Austenitic Stainless Steel NAS 205	
ASTM Designation	EN Designation
309S	1.4833
S30908	X12CrNi23-13

DESCRIPTION

Refractory austenitic stainless steel NAS 205 has high mechanical resistance, toughness and excellent high-temperature oxidation resistance, as a result of its high chromium and nickel content. The low carbon level reduces carbide precipitation during welding or high temperature applications.

CHEMICAL COMPOSITION

C	Si	Mn	P	S	Cr	Ni
≤ 0.080	≤ 0.75	≤ 2.00	≤ 0.045	≤ 0.030	22.00-24.00	12.00 - 15.00

APPLICATIONS

- Electrical resistances
- Furnaces
- High-temperature applications
- Air heaters

MECHANICAL PROERTIES AFTER COLD ROLLING AND FINAL ANNEALING

UTS	75 ksi min
0.2% YS	30 ksi min
Elongation	40% min
Hardness	max 95 HRB

PHYSICAL PROPERTIES

At 68 °F, it has a density of 0.285 lb/in^3 and a specific heat of 0.12 Btu/lb/°F

Modulus of Elasticity (x10^6 psi)	29
Coefficient of Thermal Expansion, 68-212˚F, /˚F	8.7 x10^{-6}
Thermal conductivity (Btu/hr•ft•°F)	9.3
Electrical resistivity (Micro ohm-in)	28.4

WELDING

The recommended consumable electrodes are:

Shielded electrodes	Wires and rods	Hollow electrodes
E 22 12	G 22 12 H (GMAW) W 22 12 H (GTAW)	T 22 12 H
ER 306L (Si)	P 22 12 H (PAW) S 22 12 H (SAW)	ER 309L (Si)
ER Ni Cr 3	ER 309L (Si) ER Ni Cr 3	ER Ni Cr 3

CORROSION RESISTENCE

This grade is optimized to be employed at high temperature. When used in other media, these steels are equivalent to any other general purpose austenitic stainless steel.

PITTING CORROSION

NAS 205 can be successfully used in chloride media with concentration not higher than 200 ppm.

HIGH-TEMPERATURE OXIDATION RESISTANCE

As a result of their high chromium and nickel content, these steels have high corrosion resistance at high temperatures.

Maximum operating temperatures for NAS 205 in continuous working in different media are:
(a) Oxidizing media 1920^{o}F
(b) Oxidizing media with sulphur 1830^{o}F
- Carburizing reducing media 1740^{o}F
- Sulphidizing reducing media 1550^{o}F

When the environment is not continuously oxidizing, the thermal death points are smaller than the ones above (a,b) and they depend on the cycling frequency. In any case they should not exceed 1740^{o}F.

It has satisfactory thermal resistance in cycles and is suitable in carburizing media. It can also be used in fused salt baths.

SURFACE CLEANING

Wash the surface with neutral soap and water applied with a cloth or a brush without scratching the stainless steel. Then, always rinse the stainless steel with water to remove completely the cleaning agent. Finally, it is recommended to dry the surface to preserve a good superficial condition. In severe environments, a frequent cleaning is strongly recommended.

SPECIFICATIONS NAS 205 austenitic stainless steel is included in the main international standards.

This grade can be supplied according to ASTM, ASME, EN, and MILS standard requirements.