Ulbrich Stainless Steels & Special Metals, Inc. • 153 Washington Avenue • North Haven, CT 06473 USA • 800-243-1676 • ULBRICH.com

TITANIUM GRADE 4, UNS R50700

(Commercially Pure Titanium: Grade 4) (70A) Strip, Coil, Foil, Wire, ASTM B265 GR4, AMS 4901, ASTM F67, MIL-T-9046CP1

Applications

Bellows, aircraft structural, honeycomb, gaskets, aircraft skin, heat exchanger parts

Description

Commercially Pure Titanium Grade 4 is the highest strength pure unalloyed Titanium with high oxygen and extra high strength. Grade 4 displays the highest strength of all the unalloyed CP grades. It combines excellent corrosion resistance with good formability and weldability. Mainly used in hydraulic and instrumentation tubing. Generally chosen for its corrosion resistance in a variety of chemical process equipment as well as marine and airframe applications. It can be used for parts requiring strength up to 400 °F and oxidation resistance to 600 °F.

Chemistry Typical

Titanium: Balance
Iron: 0.50 max
Oxygen: 0.40 max
Carbon: 0.80 max
Nitrogen: 0.05 max
Hydrogen: 0.015 max
Residuals each 0.10 max, total 0.40 max

Physical Properties

Density: 0.163 lbs/in³ (4.51 g/cm³)

Mean Coefficient of Thermal Expansion, in/in/°F (mm/m/°C):
70 - 212 °F (20 - 100 °C) 4.78 x 10^{-6} (8.6)

Thermal Conductivity: BTU-in/h-ft-°F (W/m-°K): At 70 °F (21 °C): 119 (17.2)

Modulus of Elasticity, ksi (MPa)
15.2 x 10³ (105 x 10³) in tension

Melting Point: 3020 °F (1660 °C)

Forms

Coil – Strip, Foil, Ribbon
Wire – Profile, Round, Flat, Square

Mechanical Properties at Room Temperature

Properties Annealed:

Ultimate Tensile Strength: 80 KSI min (552 MPa min)
Yield Strength (0.2% offset): 70 - 90 KSI (483 - 655 MPa)
Elongation: 15% min

Properties: Tempered

Titanium Grade 4 can be cold rolled to various tempers. Contact Ulbrich Technical Service for additional information.

Additional Properties

Corrosion Resistance

Refer to NACE (National Associate of Corrosion Engineers) for recommendations.

Finishes

#1 – Hot rolled annealed and descaled. It is available in strip, foil and ribbon. It is used for applications where a smooth decorative finish is not required.
#2D – Dull finish produced by cold rolling, annealing and descaling. Used for deep drawn parts and those parts that need to retain lubricants in the forming process.
#2B – Smooth finish produced by cold rolling, annealing and descaling. A light cold rolling pass is added after anneal with polished rolls giving it a brighter finish than 2D.
#BA – Bright annealed cold rolled and bright annealed
#CBA – Course bright annealed cold rolled matte finish and bright anneal
#2 – Cold Rolled
#2BA – Smooth finish produced by cold rolling and bright annealing. A light pass using highly polished rolls produces a glossy finish. A 2BA finish may be used for lightly formed applications where a glossy finish is desired in the formed part.
Polished – Various grit finish for specific polish finished requirements.
** Not all finishes are available for all alloys – Contact Ulbrich Sales for more information.*

Wire Finishes

XC – Extra clean. Bright annealed or bright annealed and cold rolled
Grease – Ultra bright finish for decorative applications
Soap – Soap is not removed from tempered wire to act as a lubricant.
** Contact Ulbrich Wire for custom finishes.*

Heat Treatment

Titanium Grade 4 can only be hardened by cold work.

Welding

For best results refer to: SSINA's "Welding of Stainless Steels and Other Joining Methods".