L6 Instructions for use
Ag-Pd-Au Alloys for Inlays, Crown and Bridgework
(Products with catalogue numbers in the appendix)

**Intended use**
Fixed and removable dentures.

**Product description**
These casting Ag-Pd-Au alloys have a narrower processing tolerance than high gold content and reduced gold content alloys. The group includes alloys with different mechanical and physical properties. It is therefore possible to select an alloy on the basis of its composition which is best suited to the type of work to be performed. The alloys can be soldered without difficulties and are also suitable for the cast-on technique.

**Expected clinical benefit**
Restoration of chewing function and improved aesthetics.

**Qualification**
Professional dentist and dental technician know-how is required. The instructions for use must be available and understood before the first application. The manufacturing work must be carried out by qualified specialists. For information and additional details, please contact your Cendres+Métaux representative.

**Side effects**
With patients having an existing allergy to one or several elements contained in any one alloy, this particular alloy must not be used. With patients suspected of having an allergy to one or several elements contained in any one alloy, this alloy can only be used after preliminary allergological testing and proof of a non-existing allergy.

**Traceability of lot numbers**
If different lots of an alloy are being used for the realisation of a restoration, all lot numbers concerned must be noted in order to assure traceability.

**Disinfection**
All the parts must be disinfected before use with a high-level disinfectant. Follow the instructions of the manufacturer regarding dosage and exposure time. When choosing the disinfectant, ensure that:
– it is suitable for the cleaning and disinfection of dental prosthetic components,
– it is compatible with the materials of the products to be cleaned and disinfected, and
– it has proven efficacy in disinfection.
We recommend using an ortho-phthaldehyde (OPA) solution like the Cidex® OPA Solution. Strictly follow the manufacturer’s instructions.

**General instructions**

**Modelling**
Usual modelling technique for ceramic-fused-to-metal works. Minimal wall thickness 0.4 mm. With bridgework the connections must have a minimum section of 6–9 mm². Modelling of garlands or inlay shaped reinforcements in the palatinal region will give added stability. The application of air and cooling vents improves casting results.

**Preventive measures**
Mixing of different alloys or alloys of similar types is not allowed!
Wear darkened eye protection and protective gloves when melting.
Protect eyes, hands and breathing when pickling.
Protect eyes and breathing during processing with rotating instruments with an aspirator device.
With the publication of these instructions for use all previous editions are no longer valid.
The manufacturer refuses any liability for damages due to disregard of the instructions for use below.
**Spruing**

Wax sprues of no less than Ø 3.5 mm are required. Direct (Ø 3.5 mm) and cross bar (Ø 5 mm) spruing produce excellent results. Feeder sprues to heavy pontics should be of at least Ø 4 mm. Air vents (Ø 1 mm) may be used to advantage. Wax patterns should be set outside the thermal centre, i.e. near the casting ring wall and about 5 mm from the end. For individual copings and small bridges (up to three units), use of the circular sprue provides ideal positioning of the wax patterns and ensure controlled solidification of the frameworks.

**Investing**

When using steel casting rings always use refractory liner in order to allow free expansion of the investment.

When using plaster based investment compounds care has to be taken not to exceed a preheating temperature of 700°C in order to prevent an embrittlement of the alloy by the uptake of sulphur. Pd-based alloys absorb carbon in the melted condition. Therefore graphite based investment compounds should not be used. Also, these alloys should only be melted in ceramic or vitrified carbon crucibles to prevent embrittlement of the alloy during frequent remelting.

The following investment materials from Cendres+Métaux are suitable for this alloy type:

- uniVest Plus: universal phosphate-bonded, graphite- and gypsum-free investment material
- CM-20: graphite-free investment material based on quartz and cristobalite
- uniVest Rapid: graphite-free, phosphate-bonded investment material

**Rapid preheating technique**

The use of burn-out plastic parts can lead to spalling in the investment material.

**Preheating**

Observe manufacturer’s recommendations with regard to setting times, temperature levels etc. On reaching the end temperature a soaking period of 20 to 45 min. is advisable depending on the size of the cylinder.

**Re-use of alloy**

Only use perfectly cleaned (by sand-blasting with aluminium oxide) buttons and sprues and add at least ⅓ of new alloy.

**Melting**

It is important, when using a torch for melting that the recommended propane (approx. 0.5 bar or 7.25 psi) / oxygen (approx. 1.0 bar or 14.5 psi) mixture and pressure are observed. Before melting add a pinch of flux to the alloy.

Flux: boric acid

**Surface quality of cast objects**

In order to prevent corrosion the cast object must have a surface free of shrink holes and porosities after trimming and polishing.

**Cooling of castings**

Do not quench the casting cylinder after casting, but bench cool to room temperature.

**Finishing**

Trim the framework first preferably using carbide burs and then fine grinding points at low speed.

**Soldering**

We recommend using a propane/oxygen torch for soldering and a flux like CM soldering paste. During soldering wear dark goggles for protection. The design of the soldering block is a compromise between minimising its thermal mass whilst retaining sufficient strength to avoid its fracturing during soldering. Leave a parallel gap of 0.1 – 0.2 mm between surfaces to be soldered and sufficient area to ensure adequate strength of the joint.

**Pickling**

After casting or soldering pickle in a warm, freshly prepared (clean) solution of 10 vol.% sulphuric acid (H₂SO₄)

Note: When using other pickling agents follow the instructions for use of the respective manufacturer.

**Thermal treatments (not compulsory)**

After casting, some of the high gold metal alloys have not yet obtained their maximal mechanical properties. For long-span bridgework and for works with attachments in combustible plastic which will not be veneered with ceramic, a simulation firing of the work in the as cast condition (cleaned frameworks, sprues not yet removed) in the ceramic furnace can be done. This procedure has the following advantages: The hardness increase allows easier and faster trimming of the frameworks. Grinding overlaps are prevented. Possible tensions due to the casting process are reduced. (Firing data see table overleaf).
Gilding of frameworks
Gilding is carried out at the user’s own risk.

Polishing
After the last firing free metal surfaces must be polished to a high shine in order to completely remove the oxide layer.

<table>
<thead>
<tr>
<th>Labeling on packaging/symbols</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of manufacture</td>
<td>Date of manufacture</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Manufacturer</td>
</tr>
<tr>
<td>Catalogue number</td>
<td>Catalogue number</td>
</tr>
<tr>
<td>Batch code</td>
<td>Batch code</td>
</tr>
<tr>
<td>Quantity</td>
<td>Quantity</td>
</tr>
<tr>
<td>Consult instructions for use</td>
<td>Consult instructions for use</td>
</tr>
<tr>
<td>URL: cmsa.ch/docs</td>
<td>URL: cmsa.ch/docs</td>
</tr>
<tr>
<td>Rx only</td>
<td>Attention: According to US federal law, this product may only be sold by or on behalf of a physician.</td>
</tr>
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</table>

Cendres+Métaux products with CE labelling meet the requirements of the relevant European requirements.
## Instructions for use

<table>
<thead>
<tr>
<th>Alloy Type</th>
<th>Cat. No.</th>
<th>Indication</th>
<th>Composition %</th>
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</thead>
<tbody>
<tr>
<td><strong>Group metals</strong></td>
<td></td>
<td></td>
<td>Ag</td>
</tr>
<tr>
<td><strong>Strator 3</strong></td>
<td>010675</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
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<td>26.05</td>
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</table>

### Alloys

<table>
<thead>
<tr>
<th>Alloy Type</th>
<th>Cat. No.</th>
<th>Indication</th>
<th>Physical properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Density</strong></td>
<td>g/cm³</td>
<td>°C</td>
<td>g/cm³</td>
</tr>
<tr>
<td><strong>Strator 3</strong></td>
<td>11.4</td>
<td>855–900</td>
<td>75</td>
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<tr>
<td><strong>Pagalinor 2</strong></td>
<td>11.1</td>
<td>900–980</td>
<td>110</td>
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<tr>
<td><strong>Pallorag 33</strong></td>
<td>10.9</td>
<td>935–1020</td>
<td>95</td>
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<td><strong>Pagalin 2</strong></td>
<td>10.8</td>
<td>975–1070</td>
<td>95</td>
</tr>
</tbody>
</table>

### Mechanical properties

<table>
<thead>
<tr>
<th>Alloy Type</th>
<th>Physical properties</th>
<th>Mechanical properties</th>
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</thead>
<tbody>
<tr>
<td><strong>Hardness HV5</strong></td>
<td><strong>Proof stress Rp 0.2 %</strong></td>
<td><strong>Tensile strength (Rm)</strong></td>
</tr>
<tr>
<td></td>
<td>As cast</td>
<td>Soft</td>
</tr>
<tr>
<td><strong>Strator 3</strong></td>
<td>175</td>
<td>125</td>
</tr>
<tr>
<td><strong>Pagalinor 2</strong></td>
<td>185</td>
<td>135</td>
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<tr>
<td><strong>Pallorag 33</strong></td>
<td>170</td>
<td>135</td>
</tr>
<tr>
<td><strong>Pagalin 2</strong></td>
<td>175</td>
<td>135</td>
</tr>
</tbody>
</table>

* 100% selfhardening after cooling in the cylinder or soldering block, otherwise particular instructions for use.
Alloys | Solder | Laser welding wire | Instructions for use | Sandblasting with glass beads 50 µm
--- | --- | --- | --- | ---
| | Pre-Solder | Post-Solder | Preheating °C | Crucible | Castling temperature °C | S.G 810 | S.G 750 | not weldable | 700 = Graphite crucible | 650–680 = Universal ceramic crucible
Strator 3 | 1010–1060
Pagalinor 2 | LW N° 6
Pallorag 33 | LW N° 7
Pagalin 2 | LW N° 7

\[\text{S.G} = \text{Shrinkage Gap}\]

Alloys | Recommended casting systems (not compulsory) | Particular instructions for use
--- | --- | --- |
| | Prepare-oxygen flame | Preheating 700°C / 10 min / H₂O
Vacuum-pressure casting with electric resistance furnace | Post-melting time 700°C / 10 min / H₂O
Centrifugal casting with electric resistance furnace | Post-melting time 650–680°C / 15 / air*
High frequency induction in atmosphere | Post-melting time 700°C / 10 min / H₂O
High frequency induction in protective gas atmosphere | Post-melting time 630–680°C / 15 / air*
| | Crucible | Hardening | Sandblasting with glass beads 50 µm
Strator 3 | ✔ | ✔ | ✔ | 1010–1060°C / 15 / air* | ✔
Pagalinor 2 | ✔ | ✔ | ✔ | 1180°C / 15 / air* | ✔
Pallorag 33 | ✔ | ✔ | ✔ | 1120–1170°C / 15 / air* | ✔
Pagalin 2 | ✔ | ✔ | ✔ | 1270°C / 15 / air* | ✔

* Annealing before hardening