

Material Safety Data Sheet

SECTION 1 - SUBSTANCE IDENTIFICATION

ALLOY NAME: PREMIUM
DESCRIPTION: Color: WHITE Type: PARTIAL

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

| METAL | % | SYMBOL | CAS NO | ACGIH 8 HR TLV | OSHA 8 HR PEL |
|------------|------|--------|-----------|-----------------------|--------------------------------------------------------------------------|
| COBALT | 63.6 | Co | 7440-48-4 | 0,05mg/m ³ | No data |
| SILICON | x | Si | 7440-21-3 | 10 mg/m ³ | 10 mg/m ³ (total dust) 5 mg/m ³ (respiratory dust) |
| CARBON | x | C | 7440-44-0 | 3.5 mg/m ³ | 3.5 mg/m ³ |
| MOLYBDENUM | 6 | Mo | 7439-98-7 | Not established | Not established |
| CHROMIUM | 28.5 | Cr | 7440-47-3 | 0.5 mg/m ³ | 0,5 mg/m ³ CRVI compounds: Ceiling=0,1mg/m ³ |
| MANGANESE | x | Mn | 7439-96-5 | 5 mg/m ³ | 5 mg/m ³ |

Note: % values are in weight percent and reflect nominal composition.

Note: 'x' denotes a content of less than one percent

SECTION 3- HAZARDS IDENTIFICATION

EYES: Contact with eyes may cause severe irritation and possible eye burns.
SKIN: May cause severe irritation and possible burns.
INGESTION: May cause gastrointestinal irritation with nausea, vomiting, and diarrhea.
INHALATION: May cause irritation and burns to the respiratory tract.
NOTE: Exposure levels for elements in this alloy are listed in SECTION 2. The following health data is for specific elements:
CARBON: Dust causes irritation and is possibly allergenic. Cases of pulmonary fibrosis and emphysema have resulted from prolonged inhalation of dust.
CHROMIUM: May cause histological fibrosis of the lungs. There are some references to chromium causing lung and/or nasal cancer. In addition, chromium metal has

caused tumors in laboratory animals via implant and intravenous routes. Chromium is listed as a Confirmed Human Carcinogen by the ACGIH (American Conference of Governmental Industrial Hygienists).

MANGANESE

Dust inhalation may cause tightness and pain in chest, coughing, and difficulty in breathing. Inhalation of dust may cause headache, nausea, vomiting, shortness of breath, or blurred vision. Dust may irritate skin or eyes. Ingestion may cause central nervous system depression. Prolonged inhalation of Manganese in the form of its inorganic compounds may cause Manganism. Target organs: Respiratory system, central nervous system, blood, kidneys. Medical conditions generally aggravated by exposure: Chronic respiratory disease, liver or kidney disorders, psychiatric disorders, alcoholism, and nerve system disorders.

MOLYBDENUM

Chronic inhalation of molybdenum compounds by experimental animals has caused appetite and weight loss, diarrhea, muscular incoordination, hair loss and gout. Excessive intake of molybdenum may interfere with copper metabolism.

SECTION 4 - FIRST AID MEASURES

EYE CONTACT : Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids.

SKIN CONTACT: Scrub skin thoroughly with soap and water.

INGESTION: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Induce vomiting. **Never give anything by mouth to an unconscious person. Get medical aid.

INHALATION: Remove affected person to fresh air and assist with additional oxygen if necessary. Get first aid if other symptoms appear.

SECTION 5 - FIREFIGHTING MEASURE

This material is fire and explosion resistant. Heating Beyond the melting range may generate fumes which are not flammable.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

GENERAL INFORMATION: Use proper personal protective equipment as described in section 8.

SECTION 7 - HANDLING AND STORAGE

Avoid inhalation of fumes while melting and dust while grinding. Wash hands thoroughly before eating or smoking to avoid ingestion.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTIONS

RESPIRATORY: Provide general ventilation and local exhaust to keep levels below the TLV stated in SECTION 8. Wear a NIOSH approved respirator for dust exceeding the TLVs.

HAND: Latex gloves are recommended while grinding, heat resistant gloves should be worn while handling hot metals or molds.

EYE PROTECTION: Wear eye protection suitable to each individual operation.

OTHER: Wear apron, lab coat or other protective clothing.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: WHITE
Odor: Not Applicable
pH: Not Applicable
Boiling Point: Not Applicable
Melting Range: 1300-1370 °C
Flash Point: Not Applicable
Flammability: Not Applicable
Autoflammability: Not Applicable
Explosive Properties: Not Applicable
Oxidizing Properties: Not Applicable
Vapor Pressure: Not Applicable
Solubility(Water/Fat): Insoluble

SECTION 10 - STABILITY AND REACTIVITY

At ordinary and high (below the melting range) temperatures, the material oxidizes but is stable. At very high temperatures the alloy produces fumes.

SECTION 11 - TOXICOLOGICAL INFORMATION

No specific instructions.

SECTION 12 - ECOLOGICAL INFORMATION

This is an environmentally friendly material. With proper dust collecting equipment, 100% of this alloy can be recycled.

SECTION 13 - DISPOSAL CONSIDERATIONS

Whenever possible, recover dust because it has economic value.

SECTION 14 - TRANSPORT INFORMATION

No specific instructions.

SECTION 15 - REGULATORY INFORMATION

No specific instructions.

SECTION 16 - OTHER INFORMATION

The information and recommendations set forth herein (hereinafter "information") are presented in good faith and believed to be correct as of the date hereof. However, IMPERIAL TRADING, LTD. makes no representations as to the completeness of accuracy thereof and information is supplied upon the condition that the persons receiving the above material will make their own determination as to its suitability for their purposes prior to use. In no event will IMPERIAL TRADING, LTD. be responsible for damages

of any nature whatsoever resulting from the use of or reliance upon information. No representations or warranties, either expressed or implied, or merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which information refers.

MSDS Date: = 14-Apr-2009

Specification Sheet

PREMIUM

Color: WHITE Type: PARTIAL ADA Classification: Cobalt BASE (CPB) PGM: 0%

Metal Content %

| Mn | Co | Si | C | Mo | Cr |
|----|------|----|---|----|------|
| x | 63.6 | x | x | 6 | 28.5 |

'x' denotes a content of less than one percent.

Thermal Properties

| Melting Range | Casting Temperature |
|---------------|---------------------|
| 2370-2460 °F | 2750 °F |
| 1300-1370 °C | 1510 °C |

Mechanical Properties

| Vickers Hardness (VHN) | | Yield Strength (0.2% Offset) | | Modulus of Elasticity (GPa) | Elongation (%) | | Density (g/cm ³) |
|---------------------------|------|---------------------------------|-------|--------------------------------|-------------------|------|---------------------------------|
| Soft | Hard | Soft | Hard | | Soft | Hard | |
| — | — | 87,000 psi | — psi | 200 | 9 | — | 8.3 |
| | | 600 MPa | — MPa | | | | |

PROCESS

INSTRUCTIONS FOR USE

Waxing

Commercially made plastic patterns are available for most of the framework.

Spruing

Sprue through a hole centrally located in the mold. Location and amount of sprues are at discretion of lab technician. It is advisable to join together tips of the clasp to help prevent incomplete casting.

Investing

After wax model is completed, invest the ring with partial investment following manufacturer's recommended instructions. If you are using a rapid-fire investment, follow the manufacturer's instructions.

Recommended cycle:

Burnout

1. Start-up at 750-850 °F (400-455 °C)
2. After 1 hour increase to 2000(1095)

3. Hold at 2000(1095) for 1 hour.
4. Use spacers under the ring.

Note: The process above is recommended. Each investment is unique, please review investment manufacture instructions. ...

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| Casting | Use induction or torch casting. When using the oxy-acetylene torch, equipped with no. 4 or no. 6 tip, adjust the flame with inner core between ½ inch and 1 inch (12mm - 24mm) long. Do not hold torch too close to the alloy. Cast when the metal slumps. Do not overheat the alloy. Do not pull the torch away from the metal when casting. After casting, allow the ring to bench cool. |
| Finishing | Sandblast casting thoroughly to remove all evidence of investment particles and oxide surface. Finish with appropriate stones and Electro-polish as per manufacturer's recommended instructions. |
| Soldering | Use: Co/Cr Pre |

16-Apr-2009