

Instructions for use

Low-cost, high precious metal content alloy for metal-ceramic dental restorative systems, especially on implants

Indications

The palladium-gold alloy Esteticor Implant® 32 corresponds to ISO 22674 / ISO 9693 and is compatible with all ceramics having a medium CTE.

- Fixed implant and dentally supported crowns and bridgework.
- Short-span and especially long-span bridgework
- Restorations with attachments made of non residual burnout resin



Traceability of lot numbers

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

Disinfection

Each prosthetic restoration must be cleaned and disinfected before try-in or definite insertion in the mouth of the patient.

Allergies

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.

Physical properties

Composition in weight %

Au + Pt group metals	73.00
Au	32.00
Pd	40.85
Ag	19.00
Sn	5.00
In	3.00
Ru	0.15
Colour	white
Density g/cm ³	13.1
Melting range °C	1215–1290
CTE (25–500°C) 10 ⁻⁶ K ⁻¹	14.2
(25–600°C) 10 ⁻⁶ K ⁻¹	14.5
Young's Modulus GPa *	125

mechanical properties

Hardness HV5 *	1	225
	2	240
0.2% Proof stress, Rp 0.2% MPa*	1	510
	2	555
Yield strength (Rm) MPa*	1	800
	2	820
Elongation A5 % *	1	17
	2	17

State

1	as cast
2	after firing

* The values indicated result from measurements obtained under exactly defined conditions. Individual deviations of ± 10% are possible and to be considered as normal.

Rx only

The products carry the CE sign.
See packaging for details.

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 during pickling.
Protect eyes and breathing during processing with rotating instruments with an aspirator device.

Upon publication, these instructions for use supersede all previous editions.

The manufacturer is not liable for any damages due to the user disregarding the instructions for use below.

1. Modelling

1.1 dentally supported bridgeworks

Usual modelling technique for the construction of frameworks.
Minimum wax thickness with abutment crowns 0.4 mm and with single crowns 0.3 mm. With bridgework care has to be taken, that the connections have a surface of at least 6–9 mm². By modelling garlands and inlay-like reinforcements in the palatal region the stability can be further increased. By attaching vents and cooling sprues casting quality will be improved.

1.2 implant-supported bridgework

Modelling technique as described in 1.1. In addition, garlands or any exposed metal surfaces on or between massive intermediary elements of bridgework support the dissipation of heat during the cooling processes after the ceramic firings. When using gold cylinders (e.g. Ceramicor®) **for the casting-on technique**, make sure that the wax layer added onto the gold cylinder has a minimal thickness of 0.5 mm in order to avoid stress cracks in the ceramic in the marginal area. The penetration of the cast-on alloy into the functional inner parts of the gold cylinder can be eliminated by ensuring that the wax layer does not exceed the edge of the gold cylinder. Furthermore, it is recommended to clean the inner and outer surfaces of the gold cylinders prior to modelling using a steam-jet. After completing modelling and before investing, the inner surfaces of the incorporated gold cylinders should be carefully degreased using a cotton swab, tipped in alcohol. When using **prefabricated parts of non-residual burnout resin** instead of gold cylinders, the modelling technique as described in 1.1 applies. These prefabricated resin-parts must be screwed very carefully onto the abutment (do not overtighten) in order to avoid deformation and thus non-fitting casting results.

2. Sprueing system

The modelled frameworks on implants must be sprued with a sufficiently dimensioned and stable sprueing system. When connecting the sprues, make sure that the wax parts have as few contractions as possible. Connect the sprues with a \varnothing of 3.0–3.5 mm to the thickest parts of the cast object. The cross bar must have a \varnothing of 5.0–6.0 mm depending on the size of the bridgework. The distances of the cast object to the cross-bar and from the cross-bar to the button must be specifically adapted in order to maintain the correct positioning of the cast object outside of the heat-centre in the cylinder. The connectors between cross-bar and button must have a minimum \varnothing of at least 4.0 mm.

3. Investing

The following investments are recommended for this type of alloy: Cendres+Métaux-Ceramicor® (containing graphite) **recommended for the conventional preheating technique and especially for implant-supported bridgework.**

CM-20 (based on quartz and cristobalite, without graphite and for the rapid preheating technique) not recommended for implant supported bridgework containing non-residual burnout resin or gold cylinders in combination with rapid preheating technique. When using gold cylinders, avoid the application of debubbling agents, so that the investment can completely cover the inner surfaces of the functional parts of the gold cylinders, thus minimizing the risk of the cast-on alloy flowing-in.

4. Mixing ratio for the investment for implant-supported bridgework

Example for Cendres+Métaux-Ceramicor® investment: For implant-supported frameworks, we recommend to adjust the investment to a low linear total expansion as follows:

Frameworks with gold cylinders in a casting ring size 9: mix 480 g powder with 45.9 ml expansion liquid and 30.6 ml distilled water.

Frameworks with non-residual burnout resin parts in a casting ring size 9: mix 480 g powder with 45.9 ml expansion liquid and 30.6 ml distilled water.

When using other investments, the recommendations of the respective manufacturer for the mixing ratio apply.

5. Preheating of the casting cylinders

Final temperature: 850°C

Further information on the conventional preheating technique can be obtained in the instructions for use of the Cendres+Métaux-Ceramicor® investment.

5.1 Holding time at final temperature

When using prefabricated parts of non residual burnout resin, such as implant superstructures, casting sprues, cross bars or bridgework connected with modelling resin (e.g. pattern-resin)

Cylinder size 3: 40–60 min. at 850°C

Cylinder size 6: 60–80 min. at 850°C

Cylinder size 9: 80–90 min. at 850°C

When using other investments, the recommendations of the respective manufacturer for the final temperatures and holding time apply.

6. Re-use of alloy

Only use perfectly cleaned (by sandblasting with aluminium oxide) buttons and sprues and add **at least 1/3 of new alloy.**

7. Melting and casting, (recommended casting temperatures)

Recommended casting systems (not compulsory)

- Propane-oxygen flame
- Vacuum-pressure casting with electric resistance furnace (1440°C)
- Centrifugal casting with electric resistance furnace (1390°C)
- High frequency induction in atmosphere
- High frequency induction in protective gas atmosphere

8. Melting

If the alloy is molten in atmosphere in a ceramic or vitrified carbon crucible, the addition of a minimal amount of melting powder (borax) may suppress the oxidation of the alloy surface and thus allow for a better determination of the correct starting of the casting procedure. When using a propane-oxygen flame, the addition of melting powder is not necessary, if the ceramic crucible has been coated with a borax layer prior to its first use.

8.1 Continued heating times in seconds

As soon as the alloy reaches at the liquid state, the following continued heating times apply prior to start the casting procedure:

Propane-oxygen flame	5–10 s
Electric resistance furnaces	40–60 s
High frequency induction	5–10 s

9. Cooling and devesting of cast objects

Do not quench the casting cylinder after casting, but bench cool to room temperature. Never use a hammer, but remove the investment by carefully using plaster-tweezers or a pneumatic hand-chisel. The removal of investment in the functional inner parts of the cast-on gold caps or the cast resin parts must be done by either ultra sonic bath, a water-jet or with a glass fibre brush.

10. First special thermal treatment after devesting

In order to keep the obtained precision after casting, especially with implant-supported bridgework, it is mandatory to execute a **special thermal treatment** on the entire, well cleaned casting object (including sprues and button) in a ceramic furnace at **600°C / 15 min.**, followed by bench cooling.

11. Conditioning of the framework for veneering with ceramic

Trim the frameworks with tungsten cutters, then fine trim the surfaces to be veneered using ceramically bonded grinding stones. Always maintain the same grinding direction in order to avoid overlapps on the surface. Don't use diamond coated grinders!

12. Sandblasting

Sandblast the trimmed framework with non-recycled aluminium oxide (Al₂O₃)

Grain size

50 µm

Pressure

2–4 bar

13. Cleaning

Clean the sandblasted frameworks thoroughly with a steam-jet.

14. Oxide firing

Massive-sized (heavy) cast frameworks require a general reduction of the heat rate to 40–50°C / min. in order to ensure a regular heat soaking of the framework.

Oxidize at 900°C / 10 min. without vacuum

14.1 Second special thermal treatment for implant supported bridgeworks after oxide firing

To maintain the precision of the framework, it has to be heat treated a **second time** with the **special thermal treatment** in a ceramic furnace at **600°C / 15 min.**, followed by bench cooling. The oxide layer resulting from the two thermal treatments must be removed by sandblasting.

15. Veneering with ceramic

Compatible, tested ceramics:

(ISO 9693): Vita VMK 95, IPS d'SIGN

Applicability of Esteticor Implant® 32 for the conception of precise screw-retained bridgeworks on implants with reference to the firing temperatures of the ceramics:

Important screw-retained implant supported bridgeworks should be cast separately, then connected before firing by soldering or laser-welding, or soldering after firing in order to maintain the necessary precision.

15.1 Support of the frameworks

Bridgework with 3–6 units can be supported with the usual firing pins, placed in each abutment crown. Larger and more massive bridgework should be supported with an individually crafted firing support. The use of an individual support might make it necessary to raise the final firing temperatures by 10–20°C, depending on the type of ceramic furnace.

16. Gilding of frameworks

Gilding is carried out at the users own risk.

17. Joining techniques

17.1 Soldering before firing for the use of ceramics with firing temperatures > 900°C:

CM-solder S.G 1055 for the joining of bridgework with more than 7 units. If possible, prepare the soldering-areas already at the modelling stage and ensure, that the width of the soldering gap does not exceed 0.2 mm. In case of unplanned soldering before firing (imprecise fit), separate the framework by cutting through an intermediary element in order to obtain a large and stable soldering area.

17.2 Soldering before firing: for the use of ceramics with firing temperatures < 900°C:

S.G 1030 = same indications as solder S.G 1055

17.3 Soldering after firing: CM-solder S.G 750 for furnace soldering.

Prepare the soldering areas so that the solder strip has contact with both metallic parts. The width of the soldering gap must not exceed 0.2 mm. After the hardening of the soldering block and the removal of the fixations of sticky wax or modelling resin, the now accessible soldering gap must be filled with soldering flux (CM Flux C), then placed in a preheating furnace at 500°C and held at this temperature for 20–40 minutes, depending on the size of the bridgework. Then remove the soldering block, wet the soldering gap and the solder again with soldering flux, then solder in a ceramic furnace. Adjust the soldering temperature to 810°C.

Attention: prior to soldering after firing, check the last firing temperature of your ceramic, this must not be below 830°C!

17.4 Laser welding

Esteticor Implant® 32 can be laser-welded with the laser welding wire LW N° 3, Ø 0.4 mm, as filler metal.

The ideal welding-parameters (basic values for connecting and filling of an x-shaped joint) can be found in the instructions for use of the laser welding wire. Further information on laser welding can be obtained from the Cendres+Métaux-brochure «Laser welding» (edition 04.04) and on the website www.cmsa.ch/dental.

18. Polishing

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

19. Oxide removal

The removal of residues of flux after firing can be done by pickling in a warm and clean bath of 10 Vol.-% sulphuric acid (H₂SO₄) or in a pickling agent. **Note:** When using other pickling agents follow the instructions for use of the respective manufacturer.

The removal of oxides after ceramic firing inside of the functional inner parts of the implant supported crowns or the inside of a conventional crown can only be done by a very careful sandblasting, using non-abrasive agent and a pressure of max. 2 bars.

20. Further information

On processing precious metal alloys, soldering and casting-on are included in the Dental documentation of Cendres+Métaux (04.99 edition) and on the website www.cmsa.ch/dental.

The above mentioned instructions for use are based on our own experience and test results and should therefore be understood as basic guidelines.

We reserve the right to improve the product or adapt these instructions for use.