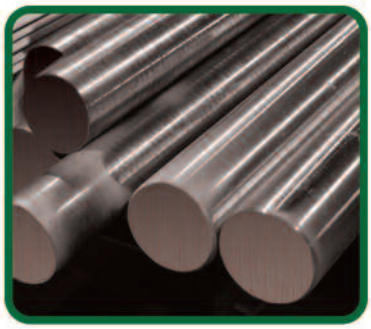
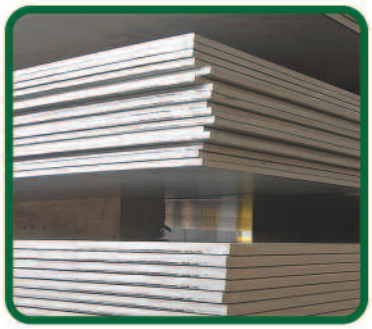
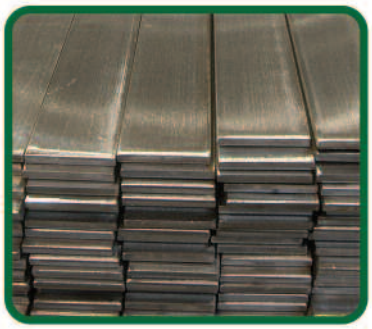
Alloy 303 Specifications: UNS S30300







ALLOY 303 (UNS S30300)

Penn Stainless inventory now includes Alloy 303 (UNS S30300) in sheet, sheet coil, plate, round bar, processed flat bar and tubular products.

GENERAL PROPERTIES

Alloy 303 is a non-magnetic, austenitic stainless steel that is not hardenable by heat treatment. It is the free machining modification of the basic 18% chromium / 8% nickel stainless steel. Alloy 303 was specially designed to exhibit improved machinability while maintaining good mechanical and corrosion resistant properties Due to the presence of sulfur in the steel composition, Alloy 303 is the most readily machineable austenitic stainless steel; however, the sulfur addition does lower Alloy 303's corrosion resistance to below that of Alloy 304. Like other austenitic grades, Alloy 303 demonstrates excellent toughness, although the sulfur does reduce this a little as well.

APPLICATIONS

Alloy 303 is frequently used in applications that require parts to be heavily machined. Some examples include:

- Nuts and bolts
- Gears
- Shafts
- Electrical switchgear components
- Aircraft fittings
- Screws
- Bushings

STANDARDS ALLOY 303

ASTM/ASME .....UNS S30300
EURONORM FeMi35Cr20Cu4Mo2
DIN 2.4660

Alloy 303 (UNS S30300) can be processed by Penn Stainless utilizing the following methods:

- Shear Cutting
- Plasma Cutting
- HQ Plasma Cutting
- Dynamic Water Jet Cutting
- Laser Cutting
- Saw Cutting
- Gauer Processing
- Machine Cutting

Product Offering:

- Plate
- Round bar
- Square bar
- Hex Bar
- Rolled flat bar
- Threaded rod

CORROSION RESISTANCE

- Good resistance to mildly corrosive atmospheres, but significantly less than Alloy 304
- When additional sulfur is added to improve machinability, it can often slightly reduce corrosion resistance
- In most dry and mild corrosive environments, Alloy 303 is comparable to other unmodified alloys
- Should not be exposed to moist, marine environments as it is subject to rapid-pitting corrosion and a rust film will tend to form
- Like other common austenitic stainless steels, it is subject to corrosion cracking in chloride environments above 60ºC

HEAT RESISTANCE

- Good oxidation resistance at temperatures up to 1700ºF (927ºC)
- Continuous use at temperatures above 1400ºF (760ºC) is not usually recommended due to carbide precipitation which can lead to irregular scaling
- Does not have a low carbon content so it is also vulnerable to sensitisation

WELDING CHARACTERISTICS

- Not generally recommended, but may be welded with some difficulty
- May be welded with Alloy 310 electrodes
- Should be annealed after welding to re-dissolve precipitated carbides

MACHINABILITY

- High machining rates can be obtained in the annealed condition with hardness in the range of 200 to 240 Brinell
- Will work harden, therefore, it should be machined at reduced surface feet per minute and heavier feeds to prevent glazing at the tool interface.

CHEMICAL PROPERTIES

Type	C	Mn	Si	P	S	Cr	Ni	Fe
303	0.15 max	2.0 max	1.00 max	0.20 max	0.15 min	min: 17.0 max: 19.0	min: 8.0 max: 10.0	balance

MECHANICAL PROPERTIES

Grade	Tensile Strength ksi (MPa) min	Yield Strength 0.2% offset ksi (MPa) min	Elongation (% in 50mm) min	Hardness (Brinell) MAX	Hardness (Rockwell B) MAX
303	75 (517)	30 (207)	35	228	

PHYSICAL PROPERTIES

	Alloy 303	
Density	lb_m/in^3	g/cm^3
at 68°F (20°C)	0.290	8.03
Coefficient of Thermal Expansion	**Per °F x 10^{-6}**	**Per °C x 10^{-6}**
at 68 - 212°F (20 - 100°C)	9.2	16.6
at 68 - 932°F (20 - 500°C)	10.4	18.8
at 68 - 1450°F (20 - 1000°C)	10.9	19.6
Electrical Resistivity	**Microhm-in.**	**Microhm-cm.**
at 68°F (20°C)	28.3	72.0
at 212°F (100°C)	30.7	78.0
at 392°F (200°C)	33.8	86.0
at 752°F (400°C)	39.4	100.0
at 1112°F (600°C)	43.7	111.0
at 1472°F (800°C)	47.6	121.0
Thermal Conductivity	**Btu·in/hr·ft^2·°F**	**W/m·K**
at 68 - 212°F (20 - 100°C)	113.2	16.4
Melting Range	**°F**	**°C**
	2552	1400

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