

Titanium Grade 2, also known as commercially pure (CP) titanium, is widely utilized in industrial applications that demand exceptional corrosion resistance, particularly in highly oxidizing aqueous environments with or without chlorides. Its excellent ductility and formability, combined with it being highly weldable, make it ideal for components such as seawater piping, reactor vessels, and heat exchangers in the Chemical Processing, Oil and Gas, and Naval/Marine industries. Additionally, Grade 2 is often dual certified as Grade 2/2H, with the latter indicating a higher carbon content that enhances mechanical properties.

Chemistry

	C	O	N	H	Fe	Ti
Min	-	-	-	-	-	-
Max	0.08	0.25	0.03	0.015	0.30	bal

Specifications

UNS: R50400

W. Nr./EN: 3.7034

ASTM: B265

Physical Properties

Density	0.163 lb/in ³
Melting Range	3000 - 3040°F
Poisson Ratio	0.32
Electrical Resistivity	21 μΩ • in
Coefficient of Thermal Expansion (68°F - 212°F)	4.8 μin/in • °F
Thermal Conductivity (68°F)	12.6 BTU/(hr•ft•°F)
Modulus of Elasticity (68°F)	15.2 • 10 ⁶ psi

Heat Treatment

Anneal	1300°F 2 Hrs/Air Cool
Stress Relieve	1000 - 1100°F 30 Min/Air Cool

*Due to the formation of alpha case at the surface, material removal is required

Mechanical Properties

Specification: ASTM B265

	Grade 2	Grade 2H
Ultimate Tensile Strength, ksi	50	58
0.2% Yield Strength, ksi	40	40
Elongation, %	20	20

*Minimum values per specification

Typical Tensile Properties

Temperature, °F	68	212	392	572	752	842
Ultimate Tensile Strength, ksi	70.0	56.0	41.0	33.0	27.0	26.0
0.2% Yield Strength, ksi	50.0	37.0	28.0	18.0	13.0	11.0
Elongation, %	28.0	31.0	37.0	43.0	38.0	34.0

Features

- Good impact properties at low temperatures
- Highly weldable
- Excellent seawater and marine corrosion resistance
- Great resistance to oxidizing acids/media

Applications

- Seawater Applications
- Pressure Vessels
- Heat Exchangers
- Petrochemical
- Oil & Gas
- Naval & Marine



Corrosion Resistance

Resistance to Chlorine

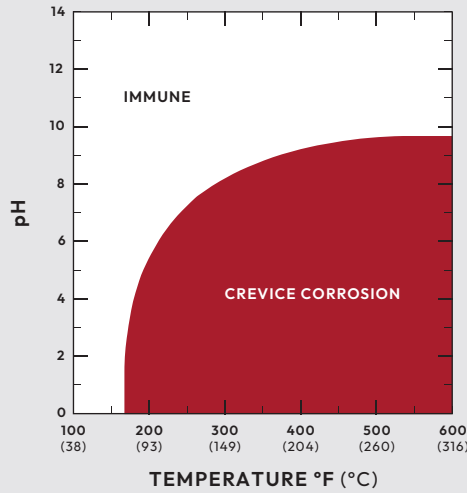
Environment	Temperature, °F	Corrosion Rate, mpy
Wet Chlorine	50 - 190	0 - 0.02
Water Saturated, Chlorine Gas	190	0.065
Dry Chlorine	86	Rapid Attack, Ignition

Source: (1997, January 1). Corrosion Resistance of Titanium. Timet. Retrieved December 2, 2024, from <https://www.timet.com/assets/local/documents/technicalmanuals/corrosion.pdf>

Resistance to Concentrated NaCl Brine

Effect of Temperature and pH on Crevice Corrosion of unalloyed Titanium in Saturated NaCl Brine

Source: (1997, January 1). Corrosion Resistance of Titanium. Timet. Retrieved December 2, 2024, from <https://www.timet.com/assets/local/documents/technicalmanuals/corrosion.pdf>



Resistance to Concentrated Nitric Acid

Corrosion of Titanium and Stainless Steel Heating Surfaces Exposed to Boiling 90% Nitric Acid (215°F) - Corrosion Rate - mpy

Metal Temperature, °F	240	275	310
Titanium Grade 2	1.1 - 6.6	1.6 - 6.1	1.0 - 2.3
304L	150 - 518	676 - 2900	722 - 2900

Source: (1997, January 1). Corrosion Resistance of Titanium. Timet. Retrieved December 2, 2024, from <https://www.timet.com/assets/local/documents/technicalmanuals/corrosion.pdf>

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