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303 Stainless Steel

303 stainless steel is the most readily machinable of all the austenitic grades of stainless steel.

The machinable nature of grade 303 is due to the presence of Sulphur in the steel composition. While the Sulphur improves machining, it also causes a decrease in the corrosion resistance and a slight lowering of the toughness. The corrosion resistance of type 303 is lower than that for 304. The toughness is still excellent as with other austenitic grades.

Property data given in this document is typical for bar products covered by ASTM A582. It is reasonable to expect specifications in these standards to be similar but not necessarily identical to those given in this datasheet.

Applications

Grade 303 is used in applications that require parts to be heavily machined. These applications include: Nuts and bolts, Screws, Gears, Aircraft fittings, Bushing and Shafts.

Typical Chemical Composition

%	303
C	0.15 max
Mn	2.0
Si	1.0
P	0.20
S	0.15 min
Cr	17-19
Ni	8 -10

Typical Mechanical Properties

Tensile Strength (MPa)	500
Proof Stress 0.2% (MPa)	190
Elongation A5 (%)	35
Hardness Rockwell (HB)	262 max

Typical Physical Properties

Density	8.03g/cm ³
Melting Point	1455°C
Modulus of Elasticity	193 GPa
Electrical Resistivity	0.072x10 ⁻⁶ Ohm.m
Thermal Conductivity	16.3 W/m.K@100°C
Thermal Expansion	17.3x10 ⁻⁶ /K@100°C

Corrosion Resistance

Sulphur additions to the composition act as initiation sites for pitting corrosion. This decreases the corrosion resistance of 303 stainless steel to less than that for 304. However, corrosion resistance remains good in mild environments.

In chloride containing environments over 60°C, 303 stainless steel is subject to pitting and crevice corrosion. Grade 303 stainless is not suitable for use in marine environments.

Heat Resistance

Grade 303 stainless steel has good resistance to oxidation when intermittently exposed to temperatures up to 760°C. It also has good oxidation resistance in continuous service to 870°C. This, however, is not recommended as 303 is sensitive to carbide precipitation with continuous use at 425-860°C.