

MATERIAL DATASHEET

Alloy 316Ti Stainless Steel

UNS: S31635
EN-DIN: 1.4571

Type 316Ti is a titanium stabilized version of Type 316 molybdenum-bearing austenitic stainless steel. The Type 316 alloys are more resistant to general corrosion and pitting/crevice corrosion than the conventional chromium-nickel austenitic stainless steels such as Type 304. They also offer higher creep, stress-rupture and tensile strength at elevated temperature. Type 316 stainless steel can be susceptible to sensitization – the formation of grain boundary chromium carbides at temperatures between approximately 900 and 1500 °F (425 to 815 °C) – which can result in rapid corrosion. Resistance to sensitization is achieved in Type 316Ti with titanium additions to stabilize the structure against chromium carbide precipitation, which is the source of sensitization. This stabilization is achieved by an intermediate temperature heat treatment, during which the titanium reacts with carbon to form titanium carbides. This significantly reduces susceptibility to sensitization in service by limiting the formation of chromium carbides. Thus, the alloy can be used for extended periods at elevated temperatures without compromising its corrosion resistance.

Nominal Composition

| | C | Mn | P | S | Si | Cr | Ni | Mo | Ti | N | Fe |
|-----|------|-----|-------|-------|------|------|------|------|---------|------|-----|
| min | - | - | - | - | - | 16.0 | 10.0 | 2.00 | 5X(C+N) | - | - |
| max | .080 | 2.0 | 0.045 | 0.030 | 0.75 | 18.0 | 14.0 | 3.00 | 0.70 | 0.10 | BAL |

Physical Properties

| | At 70°F | At 20°C |
|---------------------------|--|--------------------------------------|
| Density | 0.29 lb./in ³ | 7.99 g/cm ³ |
| Modulus of Elasticity (E) | 28.0 x 10 ³ ksi in tension | 193 x 10 ³ MPa in tension |
| Coefficient of Expansion | 9.2 x 10 ⁻⁶ microinches/in.-°F (32-212°F) | 16.5 μm/m-°C (0-100°C) |
| Electrical Resistivity | 28.4 μ ohm.in | 72 μ ohm.cm |
| Thermal Conductivity | 8.4 Btu-in./ft. ² hr.-°F (100°C) | 14.6 W/m-K (100°C) |

Applicable Specifications

ASME SA-240, ASTM A240

Typical Mechanical Properties – Typical Room Temperature Mechanical Properties

| Condition | Tensile Strength (UTS) | 0.2% YS | Elongation% in 2" (50.8 mm) | Hardness Rockwell |
|-----------|------------------------|-------------------|-----------------------------|-------------------|
| Annealed | 90 ksi (620 MPa) | 36 ksi (248 MPa) | 54 | 76 HRBW |

Typical mechanical properties are based on ATI source, ASTM A240



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REV 2024 06 05

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