Solaro® 4

Instructions for use

**Medium-Gold Dental Alloy, yellow,
tested according to ISO 22674, type 4 standard**

Indications

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	49.50
Au	45.00
Ag	41.00
Cu	9.50
Pd	4.48
Ru	0.02
Colour	yellow
Density g/cm³	12.9
Melting range °C	885–945
Young's Modulus GPa *	85

Mechanical properties	**1**	**2**	**3**
Hardness HV5 *	120	170	215
0.2 % Proof stress, Rp 0.2 % MPa *	245	435	610
Yield strength (Rm) MPa *	415	595	755
Elongation A5 % *	38	19	12

State

1	soft (700 °C/10'/H20)
2	after casting
3	hardened (soft + 350 °C/15'/air)

Solders	**Melting range**
S.G 810	750–810 °C
S.G 750	695–750 °C

Laser welding

Fil de laser	LW 6

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

Preventive measure (contraindication) and important notes

The manufacturer shall not be liable for any damage resulting from failure to comply with the present Instructions for Use. It has been suggested in the professional literature that allergic reactions in response to some of the components of the alloy cannot be excluded in extremely rare cases. The alloy should not be used if the patient is known to have allergies or hypersensitivity to chemical components of the alloy.

Corrosion resistance and biocompatibility

Solaro® 4 has been subjected to the following tests:
Corrosion resistance test according to the ISO 22674 standard.
Cell toxicity test according to the ISO 10993-5 standard.
Sensitisation test according to the ISO 10993-10 standard.
Mutagenicity test (AMES) according to the ISO 10993-3 standard.
The biological compatibility of the alloy in accordance with ISO 10993-1 and ISO 7405 has been demonstrated through in-vivo and in-vitro testing and based on the available technical literature.

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.

Disclaimer

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.

Distributed since 2012

Solaro® 4 complies with the ISO 22674 standard

Solaro® 4 has been manufactured in compliance with the quality assurance standards, ISO 9001/ISO 13485.

Rx only

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

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Precautions for handling
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.

1. Modelling
Usual modeling 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 modeling 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. Spruing 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 modeled 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
When using steel casting rings always use refractory liner in order to allow free expansion of the investment.

3.1 Investments
All regular or phosphate-bonded (e.g. Ceramicor®, CM-20, uniVest® Plus or uniVest® Rapid, multiVest®) investments for precious metal alloys may be used. Follow the procedures recommended by the manufacturer.

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 minimizes the risk of unwanted inflow of the casting alloy.

4. Preheating
Preheating temperature: 680 °C
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.

5. Crucibles
Glaze the crucible before first use with a recommended flux (e.g. Borax).

The following crucibles can be used:

Graphite crucible:	**Casting temperature 1045 °C**
Glassy carbon crucible:	**Casting temperature 1045 °C**
Ceramic crucible:	**Casting temperature 1095 °C**

6. Re-melting
When melting down thoroughly cleaned casting buttons, add at least ⅓ of new alloy. The used copings have to be clean, free of investment and flux residue.

7. Melting
Observe manufacturer's recommendations with regard to the casting temperature of the alloy. The alloy can be molten with regular casting systems.
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.
It is important, when using a torch for melting (for inst. Meteor type «O») that the recommended propane (approx. 0.5 bar or 7.25 psi)/oxygen (approx. 1.5 bar or 21.75 psi) mixture and pressure are observed. Before melting add a pinch of flux to the alloy. Once the alloy has completely melted, continue heating for a further approx. 5 sec. before releasing the casting machine arm. When melting by induction or resistance heating, high frequency induction melting heating is continued for approx. 5 seconds.

Centrifugal casting with electrically heated resistance furnace (100–150 °C above liquidus temperature)
Vacuum pressure casting with electrically heated resistance furnace (100–150 °C above liquidus temperature)

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	20–40 s
Vacuum-pressure casting with electric resistance furnace	20–40 s

8. Cooling and divesting 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 handchisel.
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. Finishing
According to customary technique, using the preferred abrasives stones for this purpose.

10. Veneering
Using pure aluminium oxide (Al_2O_3) grain size approx. 110μm Blasting followed by cleaning with a steam jet cleaner.
For veneering with plastic materials, please comply with the Instructions for Use of the manufacturer.

11. Soldering

Solders:	S.G 810/S.G 750

The batch tests were carried out according to the ISO 9333 standard.

We recommend using a propane/oxygen torch (Meteor Type «L») for soldering and the CM-soldering paste. During soldering wear dark goggles for protection.
If possible, prepare the soldering-areas already at the modeling 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.

12. Laser welding
Solaro® 4 can be laser-welded with the laser welding wire LW 6, ∅ 0.4 mm, as filler metal.
The laser welding tests were carried out according to the ISO 28319 standard.
The following laser parameters should be set:

Focus	0.9 mm
Voltage	280 V
Puls duration	8.5 ms
Frequency	2.0 Hz

Further information on laser welding can be obtained from the Cendres+Métaux website www.cmsa.ch/dental (Interesting Facts/Laser welding).

13. Thermal treatments
Soft annealing 700 °C/10 min. – quenching in water
Self-hardening by slow cooling
Precipitation hardening (after previous soft annealing)
350 °C/15 min. – cooling exposed to air

Important
In order to attain optimal mechanical properties, the dental work pieces (indications c, d, e and f) must first be soft annealed and then hardened.

14. Polishing
Pre-polishing with flexible polishing tool. Polishing with a soft brush, felt and polishing mop, using Legabril Diamond.
High-gloss polishing with soft brush and polishing mop.

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

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

Selecting the disinfection agent, it is important to make sure that the agent:
– is suitable for cleaning and disinfection
– is compatible with the material
– is proven to be effective for disinfection