L3 Instructions for use

Palladium-based Alloys for the Ceramic-fused-to-metal Technique

(Products with catalogue numbers in the appendix)

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With the publication of these instructions for use all previous editions are no longer valid.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.

Intended use

Fixed and removable dentures.

Product description

Due to the low density and high palladium or palladium silver content, these alloys (Type 4 according to ISO 22674) have a narrower processing tolerance than alloys with a high gold and precious metal content. They are suitable for bridge work with short and large spans as well as for milling and combined works and for the cast-on technique. Pd-Ag alloys can be soldered before and after firing without difficulties.

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 instrucions

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 mm^2. 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.

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.

The following investment materials from Cendres+Métaux are suitable for this alloy type:
uniVest Plus: universal phosphate-bonded, graphite- and gypsum-free investment material
uniVest Rapid: graphite-free, phosphate-bonded investment material

Plaster-based investments must not be used for these types of alloys!

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 firing or soldering pickle in a warm, freshly prepared (clean) solution of 10 vol. % sulphuric acid (H_2SO_4)
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.

Product list		Cat. No.	
Colour	Alloys	10 g	25 g
	Cerapall 6	01000188	01000189
	Cerapall 2	01000213	01000214
	Esteticor® Biennor CF	01000217	01000218
	Esteticor® CC	01000175	01000176
	Esteticor® Blancor	01000208	01000209
	Esteticor® N2	01000184	01000185
	Ceradelta 2	01000170	01000171
	Esteticor® Actual	01000250	01000251
	Esteticor® NewStart	01000206	01000207
	Ceradelta	01000242	01000243
	Esteticor® Implant 32	01000191	01000192

Labelling on packaging/symbols	
	Date of manufacture
	Manufacturer
REF	Catalogue number
LOT	Batch code
QTY	Quantity
 www.cmsa.ch/docs	Observe the Instructions for Use, which are available in electronic form at the address specified.
Rx only	Attention: According to US federal law, this product may only be sold by or on behalf of a physician.
CE 0483	Cendres+Métaux products with CE labelling meet the requirements of the relevant European requirements.
UDI 	Unique Device Identification – UDI
EC REP	European Authorised Representative
	Importer in EU
MD	Medical device

Instructions for use

Alloys	Indication						Composition %													
	a	b	c	d	e	f	Au + Pt group metals	Au	Pt	Pd	Ag	Cu	Sn	Zn	In	Ga	Ir	Ru	Rh	Fe	Others
Cerapall 6		■	■	■	■		81.60	6.10		75.00	6.40		0.10		5.90	6.00		0.50			
Cerapall 2		■	■	■	■		81.00	2.00		78.50		6.90	2.00	0.10	4.50	5.50		0.50			
Esteticor® Biennor CF		■	■	■	■		80.00	2.00		77.60	5.00		6.40	4.60		4.00		0.40			
Esteticor® CC		■	■	■	■	■	64.49	12.00		52.29	23.00		2.00		10.00	0.50		0.20			B 0.01
Esteticor® Blancor		■	■	■			58.49	1.00		57.29	29.00		1.00		11.00	0.50		0.20			B 0.01
Esteticor® N2		■	■	■	■	■	67.60	15.20	0.20	52.00	20.00		5.40		6.00	1.00		0.20			
Ceradelta 2		■	■	■	■	■	61.50			61.45	24.45		10.00	2.00	2.00			0.05			B 0.05
Esteticor® Actual		■	■	■	■		53.80			53.60	37.59		8.60					0.20			B 0.01
Esteticor® NewStart		■	■	■	■		58.30			58.00	29.99		6.00	1.70	4.00			0.30			B 0.01
Ceradelta		■	■	■	■	■	57.50			57.45	32.00		2.00	1.00	6.00	1.50		0.05			
Esteticor® Implant 32		■	■	■	■		73.00	32.00		40.85	19.00		5.00		3.00			0.15			


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

Alloys	Physical properties					Mechanical properties							
	CTE | $10^{-6}K^{-1}$		Density	Melting range	Young's Modulus	Hardness HV5		Proof stress Rp 0.2% MPa		Tensile strength (Rm) MPa		Elongation A5 %	
	(25–500 °C)	(25–600 °C)	g/cm³	°C	GPa	As cast	After firing	As cast	After firing	As cast	After firing	As cast	After firing
Cerapall 6	13.7	14.0	11.7	1135–1340	120	260	255		530		830		34
Cerapall 2	13.5	13.9	11.4	1165–1285	130	305	280		590		860		34
Esteticor® Biennor CF	13.8	14.2	11.4	1155–1315	120	245	235		515		830		43
Esteticor® CC	14.3	14.6	11.8	1200–1305	130	305	260		645		865		9
Esteticor® Blancor	14.3	14.6	11.3	1205–1310	135	300	260		605		845		13
Esteticor® N2	14.1	14.4	12.0	1150–1265	120	295	260		565		855		13
Ceradelta 2	14.2	14.6	11.3	1160–1265	125	315	265		540		760		14
Esteticor® Actual	14.8	15.1	11.2	1190–1270	125	225	225		520		785		25
Esteticor® NewStart	14.5	14.9	11.2	1180–1270	135	265	220		525		785		32
Ceradelta	14.6	14.9	11.3	1135–1275	110	255	250		565		780		13
Esteticor® Implant 32	14.2	14.5	13.1	1215–1290	125	225	240		555		820		17

Legierungen	Lote				Laserschweissdraht	Verarbeitungshinweise		
	Vor dem Brand		Nach dem Brand			Vorwärmen °C	Tiegel	Giesstemperatur °C
Cerapall 6	S.W 1125	S.G 1120	S.G 750		LW N° 2	850	❷	1450
Cerapall 2	S.W 1125	S.G 1080	S.G 750		LW N° 2	850	❷	1450
Esteticor® Biennor CF	S.G 1055				LW N° 2	850	❷ ❸	1365–1415
Esteticor® CC	S.W 1125		S.G 750		LW N° 2	850	❷ ❸	1405–1455
Esteticor® Blancor	S.W 1100		S.G 750		LW N° 3	850	❷ ❸	1410–1460
Esteticor® N2	S.W 1100		S.G 810	S.G 750	LW N° 3	850	❷ ❸	1365–1415
Ceradelta 2	S.G 1120		S.G 750		LW N° 3	850	❷	1450
Esteticor® Actual	S.W 1100		S.G 810	S.G 750	LW N° 3	850	❷ ❸	1430–1460
Esteticor® NewStart	S.W 1100		S.G 810	S.G 750	LW N° 3	850	❷ ❸	1400–1450
Ceradelta	S.G 1120		S.G 750		LW N° 2	850	❷	1450
Esteticor® Implant 32	S.G 1055	S.G 1030	S.G 750		LW N° 3	850	❷ ❸	1390–1440

❶ = Graphite crucible ❷ = Universal ceramic crucible ❸ = Vitrified carbon crucible

Alloys	Recommended casting systems (not compulsory)								
	Propane-oxygen flame Post-melting time 5–10 s	Vacuum-pressure casting with electric resistance furnace Post-melting time 40–60 s	Centrifugal casting with electric resistance furnace Post-melting time 40–60 s	High frequency induction in atmosphere Post-melting time 5–10 s	High frequency induction in protective gas atmosphere Post-melting time 5–10 s	Thermal treatment of the framework before surface treatment (not compulsory)	Annealing	Hardening	Trimming of the framework surface with ceramically bonded grinding stones
Cerapall 6	✔	✔	✔	✔	✔		900 °C / 15 min / H_2O	600 °C / 15 min / air*	✔
Cerapall 2	✔	✔	✔	✔	✔		900 °C / 15 min / H_2O	600 °C / 15 min / air*	✔
Esteticor® Biennor CF	✔			✔	✔				✔
Esteticor® CC	✔	✔	✔	✔	✔				✔
Esteticor® Blancor	✔	✔		✔	✔				✔
Esteticor® N2	✔	✔	✔	✔	✔				✔
Ceradelta 2	✔	✔	✔	✔	✔		900 °C / 15 min / H_2O	600 °C / 15 min / air*	✔
Esteticor® Actual	✔			✔	✔	950 °C / 10 min			✔
Esteticor® NewStart	✔			✔	✔				✔
Ceradelta	✔	✔	✔	✔	✔		900 °C / 15 min / H_2O	600 °C / 15 min / air*	✔
Esteticor® Implant 32	✔	✔	✔	✔	✔	600 °C / 15 min			✔

* Annealing before hardening

Alloys	Sandblasting with non-recycled aluminium oxide (Al_2O_3) 50 μm	Cleaning with steam jet	Oxide firing		Pickling after oxide firing in a warm and clean solution of 10 vol. % sulphuric acid (H_2SO_4)	Sandblasting after oxide firing with non recycled aluminium oxide (Al_2O_3) 50 μm
			with vacuum	without vacuum		
Cerapall 6	✔	✔		950 °C / 10 min		
Cerapall 2	✔	✔		950 °C / 10 min		
Esteticor® Biennor CF	✔	✔		980 °C / 10 min		✔
Esteticor® CC	✔	✔	980 °C / 5 min			✔
Esteticor® Blancor	✔	✔		960 °C / 5 min		✔
Esteticor® N2	✔	✔	980 °C / 5 min			✔
Ceradelta 2	✔	✔		950 °C / 10 min	✔	
Esteticor® Actual	✔	✔	960 °C / 5 min			✔
Esteticor® NewStart	✔	✔	960 °C / 5 min			✔
Ceradelta	✔	✔		950 °C / 10 min	✔	
Esteticor® Implant 32	✔	✔		900 °C / 10 min		

Alloys	Ceramic veneer: cooling cycle after firing						
	Heating rate max.	Ceramics < 900 °C			Ceramics > 900 °C		
		Long-term	Normal	Rapid	Long-term	Normal	Rapid
Cerapall 6			■	■		■	
Cerapall 2			■	■		■	■
Esteticor® Biennor CF			■	■		■	■
Esteticor® CC			■			■	
Esteticor® Blancor			■		■	■	
Esteticor® N2			■			■	
Ceradelta 2			■		■	■	
Esteticor® Actual		■	■		■	■	
Esteticor® NewStart		■	■		■	■	
Ceradelta		■	■		■	■	
Esteticor® Implant 32			■			■	

Not binding, please also observe the instructions of the ceramic manufacturer!

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