

Carpenter Custom 455® Stainless Steel, Annealed, 25 mm Bar

Category : Metal , Ferrous Metal , Stainless Steel , T 400 Series Stainless Steel

Material Notes:

Data provided by Carpenter Technology Corporation. Recognizing the need for high-strength alloys with good corrosion resistance to atmospheric environments, the Carpenter Research Laboratory developed Custom 455® stainless, a martensitic age-hardenable stainless steel. This alloy is relatively soft and formable in the annealed condition. A single-step aging treatment develops exceptionally high yield strength with good ductility and toughness. This stainless can be machined in the annealed condition, and welded in much the same manner as other precipitation hardenable stainless steels. Because of its low work-hardening rate, it can be extensively cold formed. The dimensional change during hardening is only about -0.001 in/in, which permits close-tolerance finish machining in the annealed state. Custom 455 stainless represents a significant advancement in the area of precipitation hardening stainless steels. It should be considered where simplicity of heat treatment, ease of fabrication, high strength and corrosion resistance are required in combination. Because of the unique combination of high strength and corrosion resistance of Custom 455 stainless there are few other alloys available for consideration. Carpenter PH13-8 Mo can be considered where good transverse toughness and ductility are necessary in large sections. Custom 455® is a registered trademark of Carpenter Technology Corporation.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Carpenter-Custom-455-Stainless-Steel-Annealed-25-mm-Bar.php

Physical Properties	Metric	English	Comments
Density	7.76 g/cc	0.280 lb/in ³	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	297	297	Estimated from Rockwell C for Brinell test with 3000 kg load, 10 mm ball.
Hardness, Knoop	322	322	Estimated from Rockwell C
Hardness, Rockwell C	31	31	
Hardness, Vickers	311	311	Estimated from Rockwell C
Tensile Strength, Ultimate	1000 MPa	145000 psi	
Tensile Strength, Yield	713 MPa @Strain 0.200 %	103000 psi @Strain 0.200 %	
Elongation at Break	14 %	14 %	In 4D
Reduction of Area	60 %	60 %	
Modulus of Elasticity	200 GPa	29000 ksi	
Poissons Ratio	0.30 @Temperature 23.0 °C	0.30 @Temperature 73.4 °F	

Mechanical Properties	76.9 GPa Metric	11200 ksi English	Comments
	@Temperature 23.0 °C	@Temperature 73.4 °F	
Charpy Impact	95.0 J	70.1 ft-lb	V-notch

Thermal Properties	Metric	English	Comments
CTE, linear	10.6 µm/m-°C	5.89 µin/in-°F	
	@Temperature 22.0 - 93.0 °C	@Temperature 71.6 - 199 °F	
	11.2 µm/m-°C	6.22 µin/in-°F	
	@Temperature 22.0 - 260 °C	@Temperature 71.6 - 500 °F	
	12.0 µm/m-°C	6.67 µin/in-°F	
	@Temperature 22.0 - 482 °C	@Temperature 71.6 - 900 °F	
Thermal Conductivity	18.0 W/m-K	125 BTU-in/hr-ft ² -°F	
	@Temperature 100 °C	@Temperature 212 °F	
	21.3 W/m-K	148 BTU-in/hr-ft ² -°F	
	@Temperature 300 °C	@Temperature 572 °F	
	24.7 W/m-K	171 BTU-in/hr-ft ² -°F	
	@Temperature 500 °C	@Temperature 932 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.050 %	<= 0.050 %	
Chromium, Cr	11 - 12.5 %	11 - 12.5 %	
Copper, Cu	1.5 - 2.5 %	1.5 - 2.5 %	
Iron, Fe	75 %	75 %	as remainder
Manganese, Mn	<= 0.50 %	<= 0.50 %	
Molybdenum, Mo	<= 0.50 %	<= 0.50 %	
Nb + Ta	0.10 - 0.50 %	0.10 - 0.50 %	
Nickel, Ni	7.5 - 9.5 %	7.5 - 9.5 %	
Niobium, Nb (Columbium, Cb)	<= 0.50 %	<= 0.50 %	
Phosphorous, P	<= 0.040 %	<= 0.040 %	

Component Elements Properties	Metric	English	Comments
Sulfur, S	<= 0.030 %	<= 0.030 %	
Tantalum, Ta	<= 0.50 %	<= 0.50 %	
Titanium, Ti	0.80 - 1.4 %	0.80 - 1.4 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000906 ohm-cm	0.0000906 ohm-cm	

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