

## Carpenter Custom Age 625 PLUS® Nickel-Base Alloy, Double Aged 732°C/8hr/FC to 621°C/8hr/AC

Category : Metal , Nonferrous Metal , Nickel Alloy , Superalloy

### Material Notes:

Data provided by Carpenter Technology Corporation. Custom Age 625 PLUS® alloy is a precipitation hardenable, nickel-base alloy which, in many environments, displays corrosion resistance similar to that of Alloy 625 and superior to that of Alloy 718. A yield strength (0.2% offset) above 120 ksi (827 MPa) can be obtained by aging without prior warm or cold working. The precipitation hardening capability is particularly important in applications where large-section size or intricate shape precludes warm working. In the age hardened (high strength) condition, Custom Age 625 PLUS alloy offers exceptional resistance to stress corrosion cracking as well as general, pitting and crevice corrosion. Custom Age 625 PLUS alloy could be considered for applications where severely corrosive environments are a concern, such as those encountered in deep sour gas wells as well as in a variety of refinery and chemical process industry applications. In addition, Custom Age 625 PLUS alloy could be considered a candidate for use in marine environments, where Alloy 625 has been used successfully. The higher strength capability of Custom Age 625 PLUS alloy may be particularly useful for fasteners and shafts. Data provided by Carpenter Technology Corporation. Custom Age 625 PLUS® alloy is a precipitation hardenable, nickel-base alloy which, in many environments, displays corrosion resistance similar to that of Alloy 625 and superior to that of Alloy 718. A yield strength (0.2% offset) above 120 ksi (827 MPa) can be obtained by aging without prior warm or cold working. The precipitation hardening capability is particularly important in applications where large-section size or intricate shape precludes warm working. In the age hardened (high strength) condition, Custom Age 625 PLUS alloy offers exceptional resistance to stress corrosion cracking as well as general, pitting and crevice corrosion. Custom Age 625 PLUS alloy could be considered for applications where severely corrosive environments are a concern, such as those encountered in deep sour gas wells as well as in a variety of refinery and chemical process industry applications. In addition, Custom Age 625 PLUS alloy could be considered a candidate for use in marine environments, where Alloy 625 has been used successfully. The higher strength capability of Custom Age 625 PLUS alloy may be particularly useful for fasteners and shafts. Custom Age 625 PLUS® is a registered trademark of Carpenter Technology Corporation.

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[http://www.lookpolymers.com/polymer\\_Carpenter-Custom-Age-625-PLUS-Nickel-Base-Alloy-Double-Aged-732C8hrFC-to-621C8hrAC.php](http://www.lookpolymers.com/polymer_Carpenter-Custom-Age-625-PLUS-Nickel-Base-Alloy-Double-Aged-732C8hrFC-to-621C8hrAC.php)

Physical Properties	Metric	English	Comments
Density	8.40 g/cc	0.303 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	1262 MPa	183000 psi	
	1055 MPa	153000 psi	
	@Temperature 538 °C	@Temperature 1000 °F	
	1069 MPa	155000 psi	
	@Temperature 649 °C	@Temperature 1200 °F	
	1069 MPa	155000 psi	

Mechanical Properties	@Temperature 427 °C Metric	@Temperature 801 °F English	Comments
	1104 MPa	160100 psi	
	@Temperature 316 °C	@Temperature 601 °F	
	1152 MPa	167100 psi	
	@Temperature 232 °C	@Temperature 450 °F	
	1186 MPa	172000 psi	
	@Temperature 177 °C	@Temperature 351 °F	
Tensile Strength, Yield	883 MPa	128000 psi	
	@Strain 0.200 %	@Strain 0.200 %	
	773 MPa	112000 psi	
	@Strain 0.200 %, Temperature 649 °C	@Strain 0.200 %, Temperature 1200 °F	
	787 MPa	114000 psi	
	@Strain 0.200 %, Temperature 316 °C	@Strain 0.200 %, Temperature 601 °F	
	787 MPa	114000 psi	
	@Strain 0.200 %, Temperature 538 °C	@Strain 0.200 %, Temperature 1000 °F	
	787 MPa	114000 psi	
	@Strain 0.200 %, Temperature 427 °C	@Strain 0.200 %, Temperature 801 °F	
	800 MPa	116000 psi	
	@Strain 0.200 %, Temperature 232 °C	@Strain 0.200 %, Temperature 450 °F	
	821 MPa	119000 psi	
	@Strain 0.200 %, Temperature 177 °C	@Strain 0.200 %, Temperature 351 °F	
Elongation at Break	33 %	33 %	In 4D
	25 %	25 %	In 4D
	@Temperature 649 °C	@Temperature 1200 °F	
	31 %	31 %	In 4D
	@Temperature 538 °C	@Temperature 1000 °F	
	32 %	32 %	In 4D
	@Temperature 316 °C	@Temperature 601 °F	

Mechanical Properties	Metric	English	Comments
	@Temperature 427 °C	@Temperature 801 °F	
	34 %	34 %	In 4D
	@Temperature 232 °C	@Temperature 450 °F	
	34 %	34 %	In 4D
	@Temperature 177 °C	@Temperature 351 °F	
Reduction of Area	56 %	56 %	
	31 %	31 %	
	@Temperature 649 °C	@Temperature 1200 °F	
	52 %	52 %	
	@Temperature 538 °C	@Temperature 1000 °F	
	54 %	54 %	
	@Temperature 427 °C	@Temperature 801 °F	
	59 %	59 %	
	@Temperature 316 °C	@Temperature 601 °F	
	59 %	59 %	
	@Temperature 177 °C	@Temperature 351 °F	
	60 %	60 %	
	@Temperature 232 °C	@Temperature 450 °F	
Modulus of Elasticity	207 GPa	30000 ksi	
	@Temperature 23.0 °C	@Temperature 73.4 °F	

Thermal Properties	Metric	English	Comments
CTE, linear	12.6 $\mu\text{m}/\text{m}\cdot\text{°C}$	7.00 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 25.0 - 100 °C	@Temperature 77.0 - 212 °F	
	13.4 $\mu\text{m}/\text{m}\cdot\text{°C}$	7.44 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 25.0 - 300 °C	@Temperature 77.0 - 572 °F	
	14.0 $\mu\text{m}/\text{m}\cdot\text{°C}$	7.78 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 25.0 - 500 °C	@Temperature 77.0 - 932 °F	
Specific Heat Capacity	0.418 J/g·°C	0.0999 BTU/lb·°F	

Melting Point Thermal Properties	1257 - 1356 °C Metric	2295 - 2473 °F English	Comments
Solidus	1257 °C	2295 °F	
Liquidus	1356 °C	2473 °F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	<= 0.35 %	<= 0.35 %	
Carbon, C	<= 0.030 %	<= 0.030 %	
Chromium, Cr	19 - 22 %	19 - 22 %	
Iron, Fe	5.0 %	5.0 %	as remainder
Manganese, Mn	<= 0.20 %	<= 0.20 %	
Molybdenum, Mo	7.0 - 9.5 %	7.0 - 9.5 %	
Nickel, Ni	59 - 63 %	59 - 63 %	
Niobium, Nb (Columbium, Cb)	2.75 - 4.0 %	2.75 - 4.0 %	
Phosphorous, P	<= 0.015 %	<= 0.015 %	
Silicon, Si	<= 0.20 %	<= 0.20 %	
Sulfur, S	<= 0.010 %	<= 0.010 %	
Titanium, Ti	1.0 - 1.6 %	1.0 - 1.6 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0001299 ohm-cm	0.0001299 ohm-cm	

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