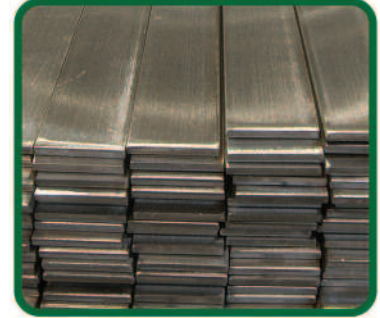
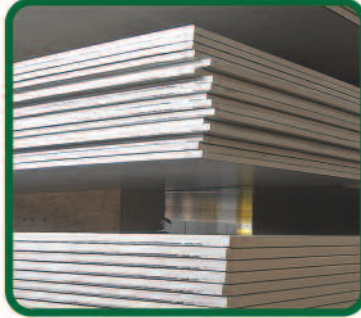
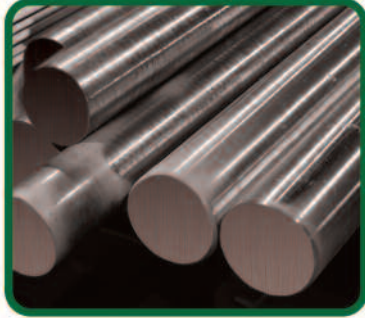




ALLOY 410S SPECIFICATIONS: UNS S41008



ALLOY 410S (UNS S41008)

Penn Stainless inventory now includes Alloy 410S (UNS S41008) in sheet, plate and processed flat bar. Tubular products are available upon request.

GENERAL PROPERTIES

Alloy 410S (UNS S41008) is a low carbon, non-hardening modification of Alloy 410 (UNS S41000) the general purpose 12% chromium martensitic stainless steel. The low carbon and a small alloy addition minimize austenite formation at high temperatures which restricts the alloys ability to harden. 410S remains soft and ductile even when rapidly cooled from above the critical temperature. This non-hardening characteristic helps prevent cracking when the alloy is exposed to high temperatures or welded. 410S is completely ferritic in the annealed condition. It exhibits adequate corrosion resistance similar to 410 and good oxidation resistance.

APPLICATIONS

Examples of applications that frequently used Alloy 410S include:

- Petroleum Refining and Petrochemical Processing
 - Columns
 - Distillation trays
 - Heat exchangers
 - Towers
- Ore Processing
 - Mining machinery
- Thermal Processing
 - Annealing boxes
 - Partitions
 - Quenching racks
- Gate valves
- Press plates

STANDARDS ALLOY 410S

ASTMA 240
 ASMESA 240
 EURONORMX6Cr13

ALLOY 410 (UNS S41008) 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
- SQUARE BAR
- HEX BAR
- ROLLED FLAT BAR
- S/E PROCESSED BAR
- TUBULAR PRODUCTS
- STRUCTURALS

CORROSION RESISTANCE

- Corrosion resistance of 410S stainless steel is similar to type 410.
- Resists corrosion in atmospheric conditions, fresh water, mild organic and mineral acids, alkalis and some chemicals.
- Exposure to chlorides in everyday activities (e.g., food preparation, sports activities, etc.) is satisfactory when proper cleaning is performed after exposure to use.

OXIDATION RESISTANCE

- Good oxidation resistance.
- Can be used in continuous service up to 1300°F (705°C).
- Scaling becomes excessive above 1500°F (811°C) in intermittent service.

WELDING CHARACTERISTICS

410S is generally considered to be weldable by the common fusion and resistance techniques. Special attention should be given to avoid brittle weld fractures during fabrication; this includes minimizing discontinuities, maintaining low weld heat input, and occasionally warming the part somewhat before forming. 410S is generally considered to have slightly poorer weldability than the most common ferritic stainless steel grade 409. A major difference can be attributed to the addition of alloy, to control hardening which results in the need for higher heat input during welding.

HEAT TREATMENT

The alloy can not be hardened by heat treatment. It is annealed between 1600 – 1650°F (871 – 899°C), and then air cooled to relieve cold working stresses. 410S should not be exposed to temperatures above 2000°F (1093°C), due to embrittlement. If large grains are found after annealing mildly cold-worked material, the annealing temperature should be decreased to 1200 – 1350°F (649 – 732°C).

CHEMICAL PROPERTIES

Type	C	Mn	Si	P	S	Cr	Ni
410S	0.08 max	1.00 max	1.00 max	0.04 max	0.03 max	min: 11.50 max: 14.50	0.60 max

MECHANICAL PROPERTIES

Grade	Tensile Strength ksi (MPa) min	Yield Strength 0.2% offset ksi (MPa) min	Elongation (% in 50mm) min	Hardness (Rockwell B) MAX
410S	64.4 (444)	42 (290)	33	75

PHYSICAL PROPERTIES

Density lb _m /in ³	Thermal Conductivity (BTU-in/hr- ft. °F)	Electrical Resistivity (in x 10 ⁻⁶)	Modulus of Elasticity (psi x 10 ⁶)	Coefficient of Thermal Expansion (in/in)/°F x 10 ⁻⁶	Specific Heat (BTU/lb/°F)	Melting Range (°F)
at 68°F: 0.280	187 at 212°F	23.7 at 68°F	29	6.0 at 32 – 212°F	0.11 at 68°F to 212°F	2700 to 2790
				7.5 at 68 – 1200°F		