Technical data sheet

Titanium Grade 5-ELI

Manufacturer

Zapp Medical Alloys GmbH
Letmather Str. 69
58239 Schwerte
Germany

Zapp Medical Alloys GmbH is certified according to:

- **ISO 9001**

Description

Titanium Grade 5-ELI - Ti6Al4V ELI
Material number: 3.7165 (DIN)
ISO 5832-3/ASTM F 136

Description

Titanium Grade 5-ELI (**E**xtra **L**ow **I**nterstitial elements) is a variant of Grade 5. This variant of the titanium alloy has a higher purity (than "normal" Grade 5), and is mainly used in medical technology, surgical implants and dental prosthetics. The alloy is used in the aforementioned applications because it is best accepted by the human body.

However, the higher purity of Grade 5-ELI compared to Grade 5 is associated with slightly poorer mechanical properties. At the same time, however, the speed of the corrosion-induced crack growth is significantly reduced.

Indication

Titanium Grade 5 ELI can be used to manufacture crowns and bridges in the anterior and posterior tooth area. Bridge substructures for the anterior teeth may be produced with up to 3 contiguous pontics. The connector cross-section must not be less than 6 mm². In the posterior tooth area, bridges may not contain more than 3 contiguous pontics. A connector cross-section of at least 9 mm² is recommended. Furthermore, bars, implant bridges and superstructure can be produced.

Veneering

Titanium framework can be veneered with a veneering ceramic suitable for titanium. Observe the operating instructions of the applicable manufacturer.

Finishing/cleaning

The substructures can be finished using a clean, titanium-suitable carbide cutter. To do this, the tools must only be pulled over the surface in one direction in order to avoid material overlaps and possible bubble formation during ceramic veneering. In addition, the maximum speed of the instruments recommended by the manufacturer must be observed. Subsequently, pure aluminium oxide (approx. 180 µm) should be used to sand the surfaces, using a pressure of 2 - 3 bar. Afterwards, thoroughly rinse the substructure under running water, or evaporate with hot steam and degrease with ethyl alcohol. Never use hydrofluoric acid!

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Chemical composition

Fe (in %)	**C** (in %)	**N** (in %)	**O** (in %)	**H** (in %)	**Al** (in %)	**V** (in %)	**Ti** (in %)
≤ 0.25	**≤ 0.08**	**≤ 0.05**	**≤ 0.13**	**≤ 0.012**	**5.50 - 6.50**	**3.50 - 4.50**	**Remainder**

Physical/mechanical properties (guidelines)

Coefficient of thermal expansion **α** (CTE value) 20 - 100°C	**9.0** $[10^{-6}\ K^{-1}]$ or $[10^{-6}\ C^{-1}]$
Specific heat capacity **c** (ambient temperature)	**526** $[J*kg^{-1}*K^{-1}]$ or $[J/*kg^{-1}*C^{-1}]$
Thermal conductivity **λ** (ambient temperature)	**6.6** $[W*m^{-1}*K^{-1}]$ or $[W*m^{-1}*C^{-1}]$
Specific electrical resistance ρ_E (ambient temperature)	**1.7** $[\Omega*mm^2*m^{-1}]$
Density **ρ** (at 20°C)	**4.42** [g/cm³]
Elasticity module (at 20°C)	**114,000** [MPa] or [N/mm²]

Tensile test at room temperature (guidelines)

Elastic limit $R_{P0,2}$ (min./max.)	**815 - 860** [MPa] or [N/mm²]
Tensile strength R_M (min./max.)	**1085 - 1153** [MPa] or [N/mm²]
Elongation at break **A** (min./max.)	**13 - 15** [%]
Contraction at fracture **Z** (min./max.)	**42 - 44** [%]

Thermal properties

Temperature **T l**ow stress annealing	**ca. 500 - 650** [°C] or**932 - 1,202** [°F]
Temperature **T** recrystallizing annealing	**approx . 730** [°C] or **1,346** [°F]

CADstar Digital Dental Solutions