Material Data Sheet  
(37) - Ceramicor®

In the cast-on and veneered state the alloy corresponds to Type 3 of both standards “ANSI/ADA, Specification No. 5 for Dental Casting Gold Alloys” and “ISO 22674”. In the cold-worked state it corresponds to Type 4 of these standards.

1. Composition

<table>
<thead>
<tr>
<th>Element</th>
<th>Composition (ISO 9202:1991)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au</td>
<td></td>
<td>60.00%</td>
</tr>
<tr>
<td>Pd</td>
<td></td>
<td>20.00%</td>
</tr>
<tr>
<td>Pt</td>
<td></td>
<td>19.00%</td>
</tr>
<tr>
<td>Ir</td>
<td></td>
<td>1.00%</td>
</tr>
</tbody>
</table>

2. Physical Properties

<table>
<thead>
<tr>
<th>Parameter</th>
<th>1400-1490°C</th>
<th>Density</th>
<th>Young's Modulus</th>
<th>Linear Coeff. of thermal expansion (25-500°C)</th>
<th>Linear Coeff. of thermal expansion (25-600°C)</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting range</td>
<td></td>
<td>17.5 g/cm³</td>
<td>136 GPa</td>
<td>11.9 x 10⁻⁶ K⁻¹</td>
<td>12.2 x 10⁻⁶ K⁻¹</td>
<td>white</td>
</tr>
</tbody>
</table>

3. Mechanical Properties

<table>
<thead>
<tr>
<th>Condition</th>
<th>Parameters</th>
<th>cold worked</th>
<th>15-75%Kv</th>
<th>1000°C/60%H2O</th>
<th>after firing</th>
<th>hardened</th>
<th>950°C+Geller Creation</th>
<th>CC</th>
<th>1000°C/1h/H2O&amp;700°C</th>
<th>/60/air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness HV5</td>
<td></td>
<td>&gt;215</td>
<td>150</td>
<td>155</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tensile strength (Rm)</td>
<td></td>
<td>&gt;750 MPa</td>
<td>540 MPa</td>
<td>570 MPa</td>
<td>665 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2% Proof stress (Rp 0.2%)</td>
<td></td>
<td>&gt;650 MPa</td>
<td>360 MPa</td>
<td>335 MPa</td>
<td>510 MPa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elongation</td>
<td></td>
<td>&gt;2 %</td>
<td>25 %</td>
<td>37 %</td>
<td>19 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Biological Testing

**Cytotoxicity Test according to ISO 10993-5:**
The cytotoxic effect of the alloy was tested with the Extraction Test.  
(Project, 990880A, 01.01.2000, BSL Bioservice, DE-82152 Planegg, FRG)

**Sensitization Test according to ISO 10993-10:**
The allergic sensitization of the alloy was tested with the Maximation Test.  
(Project 990881A, 01.01.2000, BSL Bioservice, DE-82152 Planegg, FRG)

**Mutagenicity Test (AMES) according to ISO 10993-3:**
There have been no AMES test.

**Results:**
The alloy showed no cytotoxic potential nor did it cause any allergic sensitization.

5. Handling

**thermal**
The alloy is suited for casting-on, brazing, laser and phaser welding. After these thermal treatments the alloy should be slowly cooled.

**Surface-conditioning:**
The alloy does not have to be pickled. It does not oxidize.
Remarks

Hardening:

Ceramicor hardens between 600°C and 700°C, but slowly. Because of this slow hardening the alloy is called partially selfhardened in dental technique applications.

After a 10 minute anneal at 600°C the alloy reaches a hardness of about 170 Vickers, after 1 hour about 200 Vickers. After long time annealing at 600°C hardness values of up to 235 Vickers could be reached. The hardening graph in paragraph 7 refers to 6 hour annealing time.

Strain-hardening:

The strain-hardening curve in paragraph 7 started from the soft condition (1000°C/1h/air). The values given in paragraph 3 are higher because annealing was followed by an additional hardening process.

Recrystalization:

The recrystalisation curve in paragraph 7 shows, that the alloy is soft after quenching from 1000°C. However only a partial recrystalisation is obtained. The alloy still has two phases.

Brazing:

Ceramicor can be brazed with any precious metal brazing material.

6. Certification

Corrosion testing according to standard ISO/DIS 10271 showed, that a total of 0.0±5μg/cm²×7d was set free (limit: 200μg/cm²×7d).

Manufacture, packing and delivery are constantly monitored according to the quality management system standards according to ISO 9001 and ISO 13485.
7. Graphs

**Cold work curve**

- Hardness (HV5)
- Cold work

**Hardening curve**

- Hardness (HV5)
- Temperature

**Annealing curve**

- Hardness (HV5)
- Temperature

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