

## Carlson Nitronic® 33® Austenitic Stainless Steel

Category : Metal , Ferrous Metal , Austenitic , Stainless Steel

### Material Notes:

**General Description** Nitronic 33 is a nitrogen-strengthened austenitic stainless steel that combines high yield strength with excellent toughness and ductility. It's magnetic permeability remains very low after severe cold working and at cryogenic temperatures. The alloy is superior to 304 stainless in at least five specific areas: (1) Yield strength in the annealed condition is approximately twice that of 304, (2) it has excellent strength and ductility at cryogenic temperatures, (3) has better stress corrosion cracking resistance than 304, (4) low magnetic permeability is retained at cryogenic temperatures and after severe cold working and, (5) resistance to wear and galling is superior to the standard austenitic stainless steels. The corrosion resistance of Nitronic 33 is superior to 409 and, in general, is nearly equal to 304. In weak acid solutions, the corrosion resistance of Nitronic 33 approaches that of 304. In more aggressive media Nitronic 33 is somewhat less resistance than 304. Nitronic 33 is markedly more resistant than 304 and 304L to stress corrosion cracking in hot chloride solutions at lower stress levels. At higher stress levels (approx. 50 ksi and above) they are equal. Like most stainless steels, Nitronic 33 is prone to pitting and crevice corrosion in seawater and other aggressive environments, and should not be used under these conditions unless cathodically protected. Although Nitronic 33 is considerably stronger than the conventional austenitic stainless steels, the same fabricating equipment and techniques can generally be used.

**Applications** Cryogenic Service – tanks valves, piping, flanges, and structural supports Abrasion/Wear Resistance – screens, racks, and wear plates Electrical (low magnetic permeability) – conduit shielding, MRI scanner supports, fittings, underground transmission risers and pipe and electronic support members Marine – mine sweeper components and perming piers Nuclear – spent fuel casks (internal supports) Process Equipment – heat exchangers, pressure vessels and piping where 304 is borderline with respect to stress corrosion cracking.

Information provided by Carlson

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_Carlson-Nitronic-33-Austenitic-Stainless-Steel.php](http://www.lookpolymers.com/polymer_Carlson-Nitronic-33-Austenitic-Stainless-Steel.php)

Physical Properties	Metric	English	Comments
Density	7.75 g/cc	0.280 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	<= 241	<= 241	
Hardness, Rockwell B	<= 100	<= 100	
Tensile Strength at Break	>= 689 MPa	>= 100000 psi	
	1140 MPa	166000 psi	
	@Temperature -73.3 °C	@Temperature -100 °F	
	1580 MPa	229000 psi	
	@Temperature -196 °C	@Temperature -320 °F	
Tensile Strength, Yield	>= 379 MPa	>= 55000 psi	
	@Strain 0.200 %	@Strain 0.200 %	

Mechanical Properties	717 MPa Metric	104000 psi English	Comments
	@Strain 0.200 %, Temperature -73.3 °C	@Strain 0.200 %, Temperature -100 °F	
	1217 MPa	176500 psi	
	@Strain 0.200 %, Temperature -196 °C	@Strain 0.200 %, Temperature -320 °F	
Elongation at Break	>= 40 %	>= 40 %	
	20 %	20 %	
	@Temperature -196 °C	@Temperature -320 °F	
	60.5 %	60.5 %	
	@Temperature -73.3 °C	@Temperature -100 °F	
Taber Abrasion, mg/1000 Cycles	4.35	4.35	415 rpm; 16 lb load; 10,000 rev
	7.95	7.95	105 rpm; 16 lb load; 10,000 rev

Thermal Properties	Metric	English	Comments
CTE, linear	16.1 µm/m-°C	8.93 µin/in-°F	
	@Temperature 25.6 - 93.3 °C	@Temperature 78.0 - 200 °F	
	17.4 µm/m-°C	9.68 µin/in-°F	
	@Temperature 25.6 - 316 °C	@Temperature 78.0 - 600 °F	
	19.51 µm/m-°C	10.84 µin/in-°F	
	@Temperature 25.6 - 649 °C	@Temperature 78.0 - 1200 °F	
	21.04 µm/m-°C	11.69 µin/in-°F	
	@Temperature 25.6 - 982 °C	@Temperature 78.0 - 1800 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.80 %	<= 0.80 %	
Chromium, Cr	17 - 19 %	17 - 19 %	
Iron, Fe	61.43 - 69.05 %	61.43 - 69.05 %	
Manganese, Mn	11.5 - 14.5 %	11.5 - 14.5 %	
Nickel, Ni	2.25 - 3.75 %	2.25 - 3.75 %	

<b>Nitrogen, N</b> Component Elements Properties	<b>0.20 - 0.40 %</b> Metric	<b>0.20 - 0.40 %</b> English	Comments
Phosphorous, P	<= 0.060 %	<= 0.060 %	
Silicon, Si	<= 0.75 %	<= 0.75 %	
Sulfur, S	<= 0.030 %	<= 0.030 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000700 ohm-cm	0.0000700 ohm-cm	
Magnetic Permeability	1.0017	1.0017	77°F
	1.0016	1.0016	
	@Temperature -196 °C	@Temperature -320 °F	
	1.002	1.002	
	@Temperature -73.3 °C	@Temperature -100 °F	

## Contact Songhan Plastic Technology Co.,Ltd.

Website : [www.lookpolymers.com](http://www.lookpolymers.com)

Email : [sales@lookpolymers.com](mailto:sales@lookpolymers.com)

Tel : +86 021-51131842

Mobile : +86 13061808058

Skype : lookpolymers

Address : United North Road 215,Fengxian District, Shanghai City,China