

Carpenter Custom 450® Stainless Steel, Condition H1150 (Age Hardened 621°C)

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-H1150-Age-Hardened-621C.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	278	278	Estimated from Rockwell C for 3000 kg load, 10 mm ball Brinell measurement.
Hardness, Knoop	301	301	Estimated from Rockwell C
Hardness, Rockwell C	28	28	
Hardness, Vickers	292	292	Estimated from Rockwell C
Tensile Strength, Ultimate	979 MPa	142000 psi	
	559 MPa	81100 psi	
	@Temperature 566 °C	@Temperature 1050 °F	
	731 MPa	106000 psi	
	@Temperature 427 °C	@Temperature 801 °F	
	772 MPa	112000 psi	
	@Temperature 316 °C	@Temperature 601 °F	
	1062 MPa	154000 psi	

Mechanical Properties	@Temperature -18.0 °C Metric	@Temperature -0.400 °F English	Comments
	1145 MPa	166100 psi	
	@Temperature -73.0 °C	@Temperature -99.4 °F	
	1510 MPa	219000 psi	
	@Temperature -196 °C	@Temperature -321 °F	
Tensile Strength, Yield	634 MPa	92000 psi	
	@Strain 0.200 %	@Strain 0.200 %	
	462 MPa	67000 psi	
	@Strain 0.200 %, Temperature 566 °C	@Strain 0.200 %, Temperature 1050 °F	
	634 MPa	92000 psi	
	@Strain 0.200 %, Temperature 427 °C	@Strain 0.200 %, Temperature 801 °F	
	641 MPa	93000 psi	
	@Strain 0.200 %, Temperature -18.0 °C	@Strain 0.200 %, Temperature -0.400 °F	
	662 MPa	96000 psi	
	@Strain 0.200 %, Temperature -73.0 °C	@Strain 0.200 %, Temperature -99.4 °F	
	669 MPa	97000 psi	
	@Strain 0.200 %, Temperature 316 °C	@Strain 0.200 %, Temperature 601 °F	
	938 MPa	136000 psi	
	@Strain 0.200 %, Temperature -196 °C	@Strain 0.200 %, Temperature -321 °F	
Elongation at Break	23 %	23 %	In 4D
	16 %	16 %	In 4D
	@Temperature 427 °C	@Temperature 801 °F	
	17 %	17 %	In 4D
	@Temperature 316 °C	@Temperature 601 °F	
	24 %	24 %	In 4D
	@Temperature -18.0 °C	@Temperature -0.400 °F	
	25 %	25 %	In 4D

Mechanical Properties	@Temperature -73.0 °C Metric	@Temperature -99.4 °F English	Comments
	26 %	26 %	In 4D
	@Temperature 566 °C	@Temperature 1050 °F	
	30 %	30 %	In 4D
	@Temperature -196 °C	@Temperature -321 °F	
Reduction of Area	69 %	69 %	
Modulus of Elasticity	200 GPa	29000 ksi	
Notched Tensile Strength	1441 MPa	209000 psi	K _t = 10
	@Temperature 23.0 °C	@Temperature 73.4 °F	
	1517 MPa	220000 psi	K _t = 10
	@Temperature -18.0 °C	@Temperature -0.400 °F	
	1655 MPa	240000 psi	K _t = 10
	@Temperature -73.0 °C	@Temperature -99.4 °F	
	1717 MPa	249000 psi	K _t = 10
	@Temperature -196 °C	@Temperature -321 °F	
Poissons Ratio	0.29	0.29	
Fatigue Strength	85.0 MPa	12300 psi	R.R. Moore Test, Smooth Rotating Beam
	@# of Cycles 1.00e+7	@# of Cycles 1.00e+7	
Shear Modulus	77.5 GPa	11200 ksi	Calculated
Charpy Impact	132 J	97.4 ft-lb	V-notch
	49.0 J	36.1 ft-lb	V-notch
	@Temperature -196 °C	@Temperature -321 °F	
	89.0 J	65.6 ft-lb	V-notch
	@Temperature -73.0 °C	@Temperature -99.4 °F	
	115 J	84.8 ft-lb	V-notch
	@Temperature -18.0 °C	@Temperature -0.400 °F	
	132 J	97.4 ft-lb	V-notch
	@Temperature 566 °C	@Temperature 1050 °F	
	133 J	98.1 ft-lb	V-notch
	@Temperature 427 °C	@Temperature 801 °F	

Mechanical Properties	Metric	English	Comments
	@Temperature 316 °C	@Temperature 601 °F	V-notch

Thermal Properties	Metric	English	Comments
CTE, linear	10.8 µm/m-°C	6.00 µin/in-°F	H900 Condition
	@Temperature 24.0 - 93.0 °C	@Temperature 75.2 - 199 °F	
	10.87 µm/m-°C	6.039 µin/in-°F	H900 Condition
	@Temperature 24.0 - 260 °C	@Temperature 75.2 - 500 °F	
	11.75 µm/m-°C	6.528 µin/in-°F	H900 Condition
	@Temperature 24.0 - 593 °C	@Temperature 75.2 - 1100 °F	
Specific Heat Capacity	0.477 J/g-°C	0.114 BTU/lb-°F	
Thermal Conductivity	15.0 W/m-K	104 BTU-in/hr-ft²-°F	condition H 900
	@Temperature 23.0 °C	@Temperature 73.4 °F	
	18.2 W/m-K	126 BTU-in/hr-ft²-°F	condition H 900
	@Temperature 200 °C	@Temperature 392 °F	
	24.4 W/m-K	169 BTU-in/hr-ft²-°F	condition H 900
	@Temperature 500 °C	@Temperature 932 °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 %	
Silicon, Si	<= 1.0 %	<= 1.0 %	
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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