

ATI Allegheny Ludlum AL 2205™ Duplex Stainless Steel, Sheet and Strip < 0.1875", UNS S31803

Category : Metal , Ferrous Metal , Stainless Steel

Material Notes:

Ferromagnetic. The AL 2205 alloy is a nitrogen-enhanced duplex stainless steel alloy. The nitrogen serves to significantly improved the corrosion resistance of the alloy; especially in the welded condition. Earlier duplex alloys have had moderate resistance to general corrosion and chloride stress corrosion cracking, but suffered a substantial loss of properties when used in the as-welded condition. To impart the metallurgical benefits of nitrogen to both improved corrosion performance and as-welded properties, the AL 2205 alloy is produced to a .15% minimum nitrogen content compared to the ASTM range of .08-.20%. The minimum Cr, Mo, and Ni contents of AL 2205 alloy are all above the mid range of the ASTM composition specification. When heat-treated properly, the nominal 22% chromium, 5.5% nickel, 3% molybdenum, and 0.16% nitrogen in the AL 2205 alloy produces a microstructure that consists of nearly equal mixture of austenite and ferrite phases. The microstructure and composition of the AL 2205 alloy provides corrosion resistance to many environments that is superior to Types 316, and a yield strength that is more than double that of conventional austenitic stainless steels. The microstructure and phase balance of AL 2205 alloy have been designed to facilitate the production of pipe and tube products. All AL 2205 alloy is metallographically examined to ensure that the as-shipped product is essentially free from the presence of detrimental precipitate phases such as sigma. The AL 2205 is the most widely used of the duplex stainless steels and is often used in the form of welded pipe or tubular components. The alloy has also been applied as a formed and welded sheet product in environments where resistance to general corrosion and chloride stress corrosion cracking is important. Information provided by Allegheny Ludlum

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http://www.lookpolymers.com/polymer_ATI-Allegheny-Ludlum-AL-2205-Duplex-Stainless-Steel-Sheet-and-Strip-01875-UNS-S31803.php

Physical Properties	Metric	English	Comments
Density	7.88 g/cc	0.285 lb/in ³	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell C	27	27	Typical Annealed
Tensile Strength, Ultimate	860 MPa	125000 psi	Typical; Annealed
Tensile Strength, Yield	585 MPa @Strain 0.200 %	84800 psi @Strain 0.200 %	Typical; Annealed
Elongation at Break	30 %	30 %	Typical in 2" (51 mm); Annealed
Modulus of Elasticity	190 GPa	27600 ksi	

Thermal Properties	Metric	English	Comments
CTE, linear	13.7 μm/m-°C @Temperature 20.0 - 100 °C	7.61 μin/in-°F @Temperature 68.0 - 212 °F	

Specific Heat Capacity Thermal Properties	0.420 J/g-°C Metric	0.100 BTU/lb-°F English	Comments
Thermal Conductivity	19.0 W/m-K	132 BTU-in/hr-ft ² -°F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.020 %	0.020 %	
Chromium, Cr	22.4 %	22.4 %	
Iron, Fe	67 %	67 %	as balance
Manganese, Mn	0.70 %	0.70 %	
Molybdenum, Mo	3.3 %	3.3 %	
Nickel, Ni	5.8 %	5.8 %	
Nitrogen, N	0.16 %	0.16 %	
Phosphorous, P	0.025 %	0.025 %	
Silicon, Si	0.40 %	0.40 %	
Sulfur, S	0.0010 %	0.0010 %	

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