

Carpenter Custom 455® Stainless Steel, Condition H950 (Age Hardened 510°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-H950-Age-Hardened-510C.php

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

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	459	459	Estimated from Rockwell C for Brinell test with 3000 kg load, 10 mm ball.
Hardness, Knoop	504	504	Estimated from Rockwell C
Hardness, Rockwell C	48	48	
Hardness, Vickers	482	482	Estimated from Rockwell C
Tensile Strength, Ultimate	1586 MPa	230000 psi	
	896 MPa	130000 psi	
	@Temperature 538 °C	@Temperature 1000 °F	
	1207 MPa	175100 psi	
	@Temperature 427 °C	@Temperature 801 °F	
	1345 MPa	195100 psi	
	@Temperature 316 °C	@Temperature 601 °F	
	1689 MPa	245000 psi	
	@Temperature -73.0 °C	@Temperature -99.4 °F	

Mechanical Properties	Metric MPa	English psi	Comments
	@Temperature -184 °C	@Temperature -299 °F	
Tensile Strength, Yield	1517 MPa	220000 psi	
	@Strain 0.200 %	@Strain 0.200 %	
	758 MPa	110000 psi	
	@Strain 0.200 %, Temperature 538 °C	@Strain 0.200 %, Temperature 1000 °F	
	1124 MPa	163000 psi	
	@Strain 0.200 %, Temperature 427 °C	@Strain 0.200 %, Temperature 801 °F	
	1276 MPa	185100 psi	
	@Strain 0.200 %, Temperature 316 °C	@Strain 0.200 %, Temperature 601 °F	
Elongation at Break	12 %	12 %	In 4D
	5.0 %	5.0 %	
	@Temperature -184 °C	@Temperature -299 °F	
	11 %	11 %	
	@Temperature -73.0 °C	@Temperature -99.4 °F	
	12 %	12 %	In 4D
	@Temperature 316 °C	@Temperature 601 °F	
	14 %	14 %	In 4D
	@Temperature 427 °C	@Temperature 801 °F	
	18 %	18 %	In 4D
	@Temperature 538 °C	@Temperature 1000 °F	
Reduction of Area	50 %	50 %	
	20 %	20 %	
	@Temperature -184 °C	@Temperature -299 °F	
	45 %	45 %	
	@Temperature -73.0 °C	@Temperature -99.4 °F	
	50 %	50 %	
	@Temperature 316 °C	@Temperature 601 °F	
	60 %	60 %	

Mechanical Properties	Metric	English	Comments
	70 % @Temperature 427 °C	70 % @Temperature 801 °F	
	@Temperature 538 °C	@Temperature 1000 °F	
Modulus of Elasticity	200 GPa @Temperature 23.0 °C	29000 ksi @Temperature 73.4 °F	
Notched Tensile Strength	793 MPa	115000 psi	
	1931 MPa	280100 psi	
	2068 MPa	299900 psi	
Poissons Ratio	0.30 @Temperature 23.0 °C	0.30 @Temperature 73.4 °F	
Fatigue Strength	680 MPa @# of Cycles 1.00e+7	98600 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	20.0 J	14.8 ft-lb	V-Notch
	4.00 J @Temperature -184 °C	2.95 ft-lb @Temperature -299 °F	V-Notch
	14.0 J @Temperature -73.0 °C	10.3 ft-lb @Temperature -99.4 °F	V-Notch

Thermal Properties	Metric	English	Comments
CTE, linear	10.6 $\mu\text{m}/\text{m}\cdot\text{°C}$ @Temperature 22.0 - 93.0 °C	5.89 $\mu\text{in}/\text{in}\cdot\text{°F}$ @Temperature 71.6 - 199 °F	
	11.2 $\mu\text{m}/\text{m}\cdot\text{°C}$ @Temperature 22.0 - 260 °C	6.22 $\mu\text{in}/\text{in}\cdot\text{°F}$ @Temperature 71.6 - 500 °F	
	12.0 $\mu\text{m}/\text{m}\cdot\text{°C}$ @Temperature 22.0 - 482 °C	6.67 $\mu\text{in}/\text{in}\cdot\text{°F}$ @Temperature 71.6 - 900 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.050 %	<= 0.050 %	

Component Elements Properties	Metric	English	Comments
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 %	
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	

Contact Songhan Plastic Technology Co.,Ltd.

Website : www.lookpolymers.com

Email : sales@lookpolymers.com

Tel : +86 021-51131842

Mobile : +86 13061808058

Skype : lookpolymers

Address : United North Road 215,Fengxian District, Shanghai City,China