

SS 420F, Type 420F, UNS S42020, AISI 420F, ASTM 420F, Grade 420F, ALLOY 420F

Introduction :

Stainless Steel 420F is a heat treatable chromium steel, it is a general purpose free machining version of 420 stainless. Due to the addition of sulfur, it provides good machining characteristic. High speeds and feeds combined with short brittle chips. It is commonly not welded due to its air hardening characteristics. After preheating to 300-400 F [149-204 C] with post weld tempering at temperature for 2 hours, welding may be performed. After hot working, Bring temperatures slowly up to 1400 F [760 C], then on to 2000-2200 F [1097-1204 C] furnace cool slowly to avoid cracking. To keep the working temperature above 1600 F, reheat it often. Cold working of 420F will withstand only minor cold work. Radical forming operations will result in cracking. Annealing between 1550-1650 F [843-900 C], slow furnace cooling. Grade 420F should be tempered between 300-400 F [149-204 C] & air cool for maximum hardness [Rc 52]. Soak at 1850-1950 F [1010-1066 C] at quench in heated oil for hardening. 420F Stainless Steel is not recommended for plastic molds where high surface finishes are required & for vessels containing high pressure gases or liquids. It is useful in dental and surgical instruments, cutlery, pump shafts, gears pinions and cams, steel balls, and various hand tools.

Products Available in forms :

- SS 420F, Type 420F, UNS S42020, AISI 420F Plates
- SS 420F, Type 420F, UNS S42020, AISI 420F Pipes
- SS 420F, Type 420F, UNS S42020, AISI 420F Round Bar
- SS 420F, Type 420F, UNS S42020, AISI 420F Tube
- SS 420F, Type 420F, UNS S42020, AISI 420F Flanges
- SS 420F, Type 420F, UNS S42020, AISI 420F Wire
- SS 420F, Type 420F, UNS S42020, AISI 420F Fittings

Standard Available in forms :

- ASTM A182/ ASME SA182 Stainless Steel Pipe Fittings
- ASTM A213 / ASME SA213 Seamless Stainless Steel Pipes
- ASTM A240/ ASME SA240 Stainless Steels Sheets / Plates
- ASTM A249/ ASME SA249 Stainless Steel Welded Tubes
- ASTM A269/ ASME SA269 Stainless Steel Tubes
- ASTM A270/ ASME SA270 Stainless Steel Sanitary Tubes
- ASTM A312/ ASME SA312 Stainless Steel Pipes
- ASTM A403/ ASME SA403 Stainless Steel Pipe Fittings
- ASTM A554/ ASME SA554 Stainless Steel Welded Tubes
- ASTM A731/ ASME SA731 Stainless Steel Pipes
- ASTM A789/ ASME SA789 Stainless Steel Tubes
- ASTM A790/ ASME SA790 Stainless Steel Pipes
- ASTM A791/ ASME SA791 Stainless Steel Tubes

Chemical Composition

	TYPE 420F	UNS S42020	AISI 420F	ASTM 420F	GRADE 420F	ALLOY 420F
Carbon	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Manganese	1.25max	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max
Phosphorus	0.060 max	0.040 max	0.040 max	0.040 max	0.040 max	0.040 max
Sulfur	0.150 max	0.15 max	0.15 max	0.15 max	0.15 max	0.15 max
Silicon	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max	1.00 max
Chromium	12.0-14.0	13max	13max	13max	13max	13max
Nickel	-	-	-	-	-	-
Molybdenum	0.60 max	0.60 max	0.60 max	0.60 max	0.60 max	0.60 max
Iron	Bal	Bal	Bal	Bal	Bal	Bal

Mechanical Properties

	TYPE 420F	UNS S42020	AISI 420F	ASTM 420F	GRADE 420F	ALLOY 420F
Tensile Strength (Mpa)psi	655 (95000)	655 (95000)	655 (95000)	655 (95000)	655 (95000)	655 (95000)
Yield Strength	380 (55100)	380 (55100)	380 (55100)	380 (55100)	380 (55100)	380 (55100)
Elongation in 2"[50mm] %	22 min	22 min	22 min	22 min	22 min	22 min
Reduction in Area, %	-	-	-	-	-	-
Hardness, Brinell	220	220	220	220	220	220

Fabrication and Heat Treatment

Machinability

- Grade 420F stainless steel has good machinability due to the presence of sulfur.

Welding

- Grade 420F stainless steel is basically not welded as it has air hardening characteristics.
- However, welding can be performed after preheating to 149-204°C (300-400°F) with post-weld tempering for 2 h.
- The filler metal used has to be AWS E/ER420.

Hot Working

- The hot working of grade 420F stainless steel is performed by gradually increasing temperature to 760°C (1400°F), then further to 1097-1204°C (2000-2200°F).
- Later it is cooled slowly in the furnace so as to prevent cracking.
- Reheating has to be performed often to maintain the working temperature above 871°C (1600°F).

Cold Working

- Grade 420F stainless steel can withstand only minor cold working.
- Radical forming will cause cracking.

Annealing

- Annealing of grade 420F stainless steel can be performed at 843-900°C (1550-1650°F), followed by slow furnace cooling.

Tempering

• Tempering of grade 420F stainless steel can be performed at 149-204°C(300-400°F),and then air cooled for maximum hardness (Rc 52) and corrosion resistance.

Hardening

• To harden grade 420F stainless steel, it has to be soaked at 1010-1066°C (1850-1950°F) and quenched in heated oil.

Applications

Grade 420F stainless steel can be used in the following products:

- Cutlery
- Pump shafts
- Dental and surgical instruments
- Gears
- Pinions
- Cams
- Steel balls
- Hand tools

However, it is not suitable for vessels containing high pressure gases/liquids or for plastic molds requiring high surface finishes.



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