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316 & 316L Stainless Steel

DESCRIPTION

Type 316 Stainless Steel is an austenitic chromium nickel stainless steel containing molybdenum. This addition increases general corrosion resistance, improves resistance to pitting from chloride ion solutions, and provides increased strength at elevated temperatures. Properties are similar to those of Type 304 except that this alloy is somewhat stronger at elevated temperatures. Corrosion resistance is improved, particularly against sulfuric, hydrochloric, acetic, formic and tartaric acids; acid sulfates and alkaline chlorides. Type 316L Stainless Steel is an extra-low carbon version of Type 316 that minimizes harmful carbide precipitation in the heat affected zone during welding.

PRODUCT FORMS

Sheet, Strip

SPECIFICATIONS

ASTM A240, A666

APPLICATIONS

Exhaust manifolds, furnace parts, heat exchangers, pharmaceutical and photographic equipment, valve and pump trim, chemical equipment, digesters, tanks, evaporators, pulp, paper and textile processing equipment, parts exposed to marine atmospheres and tubing

PROCESSING

Types 316 and 316L are non-hardenable by heat treatment. Annealing: Heat to 1900 – 2100°F then rapidly quench Forming: Types 316 and 316L can be readily formed and drawn.

WELDING

These alloys are generally considered to have poorer weldability than Types 304 and 304L. A major difference is the higher nickel content for these alloys which requires slower arc welding speed and more care to avoid hot cracking. When filler is needed, AWS E/ER 316L and 16-8-2 are most often specified.

CORROSION

Types 316 and 316L Stainless Steels exhibit better corrosion resistance than Type 304. They provide excellent pitting resistance and good resistance to most chemicals involved in the paper, textile and photographic industries.



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CHEMICAL COMPOSITION: ASTM A240, A666

Element	Type 316	Type 316L
Carbon	0.08 max.	0.030 max.
Manganese	2.00 max.	2.00 max.
Sulfur	0.030 max.	0.030 max.
Phosphorus	0.045 max.	0.045 max.
Silicon	0.75 max.	0.75 max
Chromium	16.0 - 18.0	16.0 - 18.0
Nickel	10.00 - 14.00	10.00 - 14.00
Molybdenum	2.00 - 3.00	2.00 - 3.00
Nitrogen	0.10 max.	0.10 max.

MECHANICAL PROPERTIES: ASTM A240

Type	Yield Strength 0.2% offset (KSI)	Tensile Strength (KSI)	% Elongation (2" Gauge Length)
316	30 min.	75 min.	40 min.
316L	25 min.	70 min.	40 min.



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PHYSICAL PROPERTIES

Density (lb./in ²) @ RT		0.29
Modulus of Elasticity in Tension (psi x 10 ⁶)		28.0
Specific Heat (BTU/o F/lb.)	32 to 212 oF	0.12
Thermal Conductivity (BTU/hr/ft ² /ft)	212oF	9.4
	932oF	12.4
Mean Coefficient of Thermal Expansion (in. x 10 ⁻⁶ per o F)	32 to 212 oF	8.9
	32 to 600oF	9.0
	32 to 1,000oF	9.7
	32 to 1,200oF	10.3
Electrical Resistivity (micro ohms - cm)	at 70oF	29.4
Melting Point Range (oF)		2500 - 2550