



Grade 420 Stainless Steel is a high-carbon steel with little bit chromium content of 12%. Comparable with other stainless steel, grade 420 can also be hardened through heat treatment. It provides good ductility in its annealed state and excellent corrosion resistance properties when the metal is polished, surface grounded or hardened. This grade has elevated hardness - 50HRC - between all the stainless steel grades with 12% chromium. Stainless steel grades that are comparable with grade 420 Stainless Steels consist martensitic stainless steels, for example the other versions of grade 420, having sulphur, vanadium and molybdenum in their composition, and the grade 440 series. Nonstandard grade 420C has carbon content that is slightly higher than that of grade 420. Martensitic stainless steels are ones with elevated hardness and high carbon content. These steels are usually fabricated by utilizing techniques that require hardening and tempering treatments. The working conditions of martensitic stainless steels are influenced by the loss of the material's strength at high temperatures, and reduction in ductility at negative temperatures.

## Applications

Alloy 420 is utilized for a wide variety of applications where good corrosion and outstanding hardness is compulsory. It is not mostly utilized at temperatures exceeding 800°F (427°C) because of quick hardening and loss of corrosion resistance. Examples of applications that utilize alloy 420 include:

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

## Characteristics

- Hardenable
- Higher carbon content to increase strength and hardness
- Maximum corrosion resistance only in the fully hardened condition or fully hardened and stress relieved condition

# S. S. 420

## Machining

Grade 420 steels can be effortlessly machined in their annealed state; however, they are hard to machine having hardness greater than 30HRC. One of the most promptly available machined alternatives is the free-machining grade 416 steels.

## Welding

Grade 420 stainless steels are welded utilizing welding rod, coated with grade 420 metals, to accomplish high-strength joints. During the process, steels are pre-heated at 150 to 320°C and post-heated to 610 to 760°C. In the "as welded" condition, parts are welded utilizing grade 309 filler rods to accomplish ductile joints. Anyway, grade 309 electrodes or rod is recommended for welding grade 420 steels by AS 1554.6.

## Hot Working

Bring temperatures slowly up to 1400 F (760 C), then on to 2000-2200 F (1097-1204 C), after working, furnace cool slowly to avoid cracking. Reheat frequently to keep the working temperature above 1600 F.

## Cold Working

420 will withstand just minor cold work. Radical forming operations will result in cracking.

## Annealing

1550-1650 F (843-900 C), slow furnace cooling.

## Tempering

300-400 F (149-204 C), air cool for maximum hardness as well as corrosion resistance.

## Hardening

Soak at 1850-1950 F (1010-1066 C) at quench in heated oil.

## Chemical Properties

C	Si	P	S	Cr	Mn	Fe
0.15 min	1.0 max	0.040 max	0.030 max	11.5-13.5	1.0 max	Remainder

## Mechanical Properties

Tensile Strength (ksi)	0.2% Yield Strength (ksi)	Elongation% in 2 inches
85	40	25

## Physical Properties

Properties	Units	Temperature in °C
Density	7.74 g/cm <sup>3</sup>	Room
Specific Heat	0.11 Kcal/kg.C	22°
Melting Point	2650 °C	-
Modulus of Elasticity	200 KN/mm <sup>2</sup>	20°
Electrical Resistivity	55 μΩ.cm	Room
Coefficient of Expansion	10.2 μm/m °C	20-100°
Thermal Conductivity	24.9 W/m-°K	20°

## ASTM Specifications

Bar	Forging	Wire
A 276, A 314	A 473	A 580

## Availability

### MANUFACTURING

Fasteners

Custom Machining

Custom Fabrication

Stamped Parts

### RAW MATERIALS

Bars

Wires

### Disclaimer

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