**FIVE TROY OUNCES (155.5 gm)**

**MELTING RANGE:** 1155–1250°C (2110–2282°F)

**CASTING TEMPERATURE:** 1343°C (2450°F)

**YIELD STRENGTH (0.2% OFFSET):** 116,300 psi, 800 MPa

**ULTIMATE TENSILE STRENGTH:** 164,500 psi, 1135 MPa

**MODULUS OF ELASTICITY:** 31.71 x 10^6 psi, 218.65 GPa

**ELONGATION (% 0.5° GL):** 15%

**CTE (25-500°C):** 14.06 x 10^-6 K^-1

**CTE (25-600°C):** 14.3 x 10^-6 K^-1

**VICKER'S HARDNESS:** 360

**SPECIFIC GRAVITY:** 7.75 gm/cm³

**PRE-SOLDER:** NNP, JNP, PNP

**POST SOLDER:** LF, WLF

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**NICKEL-CHROMIUM CERAMIC ALLOY CONTAINING BERYLLIUM**

**Nickel (Ni):** 76%; **Chromium (Cr):** 14%; **Molybdenum (Mo):** 6%; **Aluminum (Al):** 2.5%; **Beryllium (Be):** 1.99%; Balance: Ti, Co (max. percentages)

**ADA/ANSI Spec. 38**

**ISO 9693**

**IMPORTANT:** Please use a NIOSH/MSHA-approved high efficiency cartridge respirator (or supplied air mask) at all times where inhalation exposure to the dusts or vapors of this product is possible. The use of a localized exhaust hood, vent and bench suction and/or other engineering controls for the control of airborne dust and vapors is also recommended.

**WARNING:** This product contains substances known to the state of California to cause cancer (Calif. Prop. 65).

**CAUTION:** As with all nickel containing alloys, the use of this alloy should be avoided by persons with known nickel sensitivity. Also, the airborne dust from grinding metal such as beryllium as well as acrylic and porcelain can be toxic and should not be inhaled. This alloy contains less than 2% beryllium and should be melted, ground and polished with adequate ventilation only.
MATERIAL SAFETY DATA SHEET

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION
PENTRON® Laboratory Technologies, LLC
53 North Plains Industrial Road, Wallingford, CT 06492
203.265.7397 or 800.243.3100
PRODUCT NAME: Rexillium III®
Alloy

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS
Nickel (Ni), Balance; Chromium (Cr), 12–14%; Aluminum (Al), 2–3%; Molybdenum (Mo), 4–6%; Cobalt (Co), 0.15–0.5%; Beryllium (Be), 1.75–1.99%; Titanium (Ti), 0.15–0.5%

SECTION 3: HAZARD IDENTIFICATION
For pure Nickel & Chromium: 8 Hr. TLV: 1 mg/m3
For pure Molybdenum: 8 Hr. TLV: 5 mg/m3
For pure Beryllium: 8 Hr. TLV: 2 µg/m3
Ceiling Level: 5 µg/m3; Max. for 30 min: 25 µg/m3
This alloy contains nickel and beryllium. University studies on Rexillium III® alloy have demonstrated biocompatibility & clinical safety. Individual components and some of their compounds, in dust and fume form, are suspected causes of progressive lung damage and disease. Symptoms include weight loss and/or difficulty in breathing. Persons with impaired pulmonary function, airway disease or conditions, such as asthma, emphysema, chronic bronchitis, etc., may incur further impairment if excessive concentration of dust or fumes are inhaled. If prior damage or disease to the neurologic (meninges) circulatory, hematologic (blood), or urinary (kidney) systems has occurred, proper screening or exam ination should be conducted on individuals who may be exposed for further risk where handling and use of this material may cause excessive exposure.

SECTION 4: FIRST AID MEASURES
EYE CONTACT: Flush eyes thoroughly with running water, even under eyelid. Consult an ophthalmologist.
SKIN CONTACT: Flush skin and scrub thoroughly with soap and water. Consult a physician if irritation persists.
INHALATION: Remove person to fresh air, assist breathing with additional oxygen, if necessary. Consult a physician.

SECTION 5: FIRE FIGHTING MEASURES
This alloy is fire & explosion resistant.

SECTION 6: ACCIDENTAL RELEASE MEASURES
Remove dust by vacuuming or wet sweeping to prevent powdering in the air. Water NIOSH-approved protective clothing. Use contained immediate disposal. No special precautions are required for bulk (solid) shapes, such as ingots.

SECTION 7: HANDLING AND STORAGE
Remove dust by vacuuming or wet sweeping to prevent powdering in the air. Water NIOSH-approved protective clothing. Use contained immediate disposal. No special precautions are required for bulk (solid) shapes, such as ingots.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION
General, local ventilation and exhaust filtration (HEPA filters) should be employed. Respirator, goggles, gloves, coveralls or NIOSH-approved protective clothing should be used. Environmental surveillance should be done by taking air samples near breathing zone, work area and department. Medical surveillance such as periodic chest x-ray and/or lung function test should be done to monitor the potential effect of dust or fume exposure.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES
MELTING RANGE: 2110–2280°F
SPECIFIC GRAVITY: 7.75 gm/cc
SOLUBILITY IN WATER: Insoluble
APPEARANCE & ODOR: Platinum color, odorless
INGOT WEIGHT: 5–8 gms (approximately)

SECTION 10: STABILITY AND REACTIVITY
At ordinary and at high temperatures, this alloy oxidizes but remains stable. This alloy may produce fumes at very high temperatures.

SECTION 11: TOXICOLOGICAL INFORMATION
Not Available

SECTION 12: ECOLOGICAL INFORMATION
Not Available

SECTION 13: DISPOSAL CONSIDERATIONS
Use proper landfill disposal in accordance with local, state and federal regulations.

SECTION 14: TRANSPORT INFORMATION
Not Available

SECTION 15: REGULATORY INFORMATION
Federal law restricts this device for sale by or on the order of a dentist.

SECTION 16: OTHER INFORMATION
Avoid inhalation of fumes & dust. Avoid skin contact. Wear NIOSH-approved protective clothing. Use containerized disposal. No special precautions are required for bulk (solid) shapes, such as ingots.

SECTION 17: TECHNIQUE FOR REXILLIUM III® ALLOY
WAXING:
The techniques are similar to those used for other ceramic alloys. The walls of the pattern should be a minimum thickness of 0.3 mm when waxed.
SPRUING:
The direct method of spruing is to be used for single units. The indirect method is recommended for multiple units.
INVESTING:
Use of a phosphate-bonded investment such as Whip Mix® Ceramigold or Hi-Temp Investment is recommended. The pattern should be covered by no more than 1/4" of investment. Use straight liquid for full expansion as recommended by manufacturer. One layer of ring liner is recommended.
BURNOUT:
After bench setting, place the ring in a cold burnout furnace and raise the temperature to 1600°F (870°C). Heat soak at 1600°F for one hour.
MELTING AND CASTING:
Use of an induction casting machine or a gas/oxygen torch with a multi-orifice tip is recommended. (A Harris 16-S Torch with a #1390 H multi-orifice tip is a typical one). Do not use an acetylene torch or a graphite crucible. Keep the torch moving in a rotating motion, taking care to heat all the metal at an even rate. Oxides will form on each ingot. The individual ingots will not flow together to form a single mass. Place the casting ring in position when the alloy starts to slump or sag. The alloy is ready to cast when the dark shadow disappears, the ingot loses shape and the pressure of the flame causes the molten alloy inside the crucible to move. Bench cool for five minutes and quench. This alloy does not react with the crucible and may leave a thin film of metal slag in the crucible which can be easily removed after a short interval of cooling. Buttons and spools should be properly cleaned and may be reused with the addition of 50% new alloy.
PREPARATION AND FRAMEWORK:
Follow the same procedure as for precious ceramic alloys, using non-contaminating stones. Air-abrade the metal where the porcelain is to be applied, with a 50 micron nozzle and an ultrasonic using distilled water for about ten minutes. Remove from distilled water and dry completely. Degas from 1200°F (649°C) to 1825°F (996°C) under vacuum. Remove from furnace and bench cool. Adjust the hold time at 1825°F to obtain proper oxide.
PORCELAIN APPLICATION:
Follow the procedures recommended by the porcelain manufacturer.

*Whip Mix® is a registered trademark of Whip Mix Corporation.