TITANEX GmbH
Sternenweg 17 • CH-8617 Mönchaltorf
Tel. +41 (0)444 635 382 • Fax +41 (0)444 635 348
E-Mail ask@titanex.com

MwSt-CH: CHE-108677767 • MwSt-D: DE 812 310 981

TITANEX.COM
Titan, Tantal, Anodurit

Titanium Grade 5 / 23 / ELI

» Titanium Grade 5 ASTM B 265 / 348

This alpha-beta alloy is the workhorse alloy of the titanium industry. The alloy is fully heat-treatable in section sizes up to one inch, and is used up to approximately 400° C (750°F). Since it is the most commonly used alloy - over 50 per cent of all alloy grades melted are a sub-grade of Ti-6-4 - its applications span many turbine and airframes and also several industrial applications.

» Titanium Grade 23 ASTM B 265 / 348

This Grade 23 is basically a Grade 5 with the reduction of oxygen, iron and nitrogen content. To become an Extra Low Interstitial Alloy. This confers improved ductility and fracture toughness, with some reduction in strength. ELI has been widely used in fracture critical airframe structures and for offshore tubulars. Work is continuing to optimize mechanical properties through processing and heat treatment.

» Titanium Ti6Al4V ELI ASTM F 136 / 1472

Only ASTM F 136 and 1472 are Standard Specifications for Wrought Titanium-6Aluminum-4Vanadium ELI (Extra Low Interstitial) Alloy **for Surgical Implant Applications**.

The above Grade 5 and 23 are listed in the Industrial Specification of ASTM B 265 (flats) and B 348 (Rounds).

» Composition

Element	Grade 5	Grade 23	Ti6Al4V ELI
C	< 0.08 %	< 0.08 %	< 0.08 %
Fe	< 0.40 %	< 0.25 %	< 0.25 %
N	< 0.05 %	< 0.03 %	< 0.05 %
O	< 0.2%	< 0.13%	< 0.13%
Al	5.5 - 6.75 %	5.5 - 6.5 %	5.5 - 6.5 %
V	3.5 - 4.5 %	3.5 - 4.5 %	3.5 - 4.5 %
H (sheet)	< 0.015 %	< 0.015 %	< 0.015 %
H (bar)	< 0.0125 %	< 0.0125 %	< 0.0125 %
H2 (billet)	< 0.0100 %	< 0.0100 %	< 0.0100 %
Ti =	Rem	Rem	Rem

TITANEX GmbH
Sternenweg 17 • CH-8617 Mönchaltorf
Tel. +41 (0)444 635 382 • Fax +41 (0)444 635 348
E-Mail ask@titanex.com

MwSt-CH: CHE-108677767 • MwSt-D: DE 812 310 981

TITANEX.COM
Titan, Tantal, Anodurit

Titanium Grade 5 / 23 / ELI

» Physical Data

	Minimum	Typical
Density g/cm3 (lb/cu.in)		4.43 (0.159)
Melting Range °C+/-15°C (°F)		1649 (3000)
Specific Heat J/g/°C		0.56
Volume Electrical Resistivity µohm.cm (µohm.in)		170 (67)
Thermal Conductivity W/mK(Btu/ft h°F)		7.2 (50)
*Mean Thermal Exp. Coeff. 0-100°C/°C		8.8 x 10 -6
*Mean Thermal Exp. Coeff. 0-300°C/°C		9.2 x 10 -6
Beta Transus °C+/-15°C(°F)		999 (1830)

» Mechanical Data

	Min Gr 5	Min Gr 23	Min ELI	Typical
Tensile Strength MPa(ksi)	895 (130)	828 (120)	860 (125)	1000 (145)
0.2% Proof Stress MPa(ksi)	828 (120)	759 (110)	795 (115)	910 (132)
Elongation over 2 Inches %	10	10	10	18
Reduction in Area %	20	20	20	
Elastic Modulus GPa(Msi)				114 (17)
Hardness Rockwell C				36
Specified Bend Radius <0.070" x Thickness				4.5
Specified Bend Radius >0.070In x Thickness				5
Welded Bend Radius x Thickness				6
Charpy, V-Notch Impact J(ft Ibf)				24 (18)

» Fabrication Information

Weldability	Fair
Forging	Rough 982°C(1800°F), finish ó 968°C (1775°F)
Annealing	732°C(1350°F), --4hr, FC to 566°C(1050°F), AC FC not necessary for bars
Solution Treating	forgings
Ageing	904-954°C (1660-1750°F), 5min-2hr, WQ 538°C (1000°F), 4hr, AC