

Carpenter Custom 450® 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. 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-H900-Age-Hardened-482C.php

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

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	395	395	Estimated from Rockwell C for 3000 kg load, 10 mm ball Brinell measurement.
Hardness, Knoop	431	431	Estimated from Rockwell C
Hardness, Rockwell C	42.5	42.5	
Hardness, Vickers	413	413	Estimated from Rockwell C
Tensile Strength, Ultimate	1351 MPa	195900 psi	
	579 MPa	84000 psi	
	@Temperature 566 °C	@Temperature 1050 °F	
	1034 MPa	150000 psi	
	@Temperature 427 °C	@Temperature 801 °F	
	1103 MPa	160000 psi	
	@Temperature 316 °C	@Temperature 601 °F	
	1413 MPa	204900 psi	
	@Temperature -18.0 °C	@Temperature -0.400 °F	

Mechanical Properties	Metric	English	Comments
	1460 MPa	212000 psi	
	@Temperature -73.0 °C	@Temperature -99.4 °F	
	1793 MPa	260100 psi	
	@Temperature -196 °C	@Temperature -321 °F	
Tensile Strength, Yield	1296 MPa	188000 psi	
	@Strain 0.200 %	@Strain 0.200 %	
	524 MPa	76000 psi	
	@Strain 0.200 %, Temperature 566 °C	@Strain 0.200 %, Temperature 1050 °F	
	903 MPa	131000 psi	
	@Strain 0.200 %, Temperature 427 °C	@Strain 0.200 %, Temperature 801 °F	
	951 MPa	138000 psi	
	@Strain 0.200 %, Temperature 316 °C	@Strain 0.200 %, Temperature 601 °F	
	1338 MPa	194100 psi	
	@Strain 0.200 %, Temperature -18.0 °C	@Strain 0.200 %, Temperature -0.400 °F	
	1427 MPa	207000 psi	
	@Strain 0.200 %, Temperature -73.0 °C	@Strain 0.200 %, Temperature -99.4 °F	
	1717 MPa	249000 psi	
	@Strain 0.200 %, Temperature -196 °C	@Strain 0.200 %, Temperature -321 °F	
Elongation at Break	14 %	14 %	In 4D
	5.0 %	5.0 %	In 4D
	@Temperature -196 °C	@Temperature -321 °F	
	12 %	12 %	In 4D
	@Temperature 316 °C	@Temperature 601 °F	
	12 %	12 %	In 4D
	@Temperature 427 °C	@Temperature 801 °F	
	15 %	15 %	In 4D
	@Temperature -18.0 °C	@Temperature -0.400 °F	

Mechanical Properties	Metric	English	Comments
	@Temperature -73.0 °C	@Temperature -99.4 °F	
	24 %	24 %	In 4D
	@Temperature 566 °C	@Temperature 1050 °F	
Reduction of Area	56 %	56 %	
	8.0 %	8.0 %	
	@Temperature -196 °C	@Temperature -321 °F	
	45 %	45 %	
	@Temperature 427 °C	@Temperature 801 °F	
	48 %	48 %	
	@Temperature 316 °C	@Temperature 601 °F	
	57 %	57 %	
	@Temperature -18.0 °C	@Temperature -0.400 °F	
	75 %	75 %	
	@Temperature 566 °C	@Temperature 1050 °F	
Modulus of Elasticity	200 GPa	29000 ksi	
Notched Tensile Strength	586 MPa	85000 psi	K _t = 10
	@Temperature -196 °C	@Temperature -321 °F	
	1770 MPa	257000 psi	K _t = 10
	@Temperature -73.0 °C	@Temperature -99.4 °F	
	2060 MPa	298000 psi	K _t = 10
	@Temperature 23.0 °C	@Temperature 73.4 °F	
	2110 MPa	306000 psi	K _t = 10
	@Temperature -18.0 °C	@Temperature -0.400 °F	
Poissons Ratio	0.29	0.29	
Fatigue Strength	660 MPa	95700 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	54.0 J	39.8 ft-lb	V-notch
	1.00 J	0.738 ft-lb	

Mechanical Properties	Metric	English	V-notch Comments
	5.00 J @Temperature -196 °C	3.69 ft-lb @Temperature -321 °F	V-notch
	22.0 J @Temperature -73.0 °C	16.2 ft-lb @Temperature -99.4 °F	V-notch
	57.0 J @Temperature -18.0 °C	42.0 ft-lb @Temperature -0.400 °F	V-notch
	89.0 J @Temperature 427 °C	65.6 ft-lb @Temperature 801 °F	V-notch

Thermal Properties	Metric	English	Comments
CTE, linear	10.8 µm/m-°C @Temperature 24.0 - 93.0 °C	6.00 µin/in-°F @Temperature 75.2 - 199 °F	
	10.87 µm/m-°C @Temperature 24.0 - 260 °C	6.039 µin/in-°F @Temperature 75.2 - 500 °F	
	11.75 µm/m-°C @Temperature 24.0 - 593 °C	6.528 µin/in-°F @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 @Temperature 23.0 °C	104 BTU-in/hr-ft ² -°F @Temperature 73.4 °F	condition H 900
	18.2 W/m-K @Temperature 200 °C	126 BTU-in/hr-ft ² -°F @Temperature 392 °F	condition H 900
	24.4 W/m-K @Temperature 500 °C	169 BTU-in/hr-ft ² -°F @Temperature 932 °F	condition H 900

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 %	

Component Elements Properties	Metric	English	Comments
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	

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