Palladium-Based Bonding Alloy, Type 4
for low-fusing high-expanding ceramics;
free of copper

Item no. 7341 3 001
Delivery form Casting plates
Indication Classic ceramic, plastic veneering crown and bridge technique milling technique, model casting

Alloy: Pd 78 Ag 7 Ga 6

<table>
<thead>
<tr>
<th>Type</th>
<th>Colour</th>
<th>Density g/cm³</th>
<th>Composition content in % (m/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>white</td>
<td>11.3</td>
<td>Au</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Au</td>
</tr>
</tbody>
</table>

The alloy is free of Ni, Co, Cr, Be, Cd.

Technical data

<table>
<thead>
<tr>
<th>Vickers hardness HV 5/30</th>
<th>2 % proof stress MPa</th>
<th>Elongation %</th>
<th>Modulus of elasticity MPa</th>
<th>Average linear CTE µm/m·K</th>
<th>Melting range °C</th>
<th>Preheating temp. °C</th>
<th>Casting temp. °C</th>
<th>Annealing °C min</th>
<th>Hardening °C min</th>
</tr>
</thead>
<tbody>
<tr>
<td>g</td>
<td>n</td>
<td>a</td>
<td>n</td>
<td>a</td>
<td>n</td>
<td>a</td>
<td>125.000</td>
<td>14.3</td>
<td>14.5</td>
</tr>
</tbody>
</table>

g = after casting, n = after firing, a = hardened

Solders

<table>
<thead>
<tr>
<th>Application</th>
<th>Solder</th>
<th>Working temp. °C</th>
<th>Composition content in % (m/m)</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary solder/ before firing</td>
<td>PLATINOR® CPF-Lot 1</td>
<td>1030</td>
<td>Au</td>
<td>64.0</td>
</tr>
<tr>
<td></td>
<td>PLATINOR® Lot 1</td>
<td>810</td>
<td>Pt</td>
<td>70.0</td>
</tr>
<tr>
<td></td>
<td>PLATINOR® Lot 2</td>
<td>780</td>
<td>Pd</td>
<td>70.0</td>
</tr>
</tbody>
</table>

Instruction for use

Heimerle + Meule GmbH · Dennigstrasse 16 · 75179 Pforzheim · Germany · Tel. +49(0)7231 940-140 · Fax +49(0)7231 940-2701 · www.heimerle-meule.com
Instruction for use ECONOR® AP 5

1. **Modelling**
   Create an anatomically reduced wax model, considering the planned veneering. Sharp edges are to be avoided, soft level crossings are to be striven at.
   Due to stability reasons, care has to be taken at bridge frames to achieve solid modulation of the connections and in the case of larger spans to create palatal and interdental strength of the connecting parts. Wall thickness of the modelled (waxed) single crowns at least 0.4 (0.3) mm, bridge pillar crowns at least 0.5 (0.4) mm.

2. **Spruing System**
   - **Single crown:** Direct spruing with casting channel at least Ø 3.5 mm
   - From 2 single crowns on and bridges:
     - Running bars or rings with object spruing: 3.0 x 3.0 mm
     - Running bars/rings: Ø 4.0 – Ø 5.0 mm
     - Casting channels: Ø 3.5 – Ø 4.0 mm

3. **Position of the Wax Model in the Investment Mould**
   - Distance from the mould wall: The units should have at least 5-10 mm distance from the mould wall.
   - Distance from the mould bottom: Direct spruing between wax units and mould bottom a distance of 10 – 15 mm has to be kept.
     Investment of running bars or rings: the middle of the running bar or ring should cover the middle of the mould.

4. **Investment**
   Cover investment mould with investment ring spacer.
   - Investment mould x 1 / 3: 1 layer
   - Investment mould x 6 / x 9: 1 – 2 layers
   Phosphate bonded investment material is required.
   The investment material manufacturer’s instructions for use have to be complied with strictly.

5. **Burnout / Preheating**
   Conventional heating: the first preheating step at approx. 280 °C has to be hold according to the mould size for respectively 30/40/50/60 min.; further heating steps in compliance with the investment material manufacturer’s instruction for use. After reaching the final temperature (see data sheet), the holding time is according to the mould size respectively 20/30/45/60 min.; further heating steps in compliance with the manufacturer’s recommendations.
   Speed heating: the instructions of the manufacturer of the investment material have to be complied with strictly.

6. **Crucible Material**
   Ceramic crucibles must be used.

7. **Casting Units**
   All common melting and casting units can be used.

8. **Casting**
   Check data sheet for casting temperatures.
   Further heating times after reaching the liquidus temperature according to the quantity of material used and unit output.
   - Resistance heating: 60 – 120 sec.
   - High frequency: 5 – 10 sec.
   - Propane / Oxygen torch: 5 – 10 sec.
   In the case of torch melting, pay attention to the correct setting of the torch (danger of carbon damage) and melt with the reduced zone.

9. **Casting Residues**
   In order to preserve the alloy characteristics and the casting quality, no more than 50 % cleaned casting residues should be used.
   The weight used is calculated from: wax weight x alloy density (see Heimerle + Meule calculation sheet).

10. **Cooling and Divestment**
    Let mould cool down to hand temperature and carefully divest.
    This avoids deviations in fitting, change of alloy characteristics, and hot fissures. Sandblast with high grade corundum (approx. 100 μm) or with an market pickling agent to remove the investment material.

11. **Finishing and Cleaning**
    Finish flame with tungsten carbide burs and ceramic bonded milling tools with only little pressure; then sandblast surface with aluminium oxide (approx. 100 μm) at low pressure (max. 2 bar).
    For frame parts which will not be veneered high gloss polishing is recommended. Then steamclean the frame and degrease it with a suitable pickling agent (e.g. AMISUL). During grinding sufficient protection against dust inhalation has to be taken.

12. **Oxidation**
    Ensure sufficient support of the frame. 5 min. at 930 °C without vacuum.
    If the oxide layer shows spots, grind the frame again and repeat the work steps (see point 11). For conditioning of the surface, sandblast the frame with aluminium oxide (approx. 100 μm, max. pressure 2 bar) again and pickle it with AMISUL.
    Thoroughly steamclean the object thereafter.

13. **Firing of the Ceramic**
    Conventional ceramics, max. firing temperature 950 °C particularly ceramics with reduced firing temperatures are suitable for veneering. Veneering should be performed in compliance with the manufacturer’s recommendations.
    Ensure secure support of the frame during firing.

14. **Firing Process**
    In regard to the firing process the indications of the respective ceramic manufacturer have to be complied with strictly.

15. **Soldering**
    Soldering areas have to be sufficiently big and should be considered during modulation already.
    Soldering areas have to be metallically blank.
    The solder gap should be 0.05 – 0.2 mm.
    Recommended soldering:
    - Solder before firing: PLATINOR® CFP-Lot 1 1030 °C
    - Soldiers after firing: PLATINOR® Lot 1 810 °C
      PLATINOR® Lot 2 760 °C
    Slowly cool down the soldering object.

16. **Hardening**
    After casting / firing the alloy shows a sufficiently high density for its area of indication. If required, the maximum hardening after veneering can be reached through final tempering in accordance to the data sheet.

17. **Pickling and Polishing**
    Remove flux residues or oxides by pickling in AMISUL at about 80 °C or by sandblasting. Rubber-wheel the frame; final polishing can be accomplished with pastes, brushes, buffing wheels, and felt.

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