

316TI STAINLESS STEEL

Datasheet for Stainless Steel 316Ti

- Pipes & Tubes
- Sheets & Plates
- Bars & Rods, Forgings
- Fittings & Flanges
- Nuts & Bolts
- Valves



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Datasheet for Stainless Steel 316Ti

AISI 316Ti, UNS S31635, 1.4571

What is 316Ti Stainless Steel?

About 316Ti, UNS S31635, 1.4571 Stainless Steels

What is 316Ti Stainless Steel?

- Stainless Steel 316Ti (UNS S31635, WNR 1.4571) is a titanium-stabilized version of [Type 316 stainless steel](#) and is most commonly recommended for elevated temperature situations. This grade contains a small amount typically only 0.5% of titanium. While it still possesses many of the characteristics of other 316 grades, the addition of titanium allows 316Ti to be protected from precipitation at high temperatures, even with prolonged exposure. 316Ti also contains an addition of molybdenum in its composition. Like in other 316 grades, the molybdenum serves as increased protection against corrosion than the conventional chromium-nickel austenitic stainless steels such as Type 304, pitting from chloride solutions and offer higher creep, stress-rupture and tensile strength at elevated temperature. However, its high temperature resistance is also compounded by its titanium content, which allows 316Ti to be immune to precipitation at these temperatures. Additionally, the metal shows resistance to acids, such as sulfuric acids, hydrochloric acids, and acid sulfates.
- It is also known as DIN/EN designation No. 1.4571. [Type 316 stainless steel](#) can be susceptible to sensitization ñ the formation of grain boundary chromium carbides at temperatures between approximately 900 and 1500 °F (425 to 815 °C) ñ which can result in rapid corrosion. Reduced carbon Type 316L is resistant to sensitization; however, extended exposures in this temperature range will eventually result in sensitization of even the low carbon grade. 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. The titanium atoms stabilise the structure of the 316 at temperatures over 800°C. This prevents carbide precipitation at the grain boundaries and protects the metal from corrosion. **The main advantage of 316Ti is that it can be held at higher temperatures for a longer period without sensitisation (precipitation) occurring. Thus, the alloy can be used for extended periods at elevated temperatures without compromising its corrosion resistance. 316Ti retains physical and mechanical properties similar to standard grades of 316. The austenitic structure of 316 stainless steel gives excellent toughness, even at cryogenic temperatures.**
- Austenitic stainless steels can be welded together using many different welding processes. Some are more preferred for welding than others, such as 304, 308, 316, 321, and 347 which are all austenitic grades that are weldable.

Product Forms & Manufacturing Standards for Stainless Steel 316Ti

Product Forms	Material Standards
Plates, Sheets & Strips	ASTM A240, A666
Billets, Bars & Rods	ASTM A276, A484, A479
Forgings (Flanges & Fittings)	ASTM A182, A473
Wires	ASTM A313, A368, A478, A492, A493, A580.
Seamless and Welded Pipes	ASTM A312, A358, A270, A269, A249, A213, A813, A814.
Wrought Pipe Fittings	ASTM A403
Castings (Cast Fittings & Valve Parts)	ASTM A351, A743, A744

Equivalents of Stainless Steel 316/316L/316Ti

STANDARD	316	316L	316Ti
UNS	S31600	S31603	S31635
WERKSTOFF NR.	1.4401	1.4404	1.4571

Chemical, Mechanical and Physical Properties of Stainless Steel 316/316L/316Ti

Chemical Composition of SS 316/316L/316Ti

ELEMENT	316	316L	316Ti
NI	11.0 – 14.0	10.0 – 14.0	10.0 – 14.0
C	0.08 max	0.035 max	0.08 max
MN	2.0 max	2.0 max	2.0 max
P	0.045 max	0.045 max	0.045 max
S	0.30 max	0.30 max	0.30 max
SI	1.0 max	1.0 max	0.75 max
CR	16.0 – 18.0	16.0 – 18.0	16.0 – 18.0
MO	2.0 – 3.0	2.0 – 3.0	2.0 – 3.0
TI			5x(C+N) – 0.70
N			0.10 max

Physical Properties of SS316/316L/316Ti

DENSITY	7.99 g/cm ³ / 0.29 lb/in ³
MELTING POINT	1371 – 1399 (°C) / 2500 – 2550 (°F)
ANNEALED	1040 (°C) / 1900 (°F)
QUENCH	Rapid Air/Water
ELECTRICAL RESISTIVITY	74 microhm-cm (20 degrees Celsius)
SPECIFIC HEAT	0.50 kJ/kg-K (0–100 degrees Celsius)
THERMAL CONDUCTIVITY	16.2 W/m-k (100 degrees Celsius)
MODULUS OF ELASTICITY	193 x 10 ³ in tension

Mechanical Properties of SS 316/316L/316Ti

Alloy	UNS	Tensile Strength		Yield Strength		Elongation in 2 inch (min.) %	Grain Size Req.	Max. Hardness HRB Rockwell
		MPa	ksi	ksi	MPa			
316	S31600	515	75	30	205	35	—	90 HRB
316L	S31603	485	70	25	170	35	—	90 HRB
316H	S31609	515	75	30	205	35	7 or coarser	90 HRB

What is the Difference Between SS 304, SS 316 and SS 316L?

316	316L
Contains more carbon	Contains less carbon
More liable to weld decay	Better for avoiding weld corrosion
Effective in acidic environments	Good for high-temperature, high-corrosion use

- The difference between 304 and 316 is that 304 contains 18% chromium and 8% nickel, while 316 contains 16% chromium, 10% nickel and 2% molybdenum. The molybdenum is added to help resist corrosion to chlorides (like sea water and de-icing salts).
- The difference between 316 and 316L stainless steel is that 316L has a .03 max carbon and is good for welding whereas 316 has a mid range level of carbon. Even greater corrosion resistance is delivered by 317L, in which molybdenum content increases to 3 to 4% from the 2 to 3% found in 316 and 316L.
- SS 316L is more ductile when annealed, and is markedly more corrosion resistant, especially after welding. 316L is much more weld friendly than 316, as it is less susceptible to intergranular corrosion, after welding or air service up to 1600 °F (intermittent) 1700 °F (continuous), due to carbide precipitation. In 316 carbide precipitation will occur between 900 F-1070 F after 9 hours, whereas 316L will precipitate carbides between 900 °F - 1010 °F after 181 hours, 316L showing much more resistance to sensitization.
- 316L is very similar to 316 in almost every way. Cost is very similar, and both are durable, corrosion-resistant, and a good choice for high-stress situations.
- 316L, however, is a better choice for a project that requires a lot of welding because 316 is more liable than 316L to weld decay, though 316 can be annealed to resist weld decay. 316L also is a great stainless steel for high-temperature, high-corrosion uses, which is why it's so popular for use in construction and marine projects.
- SS 316/316L materials are not a low-cost option as compared to 304/304L stainless steel materials, but are a low-cost option when compared to 317L stainless steel. 317 and 317L stainless steels have higher molybdenum content and are better for overall corrosion resistance.

What are the Various Applications of Stainless Steel 316Ti?

Stainless steel 316Ti is mainly used for high temperature applications. Type 316Ti stainless steel has better corrosion properties than Type 316/316L stainless steel for high temperature applications. 316Ti to be immune to precipitation at high temperatures. Additionally, the metal shows resistance to acids, such as sulfuric acids, hydrochloric acids, and acid sulphates.

1. Industrial fluid conveying pipes
2. Mechanical structural tubes

3. Heat exchanger and condenser tubes
4. Pulp and paper manufacturing machinery
5. Boiler manufacturing

Properties and Processing Characteristics of Stainless Steel 316/ 316L/ 316Ti

- Annealing 316, 316L and 316Ti stainless steels requires heating to between 1,900 and 2,100 degrees Fahrenheit (1,038 to 1,149 degrees Celsius) before rapidly quenching.
- Type 316Ti grade stainless steel is particularly effective in acidic environments, protecting against corrosion caused by sulfuric, hydrochloric, acetic, formic, and tartaric acids, as well as acid sulfates and alkaline chlorides.
- Type 316L stainless steel is an extra-low carbon version of the 316 steel alloy. The lower carbon content in 316L minimizes deleterious carbide precipitation as a result of welding. Consequently, 316L is used when welding is required in order to ensure maximum corrosion resistance.

Stainless Steel 316Ti Product Specification

Product	Stainless Steel 316Ti
Equivalents	AISI 316Ti, 1.4571, UNS S31635
Items	Pipe, Tubes, Tubing, Fittings, Flanges, Valves, Fasteners, Sheet, Square Bar, Threaded Bar, Plate, Hexagon Bar, Fasteners and Fixings, Round Bar, Flat Bar, Rebar, Angle, Tube & Pipe, Wire
Size	1/4" - 60"
Pipe Type	Seamless, Welded, ERW, Fabricated, Custom Size Pipes
Specifications	ASTM, ASME, DIN, GOST, JIS
Certification	EN 10204 3.1
Fittings Type	Butt Weld, Screwed & Socket Weld, Flanges, Instrumentation
Other Fittings	Elbows, Tees, Reducers, Caps, Stub Ends, Flanges (ANSI, Table E, D and H), Nuts, Bolts, Screws, Threaded Bars

Our Key Products

Stainless Steel 316Ti Sheet	Stainless Steel 316Ti Plate Cuttings/Profiles	Stainless Steel 316Ti Nuts, Bolts and Fasteners
Stainless Steel 316Ti Plate	Stainless Steel 316Ti Foil, Coil	Stainless Steel 316Ti Wire
Stainless Steel 316Ti Blocks/Slabs	Stainless Steel 316Ti Strip	Stainless Steel 316Ti Ingot
Stainless Steel 316Ti Rod/Bar	Stainless Steel 316Ti Pipes and Tubes	Stainless Steel 316Ti Forgings and Castings
Stainless Steel 316Ti Flanges	Stainless Steel 316Ti Forged Fittings	Stainless Steel 316Ti Buttweld Fittings

About Metallica Metals – The Steel Pipes Factory

- Established in 1975, the Metallica Metals Group (The Steel Pipes Factory) has its operations spread across major cities in India. We are a pioneer in the stainless steel pipes, nickel alloy products, titanium products, carbon steel pipes and alloy steel pipes manufacturing and processing industry. Our products including pipe fittings, flanges, pipes, sheet plates and valves are exported to over 70 countries across the world, while in India we have supplied to even the remote areas. With over 250 tons of sale in stainless steel and carbon steel pipes every day, Metallica has emerged as a prominent vendor for many buyers in India and Overseas
- More than 3000 tons ready from stock and new production ready in just a few weeks.
- Feel free to contact us on - Email: info@metallicametals.com | Tel: +91 8928722715 | +91-22-66581538, +91-22-67436694, +91-22-66109768

Our Key Products

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[Inconel \(Ni-Cr-Mo\) Alloys](#)
[Incoloy Alloys \(Ni-Cr-Fe\)](#)
[Hastelloy Alloys](#)
[Stainless Steel 304/304L](#)
[Stainless Steel 309S/309H](#)

INSTRUMENTATION TUBES & FITTINGS

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Stainless Steel 310/310S

Stainless Steel 316/316L

Stainless Steel 316Ti

Stainless Steel 317/317L

Stainless Steel 321/321H

Stainless Steel 347/347H

Stainless Steel 904L

Duplex Steels (UNS S32205, UNS S31803)

Super Duplex Steels (UNS S32760 / UNS S32750)

Stainless Steel 254 SMO (UNS S31254 / 1.4547)

Manifold Valves

Fasteners (Nut, Bolt, Washer)

Steel Angle Bars

Hex Steel Bars

Round Steel Bars & Rod

Flat Steel Bars

Forgings, Rings & Forged Blocks

Stainless Steel Pipe

Stainless Steel Seamless Pipe

Stainless Steel Welded Pipe

Stainless Steel Tubes

Stainless Steel Furnace Tubes

Stainless Steel Seamless Tubing

Stainless Steel Heat Exchanger Tubes

Large Diameter Pipe

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