Technical Datasheet

CarTech® Custom Age 725 Alloy

Identification

UNS Number

• N07725

Type Analysis

Single figures are nominal except where noted.

Carbon (Maximum)	0.03 %	**Manganese (Maximum)**	0.20 %
Phosphorus (Maximum)	0.015 %	**Sulfur (Maximum)**	0.010 %
Silicon (Maximum)	0.20 %	**Chromium (Maximum)**	22.00 %
Nickel (Maximum)	59.00 %	**Molybdenum (Maximum)**	9.50 %
Cobalt (Maximum)	4.00 %	**Titanium (Maximum)**	1.60 %
Aluminum (Maximum)	0.35 %	**Iron**	Balance

General Information

Description

CarTech Custom Age 725 alloy is a precipitation hardenable, nickel-base alloy which 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, CarTech Custom Age 725 alloy offers exceptional resistance to stress corrosion cracking as well as general, pitting and crevice corrosion.

Applications

CarTech Custom Age 725 alloy could be considered for applications where severely corrosive environments are a concern, such as refinery and chemical process industry applications as well as those encountered in deep sour gas wells.

CarTech Custom Age 725 alloy could be considered a candidate for use in environments where alloy 625 has been used successfully. The higher strength capability of CarTech Custom Age 725 alloy may be particularly useful for fasteners and shafts.

Corrosion Resistance

CarTech Custom Age 725 alloy provides a unique combination of strength plus resistance to stress corrosion cracking, sulfide stress cracking, pitting and crevice corrosion. This alloy exhibits corrosion resistance superior to that of aged alloy 718 and similar to that of cold worked alloy 625.

Important Note: *The following 4-level rating scale is intended for comparative purposes only. Corrosion testing is recommended; factors which affect corrosion resistance include temperature, concentration, pH, impurities, aeration, velocity, crevices, deposits, metallurgical condition, stress, surface finish and dissimilar metal contact.*

Nitric Acid	Good	Sulfuric Acid	Good
Phosphoric Acid	Excellent	Acetic Acid	Excellent
Sodium Hydroxide	Excellent	Salt Spray (NaCl)	Excellent
Sea Water	Excellent	Sour Oil/Gas	Excellent
Humidity	Excellent		

Properties

Physical Properties

All Values Reported are in the Age-Hardened Condition

Density	0.3030	lb/in³
Mean CTE		
75 to 200°F	6.81	x 10 -6 in/in/°F
75 to 400°F	7.20	x 10 -6 in/in/°F
75 to 600°F	7.47	x 10 -6 in/in/°F
75 to 800°F	7.70	x 10 -6 in/in/°F
75 to 1000°F	7.99	x 10 -6 in/in/°F
75 to 1200°F	8.24	x 10 -6 in/in/°F
75 to 1400°F	8.74	x 10 -6 in/in/°F

Typical Mechanical Properties

Elevated Temperature Tension Properties

CarTech Custom Age 725 Alloy: Solution Annealed + Aged Condition

Temperature	0.2% Yield Strength		Ultimate Tensile strength		% Elongation in 4D	% Reduction of Area
	ksi	MPa	ksi	MPa		
200ºF	126	868	177	1220	35	53
400ºF	121	834	169	1165	34	57
600ºF	120	827	160	1103	37	57
800ºF	115	793	153	1054	35	53
1000ºF	114	786	149	1027	41	55
1200ºF	113	779	155	1068	41	52

Typical Room Temperature Mechanical Properties

CarTech Custom Age 725 Alloy: Typical Mechanical Properties

Condition	0.2% Yield Strength		Ultimate Tensile strength		% Elongation in 4D	% Reduction of Area	Charpy V-notch (-75ºF)		HRC
	ksi	MPa	ksi	MPa			Ft.-lbs.	J	
Solution Annealed.	47	324	117	806	70	72			28
Solution Annealed + Aged	134	923	186	1282	33	51	87	118	35

Heat Treatment

Annealing

The recommend annealing temperature is 1900°F followed by air cooling.

Age

The recommended aging treatment is 1350°F for 8 hours, furnace cooled at a rate of 100°C to 1150°F, hold for 8 hours, air cool to room temperature.

Workability

Hot Working

CarTech Custom Age 725 alloy may be hot worked using a maximum furnace temperature of 2100°F (1149°C). Exercise care in avoiding frictional heat build-up as this may cause the material to exceed the 2100°F (1149°C) maximum temperature.

This alloy becomes very stiff at temperatures below 1850°F (1010°C). Uniform reductions are recommended to avoid the formation of a duplex grain structure.

After hot working, the alloy should be solution treated to recrystallize the grain structure and to precipitate stabilizing niobium/titanium-rich carbides.

Other Information

Applicable Specifications

- ASTM B805
- NACE MR0175

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