



**PRECISION  
SPECIALTY METALS**  
A Worthington Industries Company

**PRECISION SPECIALTY METALS, INC.**

**Material Safety Data Sheet  
for  
Stainless Steel**

November 2006

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**Section I - Product/Company Identification**

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Manufacturer's name and address:	Precision Specialty Metals, Inc. 3301 Medford Street Los Angeles, CA 90063
Telephone Number:	(323) 475-3200
Chemical Name and Synonyms:	Stainless Steel
Trade Name and Synonyms:	Stainless Steel 200, 300, 400 Series, 17-7, A286, And 21-6-9

## SECTION II- COMPOSITION/INGREDIENTS

Component	CAS #	% Weight <sup>1</sup>	OSHA PEL-TWA (mg/M <sup>3</sup> )	ACGIH TLV-TWA (mg/M <sup>3</sup> )
Iron [Iron oxide] <u>ALLOYING ELEMENTS</u>	(Fe) 7439-89-6	60-88	5 [fume]	5; A4 <sup>2</sup> [dust & fume]
Chromium <sup>3</sup> [metal]	(Cr) 7440-47-3	10-30	0.5 Metal	0.5; A4 [metal]
Nickel <sup>3</sup> [metal]	(Ni) 7440-02-0	0-27	1	1.5, A5
Manganese <sup>3</sup> [elemental & inorganic cpds]	(Mn) 7439-96-5	0-10	1 C5 <sup>4</sup> [fume]	0.2
Molybdenum	(Mo) 7439-98-7	<8	10 [insoluble cpds, total dust] 5 [soluble cpds]	10 [insoluble cpds] Nic-3 5[soluble cpds]Nic 0.5A3
Copper <sup>3</sup>	(Cu) 7440-50-8	<6	0.1 [fume] 1 [dust]	0.2 [fume] 1 [dust and mists]
Titanium <sup>3</sup> [titanium dioxide]	(Ti) 13463-67-7	<6	10 [total dust]	10; A4
Carbon	(C) 7440-44-0	<2	N/A	N/A
Aluminum <sup>3</sup>	(Al) 7429-90-5	<2	10 [total dust] 5 [resp. fraction]	10 [metal oxide] 5 [fume]
Phosphorous [yellow]	(P) 7723-14-0	<2	0.1	0.1
Sulfur [sulfur dioxide]	(S) 7746-09-5	<.2	5	5.2, 13 STEL; A4
Silicon	(Si) 7440-21-3	<2	10 [total dust] 5 [resp. fraction]	10
Niobium	(Nb) 7440-03-1	<2	N/A	N/A
Tantalum [metal & oxide]	(Ta) 7440-25-7	<2	5 [dust] & (oxide)	5 [dusts]
Tin [Metal]	(Sn) 7440-31-5	<2	2	2
Cobalt <sup>3</sup> [elemental & inorganic cpds]	(Co) 7440-48-4	<2	0.05 [dust & fume]	0.02;A3 <sup>5</sup>
Lead <sup>3</sup> [elemental & inorganic cpds]	(Pb) 7439-92-1	<.1	0.05	0.05; A3 <sup>5</sup>

<sup>1</sup> Percent of alloying element varies with grade.

<sup>2</sup> A4= Not classifiable as a human carcinogen.

<sup>3</sup> SARA, Title III, Section 313 Toxic Chemical.

<sup>4</sup> C=Ceiling limit not to be exceeded.

<sup>5</sup> A3=Animal carcinogen.

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### Section III - Hazard Information

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Short term exposure to fumes/dust generated from stainless steel use and processing may produce irritation of the eyes and respiratory system. Inhalation of high concentrations of freshly-formed oxide fumes of iron, manganese and copper may cause metal fume fever, characterized by a metallic taste in the mouth, dryness and irritation of the throat and influenza-like symptoms.

Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly have a synergistic effect and increase the risk of lung cancer development in workers exposed to pulmonary carcinogens.

Chromium and nickel and their compounds are listed in NTP's 7th Annual Report on Carcinogens. Exposure to dust and fumes can cause sensitization dermatitis, inflammation and/or ulceration of upper respiratory tract, and cancer of nasal passages and lungs.

NTP classifies nickel metal and certain nickel compounds as "reasonably anticipated to be carcinogens." IARC classifies nickel metal as a possible human carcinogen (Group 2B) and certain nickel compounds as known human carcinogens (Group 1).

NTP reports that there is inadequate evidence for the carcinogenicity of chromium metal and most trivalent chromium (CrIII) compounds in humans and experimental animals. However, NTP classifies certain hexavalent chromium compounds as "known to be carcinogens." Similarly, IARC indicates that chromium metal and trivalent chromium compounds are not classifiable as human carcinogens (Group 3), but that certain hexavalent chromium compounds are known carcinogens (Group 1). Since the hexavalent form of chromium may be produced during welding, heat treating and alkaline descaling processes, an industrial hygiene evaluation of such processes should be conducted to determine if exposure to hexavalent chromium is present.

Finally, this product may contain trace amounts of other heavy metals including arsenic, cadmium, cobalt and lead, recognized by NTP, OSHA or IARC as carcinogens.

See also Section XIV, "Additional Regulatory Information," below.

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### Section IV - First Aid

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Eyes: If dust/fumes get in eyes, immediately flush with large amounts of running water for several minutes. Seek prompt medical attention.

Skin: If dust gets on skin, wash contaminated area with soap and water. Remove and wash contaminated clothing. If rash or irritation persists, seek medical attention.

Inhalation: If inhalation of dust/fumes occurs, immediately remove victim from the adverse environment to fresh air and seek medical attention. If breathing has stopped, certified individuals should perform CPR. Keep affected person warm and at rest.

Ingestion: If significant amounts of metal are ingested, seek medical attention.

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**Section V - Fire and Explosion Information**

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Flash point.....Not applicable

Lower Explosive Limit .....Not applicable

Upper Explosive Limit.....Not applicable

Auto ignition temperature .....Not applicable

Flammability Classification .....Not applicable

Flammable Limits .....Not applicable

Hazardous combustion products: Not applicable for solid formed alloy. Toxic metal and metallic oxide fumes may be evolved from fires involving finely divided alloy.

Unusual fire and explosion hazards: This solid formed alloy does not constitute a fire or explosion hazard. However, finely divided, suspended particulates may present a fire and explosion hazard in the presence of an ignition source. In addition, applied coatings may be combustible. For fires involving coated alloys, consult the appropriate coating MSDS.

Finely divided alloy (e.g. dust, shavings, etc.) may be combustible; may be ignited by heat, sparks or flames; and may burn rapidly with flare-burning effect. Fire may produce irritating or poisonous gases. High concentrations of airborne dust in an enclosed area can explode or burn if exposed to a source of ignition. Care should be taken to avoid the generation of airborne dust. Use of water on finely divided alloy may cause explosive hydrogen gas and heat to be evolved.

Extinguishing media: For solid formed alloy, as appropriate for surrounding fire. A fire involving finely divided alloy should be treated as Class D combustible metal fire. Fire should be extinguished by a properly trained and experienced firefighter. Proper care should be taken in applying extinguishing agent and in allowing to burn itself out.

Special fire fighting equipment: For solid formed alloy, as appropriate for surrounding fire. Positive pressure SCBA and structural firefighter's protective clothing should be used at a minimum for surrounding fire.

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## Section VI - Accidental Spill Measures

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Minimal problems with spills of this product would be expected to occur because of its solid form. If there is a spill of alloy dust, the following precautions should be taken:

- Shut off ignition sources; no flares, smoking or flames should be in or near hazard area.
- Do not touch or walk through spilled material. Clean up using methods which avoid dust generation.
- Compressed air should not be used to clean up spills.
- During cleanup, skin and eye contact and inhalation of dust should be avoided as much as possible.
- Provide local exhaust or dilution ventilation as required.

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## Section VII - Exposure Controls/Personal Protection

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Skin protection: Use appropriate protective clothing, such as welder's aprons and gloves, when welding or burning. Use clothing and equipment, as required by applicable federal, state and local occupational safety and health laws

Respiratory protection: NIOSH/MSHA-approved dust/mist/fume respirators should be used during welding, burning, and grinding operations, if applicable exposure limits are exceeded.

Eye protection: Safety glasses should always be worn when grinding or cutting; face shields should be worn when welding or burning.

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### Section VIII - Physical And Chemical Properties

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Appearance .....	Gray with metallic luster
Odor .....	No distinct odor
Physical state.....	Solid
pH (in water) (ASTM D 1293-95) .....	Not applicable
Solubility in water.....	Not applicable
Vapor pressure .....	Not applicable
Vapor density .....	Not applicable
Boiling point .....	Not applicable (i.e., >1000°C)
Melting point.....	(Base Metal) > 1600°F
Specific gravity (H <sub>2</sub> O = 1.0).....	Approximately 7
Evaporation rate .....	Not applicable

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### Section IX - Stability And Reactivity

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Stability: .....	Stable
Conditions to avoid:.....	None
Incompatibility: .....	Reacts with strong acids to produce hydrogen gas
Hazardous decomposition:.....	Will not occur
Hazardous polymerization: .....	Will not occur

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### Section X - Additional Toxicological information

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For a description of available, more detailed toxicological information, contact the supplier or manufacturer.

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## Section XI - Ecological Information

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Not applicable for solid alloy in its as-shipped form. No information has been found on specific alloy as a whole in order to determine its effect if released into the environment in finely divided form. It is believed that finely divided alloy, based on its components, will be hazardous to fish, animals, plants and the environment if released, the degree of which would depend on the particle size and quantity released. In addition, if particles are small enough, alloy may be ingested by wildlife, with possible toxic effects occurring.

The solid alloy is not expected to migrate easily into soil or groundwater based upon its insoluble form. However, finely-divided alloy can become mobile in water and contaminate soil and groundwater, if particles are small enough. Finely-divided alloy may persist in the environment for long periods, based upon the corrosion resistant, insoluble, and non-biodegradable properties of the alloy. In addition, heavy metals may contaminate the food chain and ultimately be consumed by humans.

Over time, steel will react with oxygen to form metallic oxides, the rate of which depends on various conditions. Iron oxidizes most rapidly in moist air. Metallic particulate discharged to a POTW may pass-through or contaminate sewage sludge, may interfere with the treatment system process, and may be non-compliant with a POTW permit or other regulations.

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## Section XII - Transportation Data

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Hazardous materials description/proper shipping name:

Not applicable for solid formed alloy product.

Hazard class:

Not applicable for solid formed alloy product.

Identification number:

Not applicable for solid formed alloy product.

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### **Section XIII - Disposal**

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Product dusts from use and processing may be classified as a hazardous waste, depending on various properties of the dust (e.g. toxicity, solubility, flammability), which are defined further within 40 CFR Part 261 and other federal, state and/or local laws. Solid waste generated from product use and processing should be classified by a competent environmental professional and disposed, processed or recycled in accordance with all applicable federal state and local laws.

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### **Section XIV - Additional Regulatory Information**

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#### **Sara Title III Hazard Categorization:**

Product (dust and fume) is categorized as an immediate (acute) health hazard and a delayed (chronic) health hazard as defined by 40 CFR 370.

#### **Sara Title III Section 302 Extremely Hazardous Substances (EHSs):**

No components are listed as extremely hazardous substances.

#### **California Proposition 65:**

This product contains chromium and nickel metals/compounds known to the State of California to cause cancer. This product may contain trace amounts of other heavy metals, including arsenic, cadmium, cobalt and lead, known to the State of California to cause cancer, birth defects or other reproductive harm.

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### **Section XV - User's Responsibility**

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While the information provided in this MSDS is believed to provide a useful summary of the hazards of stainless steel as it is commonly used, the MSDS cannot anticipate and provide all of the information that might be needed in every situation the user may experience. Each aspect of your operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained in this MSDS should be provided to your employees or customers. It is your responsibility to use this information to develop appropriate work practice guidelines and employee instructional programs for your operation. Professional industrial hygiene and/or safety engineering advice should be sought to assist you in this regard.

The information provided herein was believed by Precision Specialty Metals, Inc. to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of this product, and to determine the suitability of the product for its intended use.



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### Section XVI- Abbreviations

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ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
EST	Eastern Standard Time
ft <sup>3</sup>	Cubic foot
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
m <sup>3</sup>	Cubic meter
mg	Milligram
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association
N/A	Not Applicable
NIA	No Information Available
NIF	No Information Found
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PNOR	Particulate Not Otherwise Regulated
PNOC	Particulate Not Otherwise Classified
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
SCBA	Self-contained Breathing Apparatus
STEL	Short-term Exposure Limit
TLVs	Threshold Limit Values
TWA	Time-weighted Average