

Duplex UNS 32205/31803

Duplex Stainless Steel

TYPICAL AMERICAN/GERMAN DENOMINATION UNS 32205/ UNS 31803/ DIN 1.4462 TYPE 2205

Chemical Composition

Element	C	Mn	Si	Cr	Ni	P	S	Mo	N
%	0,03	2,00	1,00	22,0 23,0	4,50 6,50	0,03	0,015	3,0 3,5	0,14 0,20

Values according to ASTM A240/A240M standard

General Characteristics

The duplex stainless steel combines high mechanical resistance and corrosion resistance. Result of a perfect union between austenitic stainless steels and ferritic stainless steels, this grade combines the best characteristics of both alloys, such as immunity to corrosion under tension and good weldability. The addition of nitrogen to duplex stainless steels increases tenacity and corrosion resistance of the HAZ (Heat-Affected Zone) compared to the base metal in welded condition.

With low percentage of nickel in its chemical composition, these steels present yield strength much higher than the austenitic stainless steels, which enables the design of projects with smaller thickness and greater corrosion resistance. Aperam South America currently produces duplex stainless steel (UNS S32205/ UNS S31803/ DIN 1.4462), with excellent resistance to corrosion and mechanical resistance.

Used in the oil & gas industry on flexible pipes for the extraction of oil, it can also be applied on chemical storage tanks as well as on equipment for pulp and paper segment.

Delivery Conditions

- **Products: coils, sheets, blanks, strips cold rolled and hot rolled**

Thickness range (mm)	Mill edge width (mm)	Slitted edge width (mm)
1,20 to 10,00	1040, 1240, 1270, 1320	1000, 1020, 1200, 1219, 1220, 1250, 1300
12,70 to 50,80	1040, 1240, 1270, 1320, 1540	1000, 1020, 1200, 1219, 1220, 1250, 1300, 1500, 1524

For further information please contact Aperam South America.

Mechanical Properties

In annealed condition, according to standard ASTM E-8M: samples are perpendicular to rolling direction, specimen with $L_0 = 80$ mm. Typical values.

Yield Strength 0.2% (MPa)	Tensile Strength (MPa)	Elongation (%)	Hardness HRB
620	840	29	98

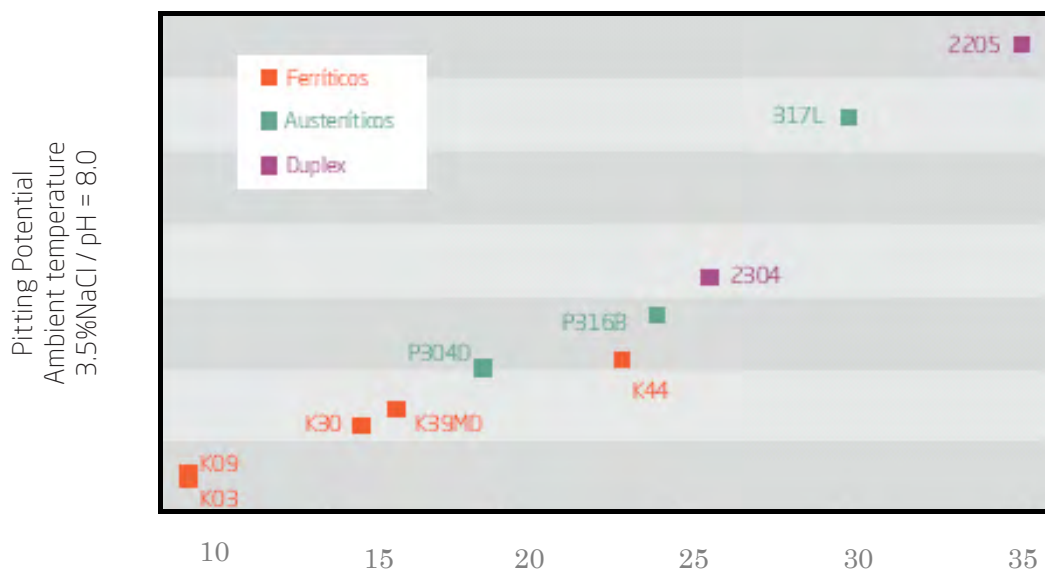
Physical Properties

Density	7.8 g/cm ³
Modulus of Elasticity	200 GPa
Average Coefficient of Thermal Expansion from 0°C to 100°C	13.7 µm/m.°C
from 0°C to 538°C	14.8 µm/m.°C
Thermal Conductivity at 100°C	16 W/m.K
Specific Heat	460 J/kg.K
Electrical Resistivity	0,8 µΩm
Melting Point	1460°C – 1465°C

Source: ASM Specialty Handbook – Stainless Steels

Corrosion Resistance

The duplex UNS 32205 is recommended for some severe conditions of corrosion where it can replace some austenitic stainless steels. The diagram below illustrates the behavior of grade duplex 2205 in an aggressive environment (13.5%NaCl / pH = 8.0) and ambient temperature, represented by its PREN (Pitting Resistance Equivalent Number), which can be calculated by the formula: $PREN = \%Cr + 3.3x\%Mo + 16x\%N$.



The high levels of chromium, nitrogen and molybdenum turn the duplex 2205 into an excellent alternative in terms of pitting resistance and its performance is superior to AISI 304L and 316L.

The information contained in this publication has been obtained from laboratory test results and traditional and respectable bibliographic references. The behavior of stainless steel may change due to conditions of temperature, pH, contaminants, and also the conservation of tools used in welding and conformation. For these reasons, the information contained in this publication may be used only as initial reference for tests or final specification by the customer. Aperam South America is not responsible for any loss or damage caused by inappropriate use of the information contained in this publication.

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