

Carpenter Custom 450® Stainless Steel, Condition H1000 (Age Hardened 538°C (1000°F))

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

Material Notes:

Data provided by Carpenter Technology Corporation. Custom 450® stainless is a martensitic age-hardenable stainless steel which exhibits very good corrosion resistance (similar to that of Stainless Type 304) with moderate strength (similar to that of Stainless Type 410). The alloy has a yield strength somewhat greater than 100 ksi (689 MPa) in the annealed condition, but is easily fabricated. A single-step aging treatment develops higher strength with good ductility and toughness. This stainless can be machined, hot-worked, and cold-formed in the same manner as other martensitic age-hardenable stainless steels. A particular advantage is ease of welding and brazing. Custom 450 stainless is generally supplied in the annealed condition, requiring no heat treatment by the user for many applications. Because it has corrosion resistance like Type 304 stainless but three times the yield strength, it has been used in applications where Type 304 was not strong enough. On the other hand, it has also replaced Type 410 stainless directly on a strength basis where Type 410 had insufficient corrosion resistance. Mechanical properties will depend on the aging temperature selected. Custom 450® is a registered trademark of Carpenter Technology Corporation.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Carpenter-Custom-450-Stainless-Steel-Condition-H1000-Age-Hardened-538C-1000F.php

Physical Properties	Metric	English	Comments
Density	7.76 g/cc	0.280 lb/in ³	H900 Condition

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	360	360	Estimated from Rockwell C for 3000 kg load, 10 mm ball Brinell measurement.
Hardness, Knoop	392	392	Estimated from Rockwell C
Hardness, Rockwell C	39	39	
Hardness, Vickers	376	376	Estimated from Rockwell C
Tensile Strength, Ultimate	1193 MPa	173000 psi	
Tensile Strength, Yield	1165 MPa @Strain 0.200 %	169000 psi @Strain 0.200 %	
Elongation at Break	17 %	17 %	In 4D
Reduction of Area	63 %	63 %	
Modulus of Elasticity	200 GPa	29000 ksi	
Notched Tensile Strength	1882 MPa	273000 psi	K _t = 10
Poissons Ratio	0.29	0.29	

Mechanical Properties	Metric	English	Comments
Fatigue Strength	@# of Cycles 1.00e+7	@# of Cycles 1.00e+7	A.S. Micro Test, Smooth Rotating Beam
Shear Modulus	77.5 GPa	11200 ksi	Calculated
Charpy Impact	69.0 J	50.9 ft-lb	V-notch

Thermal Properties	Metric	English	Comments
CTE, linear	10.8 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$	6.00 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	H900 Condition
	@Temperature 24.0 - 93.0 $^\circ\text{C}$	@Temperature 75.2 - 199 $^\circ\text{F}$	
	10.87 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$	6.039 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	
	@Temperature 24.0 - 260 $^\circ\text{C}$	@Temperature 75.2 - 500 $^\circ\text{F}$	H900 Condition
	11.75 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$	6.528 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$	H900 Condition
	@Temperature 24.0 - 593 $^\circ\text{C}$	@Temperature 75.2 - 1100 $^\circ\text{F}$	
Specific Heat Capacity	0.477 J/g- $^\circ\text{C}$	0.114 BTU/lb- $^\circ\text{F}$	
Thermal Conductivity	15.0 W/m-K	104 BTU-in/hr-ft $^2\cdot^\circ\text{F}$	condition H 900
	@Temperature 23.0 $^\circ\text{C}$	@Temperature 73.4 $^\circ\text{F}$	
	18.2 W/m-K	126 BTU-in/hr-ft $^2\cdot^\circ\text{F}$	
	@Temperature 200 $^\circ\text{C}$	@Temperature 392 $^\circ\text{F}$	condition H 900
	24.4 W/m-K	169 BTU-in/hr-ft $^2\cdot^\circ\text{F}$	condition H 900
	@Temperature 500 $^\circ\text{C}$	@Temperature 932 $^\circ\text{F}$	

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.050 %	<= 0.050 %	min. Nb content = 8 x C content
Chromium, Cr	14 - 16 %	14 - 16 %	
Copper, Cu	1.25 - 1.75 %	1.25 - 1.75 %	
Iron, Fe	75 %	75 %	as remainder
Manganese, Mn	<= 1.0 %	<= 1.0 %	
Molybdenum, Mo	0.50 - 1.0 %	0.50 - 1.0 %	
Nickel, Ni	5.0 - 7.0 %	5.0 - 7.0 %	
Phosphorous, P	<= 0.030 %	<= 0.030 %	

Component Elements Properties	Metric	English	Comments
Sulfur, S	<= 0.030 %	<= 0.030 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000846 ohm-cm	0.0000846 ohm-cm	H900 Condition

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