Esteticor® Royal H

Instructions for use

Zn-free, Au-based dental casting alloy for metal-ceramic work according to ISO 22674 and ISO 9693, Type 4.

Indications

The alloy Esteticor® Royal H is compatible with ceramic compounds having a medium CET.

– Fixed implant and dentally supported crowns.
– The alloy is suitable for accurately fitting work (bridges of up to six units on three implant abutments).

a  Inlays, onlays, crowns ¾

b  Single crowns

c  Short-span bridgework

d  Long-span bridgework

e  Milled work

f  Clasps, lingual bars, palatinal plates

Physical properties

Composition in weight %

Au + Pt group metals	97.80
Au	84.80
Pt	8.90
Pd	4.00
In	2.00
Ir	0.10
Fe	0.20
Colour	Pale yellow
Density g/cm³	18.6
Melting range °C	1100–1275
CTE (25–500 °C) $10^{-6}K^{-1}$ (25–600 °C) $10^{-6}K^{-1}$	14.3 14.5
Young's Modulus GPa*	90

Mechanical properties

Hardness HV5*	1 170 2 220
0.2 % Proof stress, Rp 0.2 % MPa*	1 430 2 515
Yield strength (Rm) MPa*	1 550 2 605
Elongation A5 %*	1 8 2 7

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.

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.

Rx only

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

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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
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 mm^2. By modelling garlands and inlay-like reinforcements in the palatinal region the stability can be further increased. By attaching vents and cooling sprues casting quality will be improved.

2. Sprueing system
2.1 Single crowns
These can be directly connected at the thickest part with a wax sprue of ∅ 3.0–3.5 mm.

2.2 Frameworks
The modelled frameworks 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 ∅ of 3.0–3.5 mm to the thickest parts of the cast object. The cross bar must have a ∅ 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 ∅ of at least 4.0 mm.

3. Investing
3.1 Investments
The following investments are recommended for this type of alloy:
Ceramicor® (containing graphite) recommended for the conventional preheating technique and particularly for implant work.
CM-20 (without graphite and for the rapid preheating technique).
Not recommended for implant bridges with plastic parts capable of being burnt out or for cast-on high-fusing alloys in combination with the rapid preheating technique.
For implant bridges with gold caps, the use of debubblizer surfactants should be dispensed with so that the investment is able to cover the entire functional inner surface of the gold cap, which greatly minimises the risk of unwanted inflow of the casting alloy.

3.2 Mixing ratio for the investment
Further information can be obtained in the instructions for use of the investment.

4. Preheating of the casting cylinders
Final temperature: 800 °C
Further information on the preheating technique can be obtained in the instructions for use of the CM-Ceramicor® or CM-20 investment.

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

6. Melting and casting
Recommended casting systems (depending on the casting equipment and the crucible)
– Propane-oxygen flame
– High frequency induction in protective gas atmosphere
– Centrifugal casting with electric resistance furnace (100–150 °C above the liquidus point)
– Vacuum-pressure casting with electric resistance furnace (100–150 °C above the liquidus point)

7. 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.

7.1 Continued heating time in seconds (depending on the casting equipment and the crucible)
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
High frequency induction	5–10 s
Centrifugal casting with electric resistance furnace	40–60 s
Vacuum-pressure casting with electric resistance furnace	40–60 s

8. 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.
An ultrasonic bath, water jet or sandblasting with glass beads should be used to remove investment from the functional insides of the cast-on gold caps or the cast plastic parts.

9. 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!

10. Sandblasting
Sandblast the trimmed framework with non-recycled aluminium oxide (Al_2O_3).

Grain size	50 µm
Pressure	2–4 bar

11. Cleaning
Clean the sandblasted frameworks thoroughly with a steam-jet.

12. 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.
900 °C / 10 min. / with vacuum

13. Oxide removal
The oxide resulting from the oxide firing can be blasted off with aluminium oxide, then clean thoroughly with a steam jet.

Grain size	50 µm
Pressure	2–4 bar

The removal of residues of flux after firing can be done by pickling in a warm and clean bath of 10 Vol.-% sulphuric acid (H_2SO_4) or in a pickling agent.
Note: When using other pickling agents follow the instructions for use of the respective manufacturer.

14. Venering with ceramic
Compatible, tested ceramics (ISO 9693): Vita VMK 95, IPS d'SIGN, Geller Creation, Celebration Ceram.

15. Gliding of frameworks
Gilding is carried out at the users own risk.

16. Joining techniques
16.1 Soldering before firing to connect several individually cast bridge segments:
CM-solder S.G 1055, for the joining of bridgework with a maximum of 6 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, separate the framework by cutting through an intermediary element in order to obtain a large and stable soldering area.

16.2 Repair soldering prior to firing in order to seal holes
CM-solder S.G 1055.

16.3 Soldering after firing:
First brazing material CM-solder S.G 810 / second brazing material CM-solder S.G 750, for furnace soldering after firing. 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 (Flux C of Cendres+Métaux), 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 870 °C for the first brazing material and to 810 °C for the second brazing material. Prior to soldering after firing, check the last firing temperature of your ceramic, this must not be below 890 °C for the first brazing material and 830 °C for the second brazing material!

16.4 Laser welding
Esteticor® Royal H can be laser-welded with the laser welding wire LW N° 2, ∅ 0.4 mm, as filler metal.
The following laser parameters should be set: focus 0.9 mm / voltage 280 V / pulse duration 8.5 ms / frequency 2.0 Hz.
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 website www.cmsa.ch/dental (Interesting Facts / Laser welding).

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

18. Further information
We reserve the right to improve the product or adapt these instructions for use.
After casting, the alloy may take on a blue-purple colour. This is a surface reaction with the investment which has no other influence.