E STEEL SDN BHD (891338-A)

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CP Grade 2 Titanium Sheet, Coil, Bar, Plate

Commercially pure titanium grades feature an excellent strength-to-density ratio and good corrosion resistance. This makes them suitable for the manufacture of components in weight-saving structures with reduced mass forces, and also for components requiring high corrosion resistance. In addition, thermal stresses in titanium structures are lower than in other metallic materials, due to the low thermal expansion of titanium. The materials are also widely used in the medical sector because of their outstanding biocompatibility.

Standard

Material No.	EN Designation	ASTM	UNS
3.7035	Titan Grade 2	Ti-Grade 2	R50400

Chemical Composition (%)[1] - Grade 2

Titanium	**Iron**	**Oxygen**	**Carbon**
Remainder	0.30 max	0.25 max	0.08 max
Nitrogen	**Hydrogen[2,3]**		
0.03 max	0.015 max		

[1]Per applicable ASTM specifications. [2]Lower hydrogen values may be obtained by negotiating with the manufacturer. [3]Final product analysis.

Mechanical Properties of CP Grade 2 Titanium

Room Temperature Mechanical Properties	UTS Ksi (MPa)	YS Ksi (MPa)	%EI	%RA
Specified Minimum Properties	50 (345)	40 (275)	20	30
Typical Properties	74-88 (510-605)	49-79 (335-545)	21-29	47-54

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Industries & Applications

Titanium Grade 2 has a lower density making it very desirable where weight can be a concern. Medical and aerospace are two key industries for titanium alloys. The strength and corrosion resistance properties of titanium Grade 2 also make it well suited to applications in the marine, chemical processing and desalination industries. Typical applications for Grade 2 titanium include oil & gas components, reaction and pressure vessels, tubing or piping systems, heat exchangers, liners, flue-gas desulphurization systems and many other industrial components. Continuous service temperatures can reach up to 800°F with occasional, intermittent service at 1000°F.

Resistance to Corrosion

Titanium's C.P. grades corrosion resistance comes from a strongly adherent, stable, protective oxide film, which forms in the presence of oxygen. This film makes the commercially pure titanium grades resistant to most oxidizing, neutral and inhibited reducing, as well as mildly reducing environments. Grade 2 offers excellent resistance to seawater and marine atmospheric corrosion. Corrosion resistance is similar between the four C.P. grades, but mechanical properties vary along with varying oxygen and iron contents. Grade 2 titanium is resistant to attack from moist chlorides and metallic chlorides, chlorite and hypochlorite solutions, nitric and chromic acids, organic acids as well as many gaseous industrial applications.

Fabrication and Heat Treatment

Titanium Grade 2 has good ductility, which allows for cold formability. To prevent cold forming concerns, the minimum bend radius for material under 0.070″ thick should be 2T, while 2.5T should be used for material over 0.070″. The material can also be easily machined, hot worked and welded. Hot working should be performed between 400°F and 600°F. Stress relieving should be performed by heating to a temperature between 900°F and 1100°F followed by either forced air or slow cooling. Annealing temperatures range from 1200°F to 1400°F for 6 minutes to 2 hours followed by an air cool.
Welding of Grade 2 titanium can be performed using various methods such as MIG and TIG. Inert gas shielding is crucial to prevent oxygen pickup and embrittlement of the weld area. A mixture of argon and helium is typically preferred but should be tested prior to accepting a welding procedure. Preheat or post heat treatments are not required.