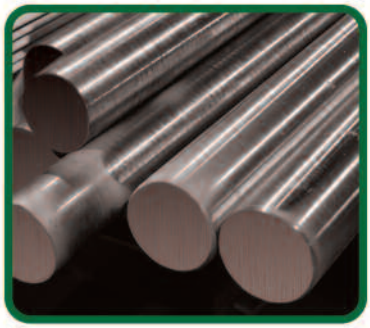
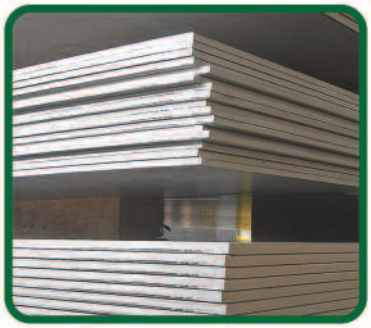
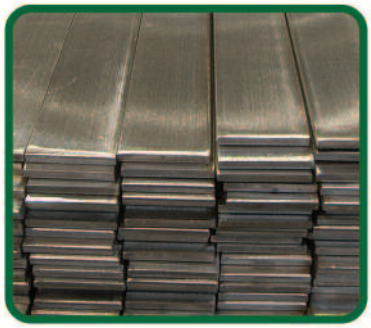
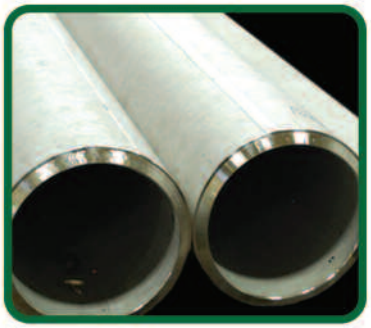
Alloy 309/309S Specifications: UNS S30900/S30908

ALLOY 309/309S (UNS S30900/S30908)

Penn Stainless inventory now includes Alloy 309/309S (UNS S30900/S30908) in sheet, sheet coil, plate, round bar, processed flat bar and tubular products.

GENERAL PROPERTIES

Alloys 309 and 309S are austenitic chromium-nickel stainless steels that are often used for higher temperature applications. Due to their high chromium and nickel content, Alloys 309 and 309S are highly corrosion resistant, have outstanding resistance to oxidation, and excellent heat resistance while providing good strength at room and elevated temperatures. The only significant difference between 309 and 309S is the carbon content. Alloy 309S has a much less carbon composition which minimizes carbide precipitation and improves weldability.

APPLICATIONS

Alloys 309 and 309S are used exclusively for their high temperature oxidation resistance, excellent high temperature strength, along with their resistance to creep deformation and environmental attack. Some examples include, but are not limited to:

- Heating elements
- Heat exchangers
- Sulfite liquor handling equipment
- Boiler baffles
- Refinery and chemical processing equipment
- Aircraft and jet engine parts
- Carburizing annealing products
- Kiln liners
- Auto exhaust parts

STANDARDS ALLOY 309/309S

ASTM/ASME .....UNS S30900/S30908
EURONORM FeMi35Cr20Cu4Mo2
DIN 2.4660

Alloy 309/309S (UNS S30900/S30908) 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:

- Sheet
- Plate
- Perforated
- Flate & expanded
- Round bar
- S/E processed bar
- Tubular products
- Structurals

CORROSION RESISTANCE

- Provide excellent corrosion resistance
- More resistant to marine atmospheres than Alloy 304
- Often used at higher temperatures to take advantage of their oxidation resistance
- Have high resistance to sulfite liquors
- Generally considered heat resistant alloys
- Destructive scaling temperature is approximately 2000°F

HEAT TREATMENT

- Cannot be hardened through heat treatment because the consist solely of austenite at room temperature
- Higher tensile and yield strengths that can be obtained through cold working and not followed by full annealing are not stable at the higher temperatures where these alloys are used
- Creep properties can be negatively affected by the use of cold worked material at these higher temperatures

FABRICATION

- Can be roll formed, stamped, and drawn readily
- In process annealing is often required to reduce hardness and increase ductility

WELDABILITY

- The austenitic class of stainless steels is generally considered to be weldable
- Generally considered to have weldability equivalent to the most common alloys of the austenitic class 304 and 304L
- Special consideration is needed to compensate for a higher coefficient of thermal expansion to avoid warping and distortion

CHEMICAL PROPERTIES

Type	C	Mn	P	S	Si	Cr	Ni	Fe
309	0.20 max	2.0 max	0.45 max	0.03 max	0.75 max	min: 22 max: 24	min: 12 max: 15	balance
309S	0.08 max	2.0 max	0.45 max	0.03 min	0.75 max	min: 22 max: 24	min: 12 max: 15	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
309					
309S	75 (515)	30 (205)	40	217	95

PHYSICAL PROPERTIES

	Alloy 309/309S	
Density	lb_m/in^3	g/cm^3
at 68°F (20°C)	0.29	8.03
Coefficient of Thermal Expansion	**(min/in)·°F**	**(mm/m)·°K**
at 68 - 212°F (20 - 100°C)	8.7	15.6
at 68 - 932°F (20 - 500°C)	9.8	17.6
at 68 - 1832°F (20 - 1000°C)	10.8	19.4
Electrical Resistivity	**mW·in**	**mW·cm**
at 68°F (20°C)	30.7	78.0
at 1200°F (648°C)	45.1	114.8
Thermal Conductivity	**Btu/hr·ft·°F**	**W/m·K**
at 68 - 212°F (20 - 100°C)	0.12	15.6
at 68 - 932°F (20 - 500°C)	10.8	18.7
Magnetic Permeability (annealed)1		
at 200H	1.02	
Modulus of Elasticity (annealed)2	**psi**	**GPa**
in tension (E)	29×10^6	200
in shear (G)	11.2×10^6	77

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