL STEEL W2, TOOL STEEL CRU-WEAR, Vascowear

### Recommended use of the chemical and restrictions on use

**Recommended Use** Tool steel 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). This product is an article and, as such, does not present a hazard to human health by inhalation or ingestion.

Skin sensitization	Category 1
Carcinogenicity	Category 1B
Specific target organ toxicity (repeated exposure)	Category 2

### Label elements

#### Emergency Overview

**Danger**

#### **Hazard statements**

May cause an allergic skin reaction

May cause cancer

May cause damage to respiratory tract through prolonged or repeated exposure if inhaled



**Appearance** Various massive product forms

**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

If skin irritation or rash occurs: Get medical advice/attention

#### 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, Vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>) affects eyes, skin, respiratory system.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### Synonyms

Tool Steel: NON-MAGNETIC GRADE-9, AL 599 ARMOR PLATE, CRCS 1006, SAE 1006, CRCS 1008-170, SAE 1008, 52100, ATI 200 Non Magnetic, ATI 200N Non Magnetic, TOOL STEEL A2, ROLOY NO. 2, TOOL STEEL A6, TOOL STEEL A7, ATI 521™ ARMOR PLATE, HOT WORK TOOL STEEL H13, ATI K12®, ATI K12®-MIL ARMOR PLATE, TOOL STEEL L6, HIGH SPEED TOOL STEEL MUSTANG, M2, HIGH SPEED TOOL STEEL M3, TOOL STEEL O1, TOOL STEEL O2, OIL HARDENING TOOL STEEL TRUGLIDE, 06, TOOL STEEL SHOCK RESISTING S5, TOOL STEEL SHOCK RESISTING S7, TOOL STEEL - ERG, TOOL STEEL 152, Tool Steel 251, 533, Tool Steel 4335, Tool Steel 4340, 31Cr Mo V, Tool Steel A 25, TOOL STEEL A3, AL TOOL STEEL A8, AL TOOL STEEL A8 MOD, Chipper Knife, TOOL STEEL D7, HOT WORK TOOL STEEL H11, IRON, TOOL STEEL L2 MODIFIED, TOOL STEEL W2, TOOL STEEL CRU-WEAR, Vascowear.

Chemical Name	CAS No.	Weight-%
Iron	7439-89-6	Balance
Manganese	7439-96-5	<12.5
Chromium	7440-47-3	<5.5
Nickel	7440-02-0	<3.5
Molybdenum	7439-98-7	<1.75
Silicon	7440-21-3	<1.5
Vanadium	7440-62-2	<1.2
Cobalt	7440-48-4	<0.5

### 4. FIRST AID MEASURES

#### First aid measures

<b>Eye contact</b>	In the case of particles coming in contact with eyes during processing, treat as with any foreign object.
<b>Skin Contact</b>	In the case of skin irritation or allergic reactions see a physician.
<b>Inhalation</b>	If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.
<b>Ingestion</b>	Not an expected route of exposure.

**Most important symptoms and effects, both acute and delayed**

<b>Symptoms</b>	May cause allergic skin reaction.
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**Indication of any immediate medical attention and special treatment needed**

<b>Note to physicians</b>	Treat symptomatically.
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## 5. FIRE-FIGHTING MEASURES

**Suitable extinguishing media**

Not flammable in the form of this product as distributed, flammable as finely divided particles or pieces resulting from processing of this product. 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** Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer; Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation, Vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>) affects eyes, skin, respiratory system.

**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.

**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

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.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control parameters

#### Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL
Iron 7439-89-6	-	-
Manganese 7439-96-5	TWA: 0.02 mg/m <sup>3</sup> respirable fraction TWA: 0.1 mg/m <sup>3</sup> inhalable fraction TWA: 0.02 mg/m <sup>3</sup> Mn TWA: 0.1 mg/m <sup>3</sup> Mn	(vacated) STEL: 3 mg/m <sup>3</sup> fume (vacated) Ceiling: 5 mg/m <sup>3</sup> Ceiling: 5 mg/m <sup>3</sup> fume Ceiling: 5 mg/m <sup>3</sup> Mn
Chromium 7440-47-3	TWA: 0.5 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup>
Nickel 7440-02-0	TWA: 1.5 mg/m <sup>3</sup> inhalable fraction	TWA: 1 mg/m <sup>3</sup>
Molybdenum 7439-98-7	TWA: 10 mg/m <sup>3</sup> inhalable fraction TWA: 3 mg/m <sup>3</sup> respirable fraction	-
Silicon 7440-21-3	-	TWA: 15 mg/m <sup>3</sup> total dust TWA: 5 mg/m <sup>3</sup> respirable fraction
Vanadium 7440-62-2	-	Ceiling: 0.5 mg/m <sup>3</sup> V <sub>2</sub> O <sub>5</sub> respirable dust Ceiling: 0.1 mg/m <sup>3</sup> V <sub>2</sub> O <sub>5</sub> fume
Cobalt 7440-48-4	TWA: 0.02 mg/m <sup>3</sup> TWA: 0.02 mg/m <sup>3</sup> Co	TWA: 0.1 mg/m <sup>3</sup> dust and fume

### 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

<b>Physical state</b>	Solid	<b>Odor</b>	Odorless
<b>Appearance</b>	Various massive product forms	<b>Odor threshold</b>	Not applicable
<b>Color</b>	metallic, gray or silver		
<b>Property</b>	<b>Values</b>	<b>Remarks • Method</b>	
pH	-		
Melting point/freezing point	2430-2540 °C / 2600-2800 °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:	-		
Lower flammability limit:	-		
Vapor pressure	-	Not applicable	
Vapor density	-	Not applicable	
Specific Gravity	7-9		
Water solubility	Insoluble	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	-
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. Vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>) affects eyes, skin, respiratory system.

<b>11. TOXICOLOGICAL INFORMATION</b>
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**Information on likely routes of exposure****Product Information**

<b>Inhalation</b>	Not an expected route of exposure for product in massive form.
<b>Eye contact</b>	Not an expected route of exposure for product in massive form.
<b>Skin Contact</b>	May cause sensitization by skin contact.
<b>Ingestion</b>	Not an expected route of exposure for product in massive form.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Iron 7439-89-6	98,600 mg/kg bw	-	> 0.25 mg/L
Manganese 7439-96-5	>2000 mg/kg bw	-	>5.14 mg/L
Chromium 7440-47-3	> 3400 mg/kg bw	-	> 5.41 mg/L
Nickel 7440-02-0	> 9000 mg/kg bw	-	> 10.2 mg/L
Molybdenum 7439-98-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.10 mg/L
Silicon 7440-21-3	> 5000 mg/kg bw	> 5000 mg/kg bw	> 2.08 mg/L
Vanadium 7440-62-2	> 2000 mg/kg bw	-	-
Cobalt 7440-48-4	550 mg/kg bw	>2000 mg/kg bw	<0.05 mg/L

**Information on toxicological effects**

<b>Symptoms</b>	May cause sensitization by skin contact. May cause allergy or asthma symptoms or breathing difficulties if inhaled.
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**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

<b>Skin corrosion/irritation</b>	Product not classified.
<b>Serious eye damage/eye irritation</b>	Product not classified.
<b>Sensitization</b>	May cause sensitization by inhalation and skin contact. Cobalt-containing alloys may cause sensitization by inhalation.
<b>Germ cell mutagenicity</b>	Product not classified.
<b>Carcinogenicity</b>	May cause cancer by inhalation.

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

<b>Reproductive toxicity</b>	Product not classified.
<b>STOT - single exposure</b>	Product not classified.
<b>STOT - repeated exposure</b>	May cause disorder and damage to the: Respiratory system.

Aspiration hazard

Product not classified.

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity

This product as shipped is not classified for aquatic toxicity.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
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.
Manganese 7439-96-5	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.
Chromium 7440-47-3	-	-	-	-
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.
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.
Silicon 7440-21-3	The 72 h EC50 of sodium metasilicate pentahydrate to Pseudokirchneriella subcapitata was greater than 250 mg/L.	-	-	-
Vanadium 7440-62-2	The 72 h EC50 of vanadium pentoxide to Desmodesmus subspicatus was 2,907 µg of V/L.	The 96 h LC50 of vanadium pentoxide to Pimephales promelas was 1,850 µg of V/L.	The 3 h EC50 of sodium metavanadate for activated sludge was greater than 100 mg/L.	The 48 h EC50 of sodium vanadate to Daphnia magna was 2,661 µg of V/L.
Cobalt 7440-48-4	The 72 h EC50 of cobalt dichloride to Pseudokirchneriella subcapitata was 144 µg 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.

### Persistence and degradability

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### Bioaccumulation

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### Other adverse effects

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

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** Not regulated

## 15. REGULATORY INFORMATION

### International Inventories

<b>TSCA</b>	Complies
<b>DSL/NDSL</b>	Complies
<b>EINECS/ELINCS</b>	Complies
<b>ENCS</b>	Complies
<b>IECSC</b>	Complies
<b>KECL</b>	Complies
<b>PICCS</b>	Complies
<b>AICS</b>	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: Chromium (Cr)

Chemical Name	CAS No.	Weight-%	SARA 313 - Threshold Values %
Manganese - 7439-96-5	7439-96-5	<12.5	1.0
Chromium - 7440-47-3	7440-47-3	<5.5	1.0
Nickel - 7440-02-0	7440-02-0	<3.5	0.1
Cobalt - 7440-48-4	7440-48-4	<0.5	0.1

#### SARA 311/312 Hazard Categories

<b>Acute health hazard</b>	Yes
<b>Chronic Health Hazard</b>	Yes
<b>Fire hazard</b>	No
<b>Sudden release of pressure hazard</b>	No
<b>Reactive Hazard</b>	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
Chromium 7440-47-3		X	X	
Nickel 7440-02-0		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
Chromium 7440-47-3	5000 lb
Nickel 7440-02-0	100 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
Manganese 7439-96-5	X	X	X
Chromium 7440-47-3	X	X	X
Nickel 7440-02-0	X	X	X
Molybdenum 7439-98-7	X	X	X
Silicon 7440-21-3	X	X	X
Vanadium 7440-62-2	X	X	X
Cobalt 7440-48-4	X	X	X

**U.S. EPA Label Information**

EPA Pesticide Registration Number Not applicable

**16. OTHER INFORMATION**

<b>NFPA</b>	Health hazards 1	Flammability 0	Instability 0	Physical and Chemical Properties -
<b>HMIS</b>	Health hazards 2*	Flammability 0	Physical hazards 0	Personal protection X
<i>Chronic Hazard Star Legend                      * = Chronic Health Hazard</i>				

Issue Date 28-May-2015

Revision Date 27-May-2016

**Revision Note**

Updated Section(s): 1, 3, 7

**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](http://ATImetals.com)