420 Stainless Steel

Categories: Metal; Ferrous Metal; Heat Resisting; Stainless Steel; T 400 Series Stainless Steel

Material Notes: 16.0 mm diameter bar, austenitized at 980°C for 30 minutes, oil quench, temper for 2 hours at 28°C above test temperature

Key Words: UNS S42000, AMS 5506, AMS 5621, ASTM A276, ASTM A314, ASTM A473, ASTM A580, FED QQ-S-763, FED QQ-S-766, FED QQ-W-423, MIL SPEC MIL-S-862, SAE J405 (51420), B.S. 420 S 37, B.S. CDS-18 (U.K), martensitic, DIN 1.4021, AFNOR Z 20 C 13 (Fr), UNI X 20 Cr 13, JIS SUS 420 J1, SS14 2303 (Sweden), ISO 683/13 4

Vendors: No vendors are listed for this material. Please click here if you are a supplier and would like information on how to add your listing to this material.

Physical Properties	Metric	English	Comments
Density	7.80 g/cc	0.282 lb/in³	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	594	594	Converted from Rockwell C Hardness
	253 @Temperature 705 °C	253 @Temperature 1300 °F	Converted from Rockwell C Hardness
	269 @Temperature 650 °C	269 @Temperature 1200 °F	Converted from Rockwell C Hardness
	297 @Temperature 595 °C	297 @Temperature 1100 °F	Converted from Rockwell C Hardness
	334 @Temperature 540 °C	334 @Temperature 1000 °F	Converted from Rockwell C Hardness
	492 @Temperature 315 °C	492 @Temperature 599 °F	Converted from Rockwell C Hardness
	506 @Temperature 425 °C	506 @Temperature 797 °F	Converted from Rockwell C Hardness
	506 @Temperature 205 °C	506 @Temperature 401 °F	Converted from Rockwell C Hardness
	521 @Temperature 480 °C	521 @Temperature 896 °F	Converted from Rockwell C Hardness
Hardness, Knoop	662	662	Converted from Rockwell C Hardness
	268 @Temperature 705 °C	268 @Temperature 1300 °F	Converted from Rockwell C Hardness
	286 @Temperature 650 °C	286 @Temperature 1200 °F	Converted from Rockwell C Hardness
	318 @Temperature 595 °C	318 @Temperature 1100 °F	Converted from Rockwell C Hardness
	362 @Temperature 540 °C	362 @Temperature 1000 °F	Converted from Rockwell C Hardness
	545 @Temperature 315 °C	545 @Temperature 599 °F	Converted from Rockwell C Hardness
	562 @Temperature 425 °C	562 @Temperature 797 °F	Converted from Rockwell C Hardness
	562 @Temperature 205 °C	562 @Temperature 401 °F	Converted from Rockwell C Hardness
	579 @Temperature 480 °C	579 @Temperature 896 °F	Converted from Rockwell C Hardness
Hardness, Rockwell C	57	57	before testing. 27-57 depending on temper.
	21 @Temperature 705 °C	21 @Temperature 1300 °F	after testing
	23.5 @Temperature 705 °C	23.5 @Temperature 1300 °F	before testing
	26 @Temperature 650 °C	26 @Temperature 1200 °F	after testing

	26.5 @Temperature 650 °C	26.5 @Temperature 1200 °F	before testing
	30.5 @Temperature 595 °C	30.5 @Temperature 1100 °F	after testing
	31 @Temperature 595 °C	31 @Temperature 1100 °F	before testing
	35.5 @Temperature 540 °C	35.5 @Temperature 1000 °F	after testing
	36 @Temperature 540 °C	36 @Temperature 1000 °F	before testing
	49 @Temperature 315 °C	49 @Temperature 599 °F	after testing
	50 @Temperature 480 °C	50 @Temperature 896 °F	after testing
	50.5 @Temperature 315 °C	50.5 @Temperature 599 °F	before testing
	51 @Temperature 205 °C	51 @Temperature 401 °F	after testing
	51.5 @Temperature 425 °C	51.5 @Temperature 797 °F	before testing
	51.5 @Temperature 205 °C	51.5 @Temperature 401 °F	before testing
	52 @Temperature 425 °C	52 @Temperature 797 °F	after testing
	52.5 @Temperature 480 °C	52.5 @Temperature 896 °F	before testing
Hardness, Vickers	641	641	Converted from Rockwell C Hardness
	260 @Temperature 705 °C	260 @Temperature 1300 °F	Converted from Rockwell C Hardness
	278 @Temperature 650 °C	278 @Temperature 1200 °F	Converted from Rockwell C Hardness
	308 @Temperature 595 °C	308 @Temperature 1100 °F	Converted from Rockwell C Hardness
	349 @Temperature 540 °C	349 @Temperature 1000 °F	Converted from Rockwell C Hardness
	525 @Temperature 315 °C	525 @Temperature 599 °F	Converted from Rockwell C Hardness
	541 @Temperature 425 °C	541 @Temperature 797 °F	Converted from Rockwell C Hardness
	541 @Temperature 205 °C	541 @Temperature 401 °F	Converted from Rockwell C Hardness
	558 @Temperature 480 °C	558 @Temperature 896 °F	Converted from Rockwell C Hardness
Tensile Strength, Ultimate	2025 MPa	293700 psi	
	170 MPa @Temperature 705 °C	24700 psi @Temperature 1300 °F	
	290 MPa @Temperature 650 °C	42100 psi @Temperature 1200 °F	
	450 MPa @Temperature 595 °C	65300 psi @Temperature 1100 °F	
	660 MPa @Temperature 540 °C	95700 psi @Temperature 1000 °F	
	1415 MPa @Temperature 480 °C	205200 psi @Temperature 896 °F	
	1705 MPa @Temperature 315 °C	247300 psi @Temperature 599 °F	
	1715 MPa @Temperature 425 °C	248700 psi @Temperature 797 °F	
	1820 MPa @Temperature 205 °C	264000 psi @Temperature 401 °F	
Tensile Strength, Yield	1360 MPa @Strain 0.200 %	197000 psi @Strain 0.200 %	
	115 MPa @Strain 0.200 %,	16700 psi @Strain 0.200 %,	

	Temperature 705 °C	Temperature 1300 °F	
	240 MPa @Strain 0.200 %, Temperature 650 °C	34800 psi @Strain 0.200 %, Temperature 1200 °F	
	380 MPa @Strain 0.200 %, Temperature 595 °C	55100 psi @Strain 0.200 %, Temperature 1100 °F	
	585 MPa @Strain 0.200 %, Temperature 540 °C	84800 psi @Strain 0.200 %, Temperature 1000 °F	
	1040 MPa @Strain 0.200 %, Temperature 315 °C	151000 psi @Strain 0.200 %, Temperature 599 °F	
	1085 MPa @Strain 0.200 %, Temperature 205 °C	157400 psi @Strain 0.200 %, Temperature 401 °F	
	1095 MPa @Strain 0.200 %, Temperature 480 °C	158800 psi @Strain 0.200 %, Temperature 896 °F	
	1155 MPa @Strain 0.200 %, Temperature 425 °C	167500 psi @Strain 0.200 %, Temperature 797 °F	
Elongation at Break	2.5 %	2.5 %	in 50 mm
	9.0 % @Temperature 480 °C	9.0 % @Temperature 896 °F	in 50 mm
	11.5 % @Temperature 205 °C	11.5 % @Temperature 401 °F	in 50 mm
	12.5 % @Temperature 425 °C	12.5 % @Temperature 797 °F	in 50 mm
	13.5 % @Temperature 315 °C	13.5 % @Temperature 599 °F	in 50 mm
	20.5 % @Temperature 540 °C	20.5 % @Temperature 1000 °F	in 50 mm
	26 % @Temperature 595 °C	26 % @Temperature 1100 °F	in 50 mm
	31.5 % @Temperature 650 °C	31.5 % @Temperature 1200 °F	in 50 mm
	36 % @Temperature 705 °C	36 % @Temperature 1300 °F	in 50 mm
Modulus of Elasticity	200 GPa	29000 ksi	
Poissons Ratio	0.24	0.24	Calculated
Shear Modulus	80.7 GPa	11700 ksi	
Charpy Impact	14.0 J @Temperature 23.0 °C	10.3 ft-lb @Temperature 73.4 °F	
	100 J @Temperature 23.0 °C	73.8 ft-lb @Temperature 73.4 °F	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000550 ohm-cm @Temperature 20.0 °C	0.0000550 ohm-cm @Temperature 68.0 °F	

Thermal Properties	Metric	English	Comments
CTE, linear	10.3 µm/m-°C @Temperature 0.000 - 100 °C	5.72 µin/in-°F @Temperature 32.0 - 212 °F	
	10.8 µm/m-°C @Temperature 0.000 - 315 °C	6.00 µin/in-°F @Temperature 32.0 - 599 °F	
	11.7 µm/m-°C @Temperature 0.000 - 540 °C	6.50 µin/in-°F @Temperature 32.0 - 1000 °F	
	12.2 µm/m-°C @Temperature 0.000 - 650 °C	6.78 µin/in-°F @Temperature 32.0 - 1200 °F	
Specific Heat Capacity	0.460 J/g-°C @Temperature 0.000 - 100 °C	0.110 BTU/lb-°F @Temperature 32.0 - 212 °F	
Thermal Conductivity	24.9 W/m-K @Temperature 100 °C	173 BTU-in/hr-ft²-°F @Temperature 212 °F	
Melting Point	1455 - 1510 °C	2651 - 2750 °F	

Solidus	1455 °C	2651 °F	
Liquidus	1510 °C	2750 °F	
Maximum Service Temperature, Air	620 °C	1150 °F	Continuous Service
	735 °C	1360 °F	Intermittent

Component Elements Properties	Metric	English	Comments
Carbon, C	>= 0.15 %	>= 0.15 %	
Chromium, Cr	13 %	13 %	
Iron, Fe	85 %	85 %	
Manganese, Mn	<= 1.0 %	<= 1.0 %	
Phosphorus, P	<= 0.040 %	<= 0.040 %	
Silicon, Si	<= 1.0 %	<= 1.0 %	
Sulfur, S	<= 0.030 %	<= 0.030 %	

References for this datasheet.