



*TITANIUM 3Al-8V-6Cr-4Mo-4Zr
Beta-C /Grade 19
(UNS R58640)*

Chemical Composition										
O	N	C	H	Fe	Al	V	Cr	Mo	Zr	Residuals
0.12	0.03	0.05	0.015	0.3	3.0-4.0	7.5-8.5	5.5-6.5	3.5-4.5	3.5-4.5	0.4

(maximum values unless range is shown)

Titanium Beta-C is a metastable beta alloy which can be heat treated to high strength levels. The alloy contains beta stabilizer elements which allow it to retain the high strength beta phase after quenching. It can be solution treated and aged to provide increases in strength above convention alpha and beta titanium alloys. Because it has one of the lowest densities for a beta titanium alloy, it has a very high specific strength (strength/density).

As in other titanium alloys, Beta-C titanium alloy has a high level of corrosion resistance based on the existence of a consistent and continuous oxide layer which is formed spontaneously upon exposure to oxygen. In addition, due to its approximate 4% molybdenum content, Beta-C titanium alloy has excellent resistance to corrosion in reducing environments such as Hydrogen Sulfide (H₂S). It has excellent resistance to corrosion in seawater making it a good choice for use in offshore and subsea oil & gas operations where corrosion, strength, and weight are concerns.

Beta-C titanium, like other titanium alloys, has a modulus of elasticity of 107 Gpa (15.5 x 10³ ksi), roughly half that of alloy steels. It also has excellent fatigue resistance, therefore it can be beneficial when used in component designs that will need to elastically deform repeatedly under high stresses. Another benefit of Beta-C titanium is its ability to retain relatively high levels of strength at temperatures up to 350°C.

Some advantages of Titanium Beta-C:

- Excellent corrosion resistance
- Can be heat treated to yield strength levels above 1170MPa (170 ksi)
- Stronger than titanium alloys 6Al-4V and 6Al-2Sn-4Zr-6Mo
- Conforms to NACE MR 0175/ISO 15156
- Excellent fatigue resistance
- High strength-to-weight ratio



Applications

Titanium Beta-C can be used in applications where very high strength, light weight and corrosion resistance are important. It has been used in a variety of applications involving oil & gas drilling, well completion and intervention, and hydrocarbon production where traditional alloys do not have sufficient strength at higher temperatures, or do not conform to the NACE MR0175 / ISO 15156 standard for severe service.

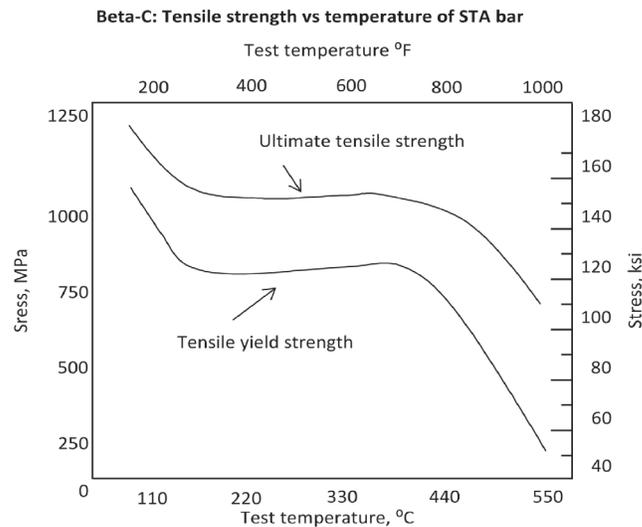
Because of the low modulus of elasticity, Titanium Beta-C has also been used for housings and shafts in high pressure/high temperature (HPHT) environments.

Titanium Beta-C has also been used in high-performance motorsport applications where high strength-to-weight ratio and the low modulus of elasticity are important factors.



Machinability

Machining capabilities are similar to other high strength titanium alloys; however, slower speeds are generally advised.



13mm (0.5 in.) bar, solution annealed at 815°C (1500°F)
+ 565°C (1050°F), 6 hr, AC

Typical Mechanical Properties Solution Treated & Aged Condition		
	MPa	ksi
Yield Strength (0.2%)	1170	170
Tensile Strength	1241	180
Elongation (%)	7	
Reduction in Area (%)	14	
Hardness	42 RC Max*	

for NACE MR0175 / ISO 15156

Titanium Engineers, with headquarters in Sugar Land, Texas, has over 25 years of experience in processing titanium and manufacturing titanium components, including high strength Beta-C titanium alloy. Titanium Engineers has large inventories of Beta-C and unlike many other titanium processors, we have the knowledge and experience to process and machine Beta-C titanium correctly in order to ensure the mechanical properties and dimensional stability required by the customer are met.

Titanium Engineers have highly experienced engineers, metallurgists, and materials experts with decades of design experience. Titanium Engineers works with you to obtain the Titanium Beta-C bar or machined components you need in the shortest possible time.

Please contact a member of our team for more information:

Sugar Land, Texas, USA
Coleshill, Birmingham, UK
Stavanger, Norway

Tel: +1 (281) 265 2910
Tel: +44 (0)1675 464200
Tel: +47 51 315 785

Email: contactus@titaniumengineers.com
Email: contactus-UK@titaniumengineers.com
Email: contactus-NO@titaniumengineers.com

