

## Carlson 2205 (UNS S32205) Duplex Stainless Steel

Category : Metal , Ferrous Metal , Austenitic , Duplex , Stainless Steel

### Material Notes:

**General Description** Carlson Alloy 2205 is a second-generation, nitrogen-alloyed duplex stainless steel (ferritic-austenitic). It offers an excellent combination of both strength and corrosion resistance over a wide range of applications. The approximate 50/50 ferrite-austenite structure provides excellent chloride pitting and stress corrosion cracking resistance, with roughly twice the yield strength of the standard austenitic stainless grades. The high chromium and molybdenum content, coupled with the nitrogen addition in 2205, provides general corrosion, pitting, and crevice corrosion resistance superior to 316L and 317L. 2205 demonstrates superior erosion-corrosion resistance when compared to 316 stainless steel. It is not subject to intergranular corrosion in the as-welded condition. 2205 may be successfully machined by conventional methods. The (UNS S32205) grade is a restricted-chemistry version which maintains chromium, molybdenum and nitrogen at higher levels than the (UNS S31803) composition.

**Applications** Due to its excellent corrosion resistance, 2205 is a suitable material for service in environments containing chlorides and hydrogen sulfide. It is also suitable for use in dilute sulfuric acid solutions and for handling organic acids, i.e., acetic acid and its mixtures.

**Oil and Gas Production** – Down-hole piping, gathering line pipe, CO<sub>2</sub> tertiary recovery piping, oil-gas separators, heat exchangers.

**Chemical Processing** – Heat exchangers, pressure vessels, tanks, columns, pumps, valves, piping.

**Transportation** – Tank trailers, ocean-going tankers, barges.

**Pulp & Paper** – Pulp digesters

**Power Industry** – Feedwater heaters, coolers, flue gas scrubbers.

**Marine Service** – Sea water piping, pumps.

Information provided by Carlson

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_Carlson-2205-UNS-S32205-Duplex-Stainless-Steel.php](http://www.lookpolymers.com/polymer_Carlson-2205-UNS-S32205-Duplex-Stainless-Steel.php)

Physical Properties	Metric	English	Comments
Density	7.82 g/cc	0.283 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	<= 293	<= 293	
Hardness, Rockwell C	<= 31	<= 31	
Tensile Strength at Break	>= 621 MPa	>= 90000 psi	
Tensile Strength, Yield	>= 448 MPa @Strain 0.200 %	>= 65000 psi @Strain 0.200 %	
Elongation at Break	>= 25 %	>= 25 %	
Modulus of Elasticity	190 GPa	27500 ksi	

Thermal Properties	Metric	English	Comments
CTE, linear	13.7 µm/m-°C	7.60 µin/in-°F	
	@Temperature 20.0 - 100 °C	@Temperature 68.0 - 212 °F	
	14.2 µm/m-°C	7.90 µin/in-°F	

Thermal Properties	Metric	English	Comments
	@ Temperature 20.0 - 199 °C	@ Temperature 68.0 - 390 °F	
	14.8 µm/m-°C	8.20 µin/in-°F	
	@Temperature 20.0 - 299 °C	@Temperature 68.0 - 570 °F	
Specific Heat Capacity	0.418 J/g-°C	0.100 BTU/lb-°F	
	@Temperature 20.0 °C	@Temperature 68.0 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.030 %	<= 0.030 %	
Chromium, Cr	22 - 23 %	22 - 23 %	
Iron, Fe	63.75 - 70.36 %	63.75 - 70.36 %	
Manganese, Mn	<= 2.0 %	<= 2.0 %	
Molybdenum, Mo	3.0 - 3.5 %	3.0 - 3.5 %	
Nickel, Ni	4.5 - 6.5 %	4.5 - 6.5 %	
Nitrogen, N	0.14 - 0.20 %	0.14 - 0.20 %	
Phosphorous, P	<= 0.030 %	<= 0.030 %	
Silicon, Si	<= 1.0 %	<= 1.0 %	
Sulfur, S	<= 0.020 %	<= 0.020 %	

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