Instructions for Use S & S Scheftner GmbH

Starbond CoS Powder 16

Product: Cobalt-Chromium bonding alloy for the manufacturing of removable and fixed restorations by Selective Laser Melting (SLM). The alloy is a type 4 alloy according to ISO 22674. Free of beryllium, nickel and cadmium.

Indications: Crown- and bridge frames for ceramic veneering.

Nominal analysis in mass percent:

Nominal values of the alloy composition					
Co	Cr	W	Mo	Si	Other constituents: C; Fe; Mn; N
59.0 %	25.0 %	9.5%	3.5%	max. 1%	max. 1.5 %

Properties (target values):

Nominal values of the alloy properties			
Technical properties		Other properties	
Properties	Standard values	Properties	Standard values
Proof stress (Rp0.2)	532 MPa	Density	8.8 g/cm³
Ultimate tensile strength	657 MPa	Solidus-Liquidus interval	1305 - 1400°C
Tensile elongation	4%	Thermal expansion coefficient 20-600°C	14,0 µm/m°C
Elastic modulus	230 GPa	Biocertificate	yes
Vickers hardness	345 HV 10		

Model:
The crown walls of the virtual model shall be at least 0.4 mm so that the final wall thickness after finishing or before ceramic and acrylic veneering will be at least 0.3 mm. Avoid sharp edges and undercut areas. Pontics are to be designed as thick and high as possible (at least 3 mm x 3 mm).

Processing in SLM Systems
The current instructions of use of the manufacturer of the SLM-system have to be observed. Parameters are to be fine tuned to Starbond CoS Powder 16. It has to be ensured that the system used is not contaminated.

Relief-firing:
We recommend to conduct relief-firing for bridges larger than 4 pontics. Relief-firing can be conducted under argon or nitrogen.
Heat up to 450°C within 60 minutes.
Hold for 45 minutes.
Heat up to 800°C within 45 minutes.
Hold for 60 minutes.
End heating process. Open stove door after temperature has decreased to 600°C.
After further temperature decrease to 300°C stop argon/nitrogen supply.

Finishing and Cleaning
When conducting relief-firing under nitrogen, sandblast frameworks after separation using aluminium oxide (approx. 110-150 µm) at 2-3 bar. Trim frameworks with clean carbide burs suitable for CoCr alloys or with diamond burs. Only trim in one direction in order to avoid overlapping that might result in bubbles during the subsequent ceramic build-up. Clean the surfaces to be veneered afterwards with fresh aluminium oxide (approx. 110-150 µm) at a pressure of 2-3 bar. Thoroughly steam clean framework or clean under running tap water. Degrease with ethyl alcohol.

Oxide-firing
No oxide-firing necessary. If oxide-firing (at 950 – 980°C) is optionally performed in order to visually check the metal surface, sandblast again with fresh aluminium oxide (approx. 110-150 µm). Clean framework again.

Veneering
As long as the used ceramic allows for it, Starbond CoS Powder 16 does not require long-time cooling. Please observe indications of ceramics manufacturer.
The thermal expansion coefficient is 14 µm/m°C.
Further processing has to be performed according to the ceramic manufacturer's instructions, especially what the cooling-time after firing is concerned.

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Soldering (if necessary)
To avoid a mix of materials, soldering should generally be avoided. Should nevertheless soldering be necessary, the soldering model should be kept as small as possible; preheat model in furnace for 10 min at 600°C. Already before heating, the surfaces to be soldered should be covered with flux. The gap should not be larger than 0.2 mm (Recommended solder: Starbond Lot). Let soldered objects cool down slowly. After opaque firing no soldering should be performed anymore. Alternative joining techniques such as laser welding or gluing are to be applied.

Laser welding
As filler wire commonly available laser welding wires suitable for the alloy (e.g. S&S Scheftner Starwire) are to be used. Observe the welding parameters recommended by the manufacturer of the welding laser.

Polishing
Smooth out the visible metal surfaces by grinding with ceramic bonded stones. Finish with rubber polishers, pre-polish with S&S Scheftner Black Diamond pre-polishing paste and polish with suitable polishing paste until high-polish effect is reached. Finally carefully steam clean or clean with ultrasonic cleaner.

Security notes
The inhaling of Starbond CoS Powder 16 is to be avoided. Please observe medical security data sheet for Starbond CoS Powder 16 and indications of SLM-system manufacturers.

Secondary effects
such as allergies to contents of the alloy or electrochemically based reactions may very rarely occur.

Reciprocal actions:
In case of occlusal or approximal contact of different alloys electrochemically based reactions may very rarely occur.

Reactions:
In case of known incompatibilities and allergies to contents of the alloy.

Warranty:
Our recommendations for use whether given verbally, in writing or by practical instructions, are based on our own trials and experience and can only be considered as standard values. Our products are subject to constant further development. Therefore alterations in construction and composition are reserved.

Packaging:

Starbond CoS Powder 16	5 kg	REF 133716

Applied standards:
DIN EN ISO 14971
DIN EN ISO 22674
DIN EN 980
DIN EN 1641
DIN EN 9693

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