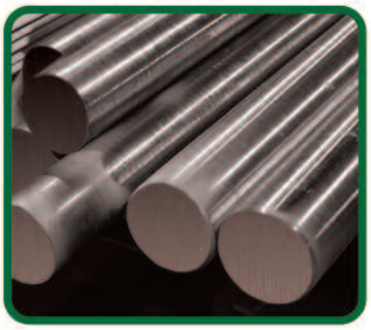
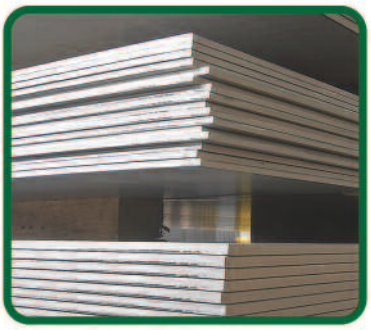
Alloy 420 Specifications: UNS S42000





ALLOY 420 (UNS S42000)

Penn Stainless inventory now includes Alloy 420 (UNS S42000) in sheet, sheet coil, plate, round bar, processed flat bar and tubular products.

GENERAL PROPERTIES

Alloy 420 is a hardenable, martensitic stainless steel that is a modification of Alloy 410. Similar to 410, it contains a minimum of 12% chromium, just sufficient enough to give corrosion resistant properties. Alloy 420 has higher carbon content than Alloy 410 which is designed to optimize strength and hardness characteristics. It has good ductility it the annealed condition but is capable of being hardened up to Rockwell hardness 50 HRC, the highest hardness of the 12% chromium grades. Due to its hardening properties, Alloy 420 is not often welded, although it is possible. Martensitic stainless steels are designed for high hardness and sometimes other properties are to some degree compromised. Corrosion resistance is lower than the common austenitic grades and their useful operating range is limited by their loss of ductility at sub-zero temperatures and loss of strength by over-tempering at elevated temperatures. Its best corrosion resistance is achieved when the metal is hardened and surface ground or polished.

APPLICATIONS

Alloy 420 is used for a variety of applications where good corrosion and outstanding hardness is necessary. It is not usually used at temperatures exceeding 800°F (427°C) due to quick hardening and loss of corrosion resistance. Examples of applications that use alloy 420 include:

- Cuttery
- Knife blades
- Surgical instruments
- Needle valves
- Shear blades
- Scissors
- Hand tools

STANDARDS ALLOY 420

ASTM/ASME .....UNS S42000
EURONORM FeMi35Cr20Cu4Mo2
DIN 2.4660

Alloy 420 (UNS S42000) can be processed by Penn Stainless utilizing the following methods:

- Dynamic Water Jet Cutting
- Saw Cutting
- Machine Cutting

Product Offering:

- Sheet
- Plate
- Round bar

CORROSION RESISTANCE

- Less resistant than the austenitic grades and the 17% chromium ferritic alloys
- Good resistance in the hardened condition to the atmosphere, foods, fresh water, and mild acids
- Resistance lowered in the annealed condition
- Best with a smooth surface finish

HEAT RESISTANCE

- Not recommended for use above the relevant tempering temperature because of reduction in mechanical properties
- Scaling temperature is approximately 1202°F (650°C)

CHEMICAL PROPERTIES

Type	C	Mn	Si	P	S	Cr
420	0.15 max	1.25 max	1.00 max	0.04 max	0.03 max	min: 12.00 max: 14.00

MECHANICAL PROPERTIES

Tempering Temperature (°C)	Tensile Strength (MPa)	Yield Strength 0.2% Proof (MPa)	Elongation (% in 50mm)	Hardness Brinell (HB)
Annealed *	655	345	25	241 max
399°F (204°C)	1600	1360	12	444
600°F (316°C)	1580	1365	14	444
800°F (427°C)	1620	1420	10	461
1000°F (538°C)	1305	1095	15	375
1099°F (593°C)	1035	810	18	302
1202°F (650°C)	895	680	20	262

* Annealed tensile properties are typical for Condition A of ASTM A276; annealed hardness is the specified maximum.

PHYSICAL PROPERTIES

	Alloy 420
Density	7750 Kg/ m^3
Elastic Modulus	200 GPa
Mean Coefficient of Thermal Expansion	**µm/m/°C**
at 32 to 212°F (0 to 100°C)	10.3
at 32 to 599°F (0 to 315°C)	10.8
at 32 to 1000°F (0 to 538°C)	**17.7**
Thermal Conductivity	**W/m.K**
at 212°F (100°C)	24.9
at 932°F (500°C)	–
Specific Heat	**J/kg.K**
at 32 to 212°F (0 to 100°C)	460
Electrical Resitivity	**550 (nΩ.m)**

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