Carpenter Custom 455® Stainless Steel, Condition H900 (Age Hardened 482°C)

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-Condition-H900-Age-Hardened-482C.php

Physical Properties	Metric	English	Comments
Density	7.76 g/cc	0.280 lb/in³	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	472	472	Estimated from Rockwell C for Brinell test with 3000 kg load, 10 mm ball.
Hardness, Knoop	519	519	Estimated from Rockwell C
Hardness, Rockwell C	49	49	
Hardness, Vickers	496	496	Estimated from Rockwell C
Tensile Strength, Ultimate	1689 MPa	245000 psi	
	1241 MPa @Temperature 427 °C	180000 psi @Temperature 801 °F	
	1345 MPa @Temperature 371 °C	195100 psi @Temperature 700 °F	
	1407 MPa @Temperature 316 °C	204100 psi @Temperature 601 °F	
	1476 MPa @Temperature 260 °C	214100 psi @Temperature 500 °F	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Yield	1241 MPa @Strain 0.200 %	180000 psi @Strain 0.200 %	
	1145 MPa @Strain 0.200 %, Temperature 427 °C	166100 psi @Strain 0.200 %, Temperature 801 °F	
	1241 MPa @Strain 0.200 %, Temperature 371 °C	180000 psi @Strain 0.200 %, Temperature 700 °F	
	1296 MPa @Strain 0.200 %, Temperature 316 °C	188000 psi @Strain 0.200 %, Temperature 601 °F	
	1372 MPa @Strain 0.200 %, Temperature 260 °C	199000 psi @Strain 0.200 %, Temperature 500 °F	
Elongation at Break	11 %	11 %	In 4D
	10 % @Temperature 260 °C	10 % @Temperature 500 °F	In 4D
	12 % @Temperature 371 °C	12 % @Temperature 700 °F	In 4D
	14 % @Temperature 427 °C	14 % @Temperature 801 °F	In 4D
Reduction of Area	48 %	48 %	
	49 % @Temperature 260 °C	49 % @Temperature 500 °F	
	50 % @Temperature 316 °C	50 % @Temperature 601 °F	
	52 % @Temperature 371 °C	52 % @Temperature 700 °F	
	56 % @Temperature 427 °C	56 % @Temperature 801 °F	
Modulus of Elasticity	200 GPa	29000 ksi	
Poissons Ratio	0.30	0.30	

Mechanical Properties	Metric	English	Comments
	@Temperature 23.0 °C	@Temperature 73.4 °F	
Fatigue Strength	772 MPa @# of Cycles 1.00e+7	112000 psi @# of Cycles 1.00e+7	R.R. Moore Test, Smooth Rotating Beam
Shear Modulus	76.9 GPa @Temperature 23.0 °C	11200 ksi @Temperature 73.4 °F	
Charpy Impact	12.0 J @Diameter 25.0 mm	8.85 ft-lb @Diameter 0.984 in	bar

Thermal Properties	Metric	English	Comments
CTE, linear	10.6 µm/m-°C @Temperature 22.0 - 93.0 °C	5.89 µin/in-°F @Temperature 71.6 - 199 °F	
	11.2 µm/m-°C @Temperature 22.0 - 260 °C	6.22 µin/in-°F @Temperature 71.6 - 500 °F	
	12.0 µm/m-°C @Temperature 22.0 - 482 °C	6.67 µin/in-°F @Temperature 71.6 - 900 °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 %	
Silicon, Si	<= 0.50 %	<= 0.50 %	
Sulfur, S	<= 0.030 %	<= 0.030 %	

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

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000758 ohm-cm @Temperature 23.0 °C	0.0000758 ohm-cm @Temperature 73.4 °F	

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