# Instructions for Use Starbond Ti5 Powder 45



## Medical product – For use by dental professionals only

#### 1. Purpose:

Titanium alloy (TiAl6V4, Grade 5, ELI) in powder form to produce fixed and/or removable dentures and dental applications in the laser melting process. According to the provisions of ISO 22674, the alloy falls under the category Type 4. Free of nickel, beryllium, cadmium, and lead. This alloy should be used by gualified and trained personnel for the intended application.

#### 2. Indications:

Restoration of chewing function in partially or completely toothless jaws, replacement of teeth destroyed by caries or weakened by extensive fillings, replacement of tooth hard substance lost due to trauma or degeneration, correction of positional and shape anomalies of teeth, aesthetic correction.

#### 3. Contraindications:

In case of known or suspected allergy to components of the product, the use of the product is contraindicated.

#### 4. Potential side effects:

Hypersensitivity reactions (allergies) to components of the alloy, electrochemically induced discomfort or taste irritation and irritation of the oral mucosa are possible in rare individual cases.

#### 5. Interactions:

In the case of occlusal or proximal contact of different alloys, electrochemically induced discomfort is possible in rare individual cases.

#### 6. Indicative analysis in mass%:

Ti	AI	V	N, C, H, Fe, O
89.1%	6.0	4.0	< 1.0 %

## 7.Technical characteristics\*:

Yield strength (Rp0.2)	920-1150 MPa	Density	4.5 g/cm3		
Tensile strength	1100-1300 MPa	Solidus-Liquidus interval	1660 °C		
Ultimate strain	3-10 %	Coefficient of thermal expansion 20–600 °C	$9.9  imes 10^{-6}  \mathrm{K}^{-1}$		
Modulus of elasticity	110-120 GPa	Laser weldable	Yes		
Vickers hardness	320-380 HV 5/30	Type (DIN EN ISO 22674)	4		
*Guideline values, depending on specific machine settings					

#### 8. Availability :

Starbond Ti5 Powder 45	2.5 kg	+10/-45μm	REF 136715
------------------------	--------	-----------	------------

#### 9. General notice:

Please carefully observe the safety instructions listed and all processing instructions in the other sections. This product should only be used in accordance with the instructions for use. Should the user and/or patient become aware of any serious incidents arising in connection with the use of the product, these must be reported to the manufacturer and to the competent authority of the Member State in which the user and/or patient is located. Any use in violation of these instructions is at the discretion and sole responsibility of the dental professional. Check for damage by visual inspection before use. Damaged products must not be used.

## Instructions for Use Starbond Ti5 Powder 45



## 10. Product application

## 10.1 Digitale Modellation:

Do not construct dentures of virtual modeling thinner than 0.4 mm, so that the wall thickness after processing and before ceramic or plastic veneer is at least 0.3 mm. Design dentures according to the anatomical tooth shapes to allow uniform ceramic layering. Avoid sharp edges and interlocking modelling. Make the connectors of the dentures as strong and high as possible (at least 3 mm × 3 mm).

## For fixed dentures

Do not create a virtual-model design for the denture thinner than 0.5 mm – ensure that the wall thickness is at least 0.4 mm after finishing and before the ceramic or acrylic veneer is applied. Design the dentures based on anatomical tooth shapes to make it possible to apply ceramic coatings evenly. Avoid sharp edges and model designs with undercut areas. Design the connecting parts of the prosthesis to be as thick and as wide as possible (at least 3 mm  $\times$  3 mm).

#### For removable dentures

The basic design should ensure a minimum thickness of 0.6 mm, resulting in a thickness of 0.5 mm after finishing. A minimum of 0.5 mm should be applied for the upper-jaw base. For standard bases, the typical base thickness is usually approx. 0.75 - 0.85 mm, whilst narrow bands or skeletonised frameworks have a thickness of 1.0 - 1.2 mm. Lower-jab mounts should generally have a thickness of about 1.8 - 2.0 mm  $\times 4.0 - 4.2$  mm. At critical points on the object, it is recommended to set the wall thickness to approx. 1.2 - 1.5 mm  $\times 1.8 - 2.0$  mm.

The design of the brackets depends on the position, function, extent of restoration, and treatment requirements. In the shoulder area of the clamp, the transition from the small connector to the clamp should be rounded off. The ideal thickness for the clamp shoulder is approx. 1.5 mm – 2.0 mm, whereby it should taper down in size to the tip of the clamp to 1.2 mm – 1.5 mm. The clamp tip should be rounded off. At critical points, e.g. at the transition area between a small connector and the clamp, the wall thickness should be set to approximately 1.2 mm – 1.5 mm – 2.0 mm. Shapes and parameters for the bracket profiles must be selected or set as required within the design software.

#### 10.2 Processing in laser melting systems:

The currently valid operating instructions of the device manufacturers must be followed. The parameters must be adjusted to Starbond Ti5 Powder 45, and it must be ensured that the equipment used is not contaminated.

#### 10.3 Relaxation firing:

During the laser melting process, tensions can occur in the microstructure. We therefore recommend that dentures from four sections upwards are subjected to a relaxation firing under argon.

Heat to 850°C for 120 minutes.

#### 10.4 Preparing and cleaning:

Blast scaffolds with aluminium oxide (approx. 110–250  $\mu$ m) (pressure: 2–4 bar) and prepare under high pressure with clean carbide milling cutters or diamond grinding tools suitable for titanium. Observe the maximum speed of the instruments recommended by the manufacturer. Process surfaces only in one direction to avoid material overlaps, which can lead to blistering during subsequent ceramic veneering. Then blast the surfaces to be veneered with pure aluminium oxide (approx. 110–250  $\mu$ m) (pressure: 2–4 bar). Clean framework thoroughly under running water or steam clean. If necessary, degrease with ethyl alcohol.

#### 10.5 Oxide firing:

Oxide firing is not required. If an oxide fire is optionally carried out for visual surface inspection, the oxide must be radiated with pure alumina (approx.  $110-250 \mu m$ ). The surface must be thoroughly cleaned again.

#### 10.6 Ceramics:

Long-term cooling is required. Follow the manufacturer's recommendations! Always follow the manufacturer's work instructions for further ceramic processing!

#### 10.7 Acrylic veneer

The manufacturers' specific instructions must be observed when developing veneer systems on protective back plates. In the case of polished modelled prostheses created by casting, the retention areas for acrylic saddles should be slightly roughened prior to processing. For further information on processing, please refer to the instructions for use from the respective acrylic manufacturers.

## Instructions for Use Starbond Ti5 Powder 45



## 10.8 Laser welding:

Commercially available laser welding wires, suitable for the alloy, are appropriate filler material. The welding parameters recommended by the manufacturer of the laser welding device used must be observed.

## 10.9 Polishing:

Carry out abrasive blasting of metal surfaces, with smoothing and rubberising using ceramic-bonded abrasives. Then polish using polishing paste until a high-gloss effect is achieved. Finally, clean thoroughly using steam-blasting and an ultrasonic cleaner.

## 11. Reuse:

Material already melted in the laser melting process should not be used by remelting for the re-production of dentures. The reuse of the product can lead to a different alloy composition and changed properties, as well as to a changed particle size distribution. New material is to be used to produce high-quality dentures.

## 12. Safety:

Inhalation of metal powder dust should be avoided. Use dust mask type P2-EN143 or comparable for all work steps! Provide local extraction or general room ventilation. Please note the information in our safety data sheet as well as the information provided by the manufacturers of the laser melting systems. Before use, remove dry bags with suitable protective equipment and dispose of properly.

## 13. Storage conditions:

Store dry and tightly closed in the original container.

## 14. Disposal:

The applicable national regulations and the relevant information in the safety data sheets must be observed.

#### 15. Warranty:

Our processing instructions are based on our tests and experience and are therefore to be understood as a recommendation.



Only for technical personnel!



€ 0482