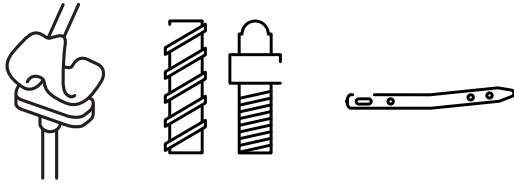


# Ti 64, TiAl6V4 ELI, Titanium Grade 23, 3.7165 ISO 5832-3 Data Sheet



Zapp is certified to ISO 9001



3.7165, Ti64, TiAl6V4 ELI, UNS R56401 – according to ISO 5832-3 – Complementary to Medical Implant Steel

Besides implant steel materials c also offers titanium materials. Zapp® 3.7165 (Extra-Low-Interstitial) is a high-strength titanium alloy with a very good strength-to-density ratio.

Titanium Grade 23 Corresponds to Titanium Grade 5 ELI ELI (Extra Low Interstitial) means that the contents of the elements iron (Fe) and oxygen (O) are limited in comparison to the conventional alloy.

This supports the bone cell growth on the implant surface and accelerate their firm adhesion (osseointegration)

The material shows exceptional biocompatibility and is easily accepted by the body.

Typical Applications of 3.765 ELI, Titanium

- Cages and Bars for the spine area
- Permanent implants for knees and hips
- Bone screws and nails
- Dental abutments

[Information about further medical applications at Zapp.](#)

## Weldability

The TIG and MIG processes using, for example, argon with a purity of 99.999% are suitable. Other suitable welding processes are plasma, laser and electron beam welding. All semi-finished products to be welded must be dry and free from impurities and oxides.

Complete inert gas protection including the underside of the seam must be guaranteed because the high affinity of titanium to atmospheric gases can lead to oxidation / embrittlement of the surface from approx. 250 ° C.

## Machining

In the annealed state, Zapp® 3.7165 has optimal conditions for the most effective machining.

## Magnetism of 3.7165 ELI

Zapp® 3.7165 is not magnetizable.

## Corrosion Resistance

Zapp® 3.7165 shows good corrosion resistance in oxidizing media, which is due to the formation of a dense, firmly adhering oxide layer. If damaged, it quickly re-forms in the presence of oxygen.

## Standard Designation

- According to DIN EN TiAl6V4
- Grade 3.7165
- According to ISO 5832-3
- According to ASTM B 348, F136
- According to UNS R56401

## Typical Chemical Composition (approx. values)

	C	N	O	H	Al	Fe
Min.	-	-	-	-	5.50	-
Max.	≤ 0.08	≤ 0.05	≤ 0.13	≤ 0.012	6.50	≤ 0.25
	V	Ti				
Min.	3.50					
Max.	4.50	rest				

## Hot working of the Titanium Grade

Preferably in an electrically heated oven under inert gas or in a vacuum. Otherwise the atmosphere should be adjusted to be slightly oxidizing to neutral.

Annealing	approx. 730 °C
Holding time	1 to 4 h
Cooling	Air

We always recommend consulting our technical advisors about heat treatment.

[Information about implant steel and further medical grades at Zapp.](#)

## Mechanical Properties\*

Tensile strength $R_m$ [MPa]	≥ 860
Yield strength $R_{p0,2}$ [MPa]	≥ 795
Elongation A [%]	≥ 10

\*Example for mechanical properties < 44,45 mm

## Physical Properties

Modulus of elasticity E at 20 °C [GPa]	114
Density $\rho$ [kg/dm <sup>3</sup> ]	4.45
Thermal conductivity $\lambda$ at 20 °C [W/m*K]	6.7
Coefficient of thermal expansion $\alpha$ [ $10^{-6} \cdot K^{-1}$ ]	
20 - 100 °C	8.6
20 - 200 °C	9.2
20 - 300 °C	9.5
20 - 500 °C	10
Specific heat c at 20 °C [J/kg*K]	560
Specific electrical resistance $\rho$ at 20 °C [ $\Omega \cdot mm^2/m$ ]	0.55
Melting range [°C]	>1680
/ Transus [°C]	~ 990

[Please see our linecard of implant steel and further medical grades.](#)

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