MEDICAL GRADE MATERIALS & COMPONENTS
High Purity Precious and Non-Precious Metals for Medical Device Manufacturing

The Prince & Izant Companies

12999 Plaza Drive, Cleveland, OH 44130 | Local: +1 216.362.7000 | Toll Free: +1 800.634.0437
nutecmed.com | princeizant.com

Noblesville, Indiana - Shanghai, China - Tainan, Taiwan - Erlangen, Germany
### MEDICAL PRODUCTS AT A GLANCE

- **Page 2** Wire Products: Pt/W, Pt, Pt/Ir, Pd/Ir, Pt/Ni
- **Page 3** Strip/Ribbon/Foil Products: Pt/Ir, Pt, Other Materials
- **Page 4** Rod Products: Pt/Ir, Pt
- **Page 4** Marker Bands/Ring Electrodes/Tubing
- **Page 5** MedBraze™ Alloys: Gold Brazing Alloys
- **Page 6** MedBraze™ Alloys: Silver Brazing Alloys
- **Page 6** Gold and Silver Brazing Paste
- **Page 7** Value Added Products
- **Page 7** Scrap Recovery Process
- **Page 8** Product Analysis Capabilities

### Your High Purity Precious and Non Precious Materials Partner

<table>
<thead>
<tr>
<th>Customer Needs</th>
<th>NuTEC Medical Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitive Pricing</td>
<td>A Comprehensive Material Offerings</td>
</tr>
<tr>
<td>Inventory Availability</td>
<td>D Custom Stocking Programs: Kanban Support, Consignment, Localized Stocking</td>
</tr>
<tr>
<td>Cost-Out Support</td>
<td>V Continuous Improvement Programs Tailored to Customer Needs</td>
</tr>
<tr>
<td>Net Pricing Models</td>
<td>O Custom Metal Recovery Models Available</td>
</tr>
<tr>
<td>Product Validation</td>
<td>C Materials Selection and Design Support</td>
</tr>
<tr>
<td>Design/Technical Support</td>
<td>A Comprehensive Analytical Lab Capabilities</td>
</tr>
<tr>
<td>Purchasing Flexibility</td>
<td>C Various Programs Available to Maximize Purchasing Efficiency</td>
</tr>
<tr>
<td>Packaging Support</td>
<td>Y Custom Packaging</td>
</tr>
<tr>
<td>Reliable Customer Service</td>
<td>Dedicated Sales and CSR Rep, Website Live Chat Support</td>
</tr>
</tbody>
</table>

...Truly Unique
Customer Experience
PT92/W8 (per Pt spec)

Tungsten is an effective hardening element for Pt. Pt-W alloys are used in biomedical applications. Pt-W microcoils can also be used in various neuromodulation devices as well as vascular/intravascular applications.

**Details of Pt92/W8 Wire**

- Material can be thermally and mechanically processed to meet tensile and elongation parameters
- Spools are labeled with net and tare weight in desired unit of measure
- Material characterization: chemical, mechanical and dimensional
- Custom packaging and stocking programs available

**Other available alloys:**

- Pt95/Ir5
- Pt90/Ir10
- Pt85/Ir15
- Pt80/Ir20
- Pt75/Ir25
- Pt70/Ir30

*Custom PGM Alloy Systems for Temperature Sensing Applications are available*
Pt90/Ir10 (per ASTM B684)

Platinum alloys containing 10-30% Iridium are commonly used in electro-medical applications requiring a strong, radiopaque non corrosive material with low electrical resistance.

**Strip / Ribbon / Foil**

Strip/ribbon/foil medical products are used in the manufacturing of high-precision metal stampings found in various implantable medical devices and components such as electrodes, micro-contacts and stent markers.

**Application Specific Physical Properties**

- Tensile Strength
- Elongation
- Camber
- Flatness
- Hardness

**Other Available Alloys:**
Pt85/Ir15
Pt80/Ir20
Pt75/Ir25
Pt99.95-99.99%

Other Materials such as Pd, Au, Ni, Ti, W, Cu, Ag, SS

**STRIP DIMENSION RANGES**

<table>
<thead>
<tr>
<th></th>
<th>Smallest</th>
<th>Largest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.0005</td>
<td>0.250</td>
</tr>
<tr>
<td></td>
<td>(mm)</td>
<td>(mm)</td>
</tr>
<tr>
<td>Width inches</td>
<td>0.004</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>(mm)</td>
<td>(mm)</td>
</tr>
<tr>
<td></td>
<td>0.1016</td>
<td>304.8</td>
</tr>
</tbody>
</table>

Various Tolerances Available
Rod

- Precious Metal rods are often used to manufacture machined and micro-machined components for implantable devices as well as other intravascular therapies.

- Roundness
- Tensile Strength
- Elongation

Common Rod Dimensions

<table>
<thead>
<tr>
<th></th>
<th>Smallest</th>
<th>Largest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter inches (mm)</td>
<td>0.012 (0.3048)</td>
<td>0.250 (6.35)</td>
</tr>
<tr>
<td>Length inches (mm)</td>
<td>6 (152.4)</td>
<td>72 (1828.8)</td>
</tr>
</tbody>
</table>

Custom diameters and lengths available

Marker Bands / Ring Electrodes / Tubing

- Marker bands/ring electrodes are available “off the shelf” for your radiopaque applications. Common applications include radiopaque marking, ring electrodes, cardiac rhythm management devices, stents and angioplasty.

- Polished surface finish when required
- Custom packaging/labeling solutions
- Complete lot traceability
- Complete chemical analysis

Common Marker Band Dimensions

<table>
<thead>
<tr>
<th></th>
<th>Smallest</th>
<th>Common</th>
<th>Largest</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD inches (mm)</td>
<td>0.009</td>
<td>0.0248</td>
<td>0.0787</td>
</tr>
<tr>
<td></td>
<td>(0.228)</td>
<td>(0.630)</td>
<td>(1.998)</td>
</tr>
<tr>
<td>ID inches (mm)</td>
<td>0.005</td>
<td>0.022</td>
<td>0.0709</td>
</tr>
<tr>
<td></td>
<td>(0.127)</td>
<td>(0.559)</td>
<td>(1.80)</td>
</tr>
</tbody>
</table>
MedBraze™ Medical Brazing Alloys

MedBraze™ products are offered in a variety of forms and can be used in the brazing of medical diagnostic equipment, surgical instruments, orthodontic applications and implantable devices.

Commonly Used Medical Braze Alloys, Forms and Applications

- Gold and Gold Bearing Alloys
- Palladium Brazing Alloys
- Silver Brazing Alloys
- Vacuum Grade Alloys available
- Primary Forms Offered: wire, rod, strip, rings, paste, stampings, preforms and custom preforms

Common Applications:

- Implantable medical devices
- Diagnostic equipment
- Orthodontic applications
- Surgical tools

Gold Brazing Alloys

<table>
<thead>
<tr>
<th>Gold Brazing Alloys</th>
<th>AWS</th>
<th>Composition</th>
<th>Solidus C (F)</th>
<th>Liquidus C (F)</th>
<th>Common Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIOroTM</td>
<td></td>
<td>99.99Au</td>
<td>1063 (1945)</td>
<td>1063 (1945)</td>
<td>cardiac monitoring, electro-medical, feedthroughs</td>
</tr>
<tr>
<td>GB8218</td>
<td>BVAu-4</td>
<td>82Au / 18Ni</td>
<td>949 (1740)</td>
<td>949 (1740)</td>
<td>dental/orthodontics</td>
</tr>
<tr>
<td>GB8020</td>
<td>BVAu-2</td>
<td>80Au / 20Cu</td>
<td>891 (1635)</td>
<td>891 (1635)</td>
<td>electro-medical, endoscopes</td>
</tr>
<tr>
<td>GB5050</td>
<td>BVAu-10</td>
<td>50Au / 50Cu</td>
<td>955 (1751)</td>
<td>970 (1778)</td>
<td>electro-medical, diagnostic equipment</td>
</tr>
<tr>
<td>GB3565</td>
<td></td>
<td>35Au / 65Cu</td>
<td>988 (1810)</td>
<td>1010 (1850)</td>
<td>diagnostic equipment, x-ray tubes</td>
</tr>
<tr>
<td>GB35623</td>
<td>BVAu-3</td>
<td>35Au / 62Cu / 3Ni</td>
<td>990 (1814)</td>
<td>1010 (1850)</td>
<td>ceramic-to-metal bonding, electro-medical</td>
</tr>
</tbody>
</table>

Grade 1 v. Grade 2: Elements detected that have a vapor pressure higher than 10-7 torr (1.3 x 10-5 Pa) at 932°F (500°C) are limited to 0.001% each for Grade 1 filler metals and 0.002% each for Grade 2 filler metals. The total of all high vapor pressure elements (including zinc, cadmium and lead) is limited to 0.010%. The total of all other impurity elements is 0.01% maximum for Grade 1 and 0.05% maximum for Grade 2. Please be sure to specify when placing and order for Vacuum Grade materials.
## Silver Brazing Alloys

<table>
<thead>
<tr>
<th>Silver Brazing Alloys</th>
<th>AWS</th>
<th>Composition</th>
<th>Solidus C (F)</th>
<th>Liquidus C (F)</th>
<th>Common Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>BVAg-0</td>
<td>BVAg-0</td>
<td>99.95Ag min</td>
<td>961 (1761)</td>
<td>961 (1761)</td>
<td>ceramic-to-metal applications</td>
</tr>
<tr>
<td>SB72a</td>
<td>BVAg-8a</td>
<td>72 Ag / 28Cu Contains Li</td>
<td>766 (1410)</td>
<td>766 (1410)</td>
<td>hermetic seals</td>
</tr>
<tr>
<td>SB72</td>
<td>BVAg-8</td>
<td>72Ag / 28Cu</td>
<td>779 (1435)</td>
<td>779 (1435)</td>
<td>hermetic seals</td>
</tr>
<tr>
<td>PAL 15</td>
<td></td>
<td>65Ag / 20Cu / 15Pd</td>
<td>850 (1562)</td>
<td>900 (1652)</td>
<td>diagnostic imaging, electromedical</td>
</tr>
<tr>
<td>SB60Sn10</td>
<td>BVAg-18</td>
<td>60Ag / 30Cu / 10Sn</td>
<td>602 (1115)</td>
<td>718 (1325)</td>
<td>medical imaging/radiation therapy</td>
</tr>
<tr>
<td>SB56</td>
<td>BAg-7</td>
<td>56Ag / 22Cu / 17Zn / 5Sn</td>
<td>618 (1145)</td>
<td>652 (1205)</td>
<td>dental/orthodontics, endoscopes</td>
</tr>
<tr>
<td>SB50Ni2</td>
<td>BAg-24</td>
<td>50Ag / 20Cu / 28Zn / 2Ni</td>
<td>660 (1220)</td>
<td>707 (1305)</td>
<td>dental/orthodontics</td>
</tr>
<tr>
<td>SB45</td>
<td>BAg-5</td>
<td>45Ag / 30Cu / 25Zn</td>
<td>663 (1225)</td>
<td>743 (1370)</td>
<td>dental/orthodontics, medical imaging</td>
</tr>
<tr>
<td>SB40Ni2</td>
<td>BAg-4</td>
<td>40Ag / 30Cu / 28Zn / 2Ni</td>
<td>671 (1240)</td>
<td>779 (1435)</td>
<td>dental</td>
</tr>
</tbody>
</table>

### Brazing Alloy Paste

**Binders:**
- Customized viscosity & rheology
- Process Control: Consistent, repeatable & reliable
- Vacuum grade binder systems for clean and complete burning

**Powder:**
- Blending capability
- Tightly controlled particle distribution
- Pure, spherical, alloyed or single element. With a wide range of particle sizes available (150 to 5 microns)

**Paste:**
- Planetary mixing
- Extended shelf-life
- Precise metal loading
- Paste formulations for syringe dispensing and screen printing
Value Added Products and Services

Our Commitment to Customers

- Leverage existing pool accounts
- ITAR compliant
- Quality oversight ISO 9001 / AS9100C
- Inventory Management
- Contract review and enforcement
- Technical Assistance

Common Forms/Applications

- Precision Pins
- Electrode Tips
- Anode Washers
- Connectors
- Micro Coils
- PTFE and ETFE Available Upon Request

Pt Pins
Pt-Ir Micro Tubes
Pt Micro Coils
Au Washers
Au Custom Wire Preforms
Au-Cu Washers
Product Analysis Capabilities

- All test report data is EAR-Controlled
- Chemical analysis is performed to NADCAP, ISO-ILAC-IAF, ISO/IEC 17025 and ITAR standards
- All tests comply with international and customer defined specifications

Laboratory Capabilities

- **Mechanical Testing:** Tensile & Elongation, Indentation Hardness
- **Microstructural Analysis:** Scanning Electron Microscope (SEM), Electron Backscatter Diffraction (EBSD)
- **Surface Analysis:** Auger Electron Spectroscopy (AES)
- **Composition:** Inductively Coupled Plasma Mass Spectrometry (ICP-MS), Thermogravimetric Analysis (TGA), Energy Dispersive X-Ray Spectroscopy (XEDS)
- **Other:** Differential Scanning Calorimetry (DSC), Gravimetric Filtration Analysis,
Scrap Recovery

*With years of experience in High Purity Precious and Non-Precious Metals, we have been able to develop unique recovery programs that expedite the metal credit process as well as the recovery process for Platinum, Palladium, Gold and Silver. This achievement has allowed us to offer our customers an optimal working capital level to meet every volume need.*

**Customer Advocacy**

- IP protection: reputable carriers, onsite surveillance, 100% melt
- Weight verification, tracking and reconciliation
- Optimal process for scrap stream
- Ensure EPA, OSHA, AML and ITAR compliance, environmentally responsible
- Refine witnessing programs available
- Maintain certificates of destruction
- Flexible financing: Effectively lower future markets/COGS
- Shipping container management
About The Prince & Izant Companies

Founded in 1927, Prince & Izant has been a leading supplier and manufacturer of brazing alloys and medical grade materials for the metal joining and medical device manufacturing industries. Our experience with high purity precious and nonprecious metals for innovative and high technology markets (Aerospace, Electronics and Medical) has afforded us the opportunity to offer our customers knowledgeable guidance, proven solutions in accordance with industry standards and attentive customer service as it relates to braze and medical component and device assembly.