

Stainless Steel grade AISI 904L



Grade 904L stainless steel is a non-stabilized austenitic stainless steel with low carbon content. This high alloy stainless steel is added with copper to improve its resistance to strong reducing acids, such as sulphuric acid. The steel is also resistant to stress corrosion cracking and crevice corrosion. Grade 904L is non-magnetic, and offers excellent formability, toughness and weldability.

Grade 904L contains high amounts of expensive ingredients, such as molybdenum and nickel. Today, most of the applications that employ grade 904L are replaced by low-cost duplex stainless steel 2205.

The following sections describe the properties of flat rolled products in ASTM B625. The specifications may not be identical for other products such as bar, tube and pipe.



Grade 904L stainless steels have excellent resistance to warm seawater and chloride attack. The high resistance of grade 904L against stress corrosion cracking is due to the presence of high amounts of nickel in its composition. Moreover, the addition of copper to these grades develops resistance to sulphuric acid and other reducing agents in both aggressive and mild conditions.

Chemical Properties

Composition	904L (%)
C	0.02 max.
Mn	2.00 max.
Si	1.00 max.
P	0.045 max.
S	0.035 max.
Cr	19.00 – 23.00
Mo	4.00 – 5.00
Ni	23.00 – 28.00
Cu	1 - 2



Mechanical Properties in room temperature

Grade	Tensile Strength (MPa) min	Yield Strength 0.2% Proof (MPa) min	Elongation (% in 50mm) min	Rockwell B (HR B)	Brinell (HB) max
904L	490	220	36	70-90	150

Physical Properties

Grade	Density (kg/m ³)	Elastic Modulus (GPa)	Mean Coefficient of Thermal Expansion (μm/m/°C)			Thermal Conductivity (W/m.K)		Specific Heat 0-100° C (J/kg.K)	Electrical Resistivity (nΩ.m)
			100°C	315°C	538°C	100°C	500°C		
904L	7900	190	15	-	-	-	21.5	500	952

Grade Specification Comparison

Grade	Old British BS	Name	Euronorm No	Japanese JIS
904L	904S13	X1NiCrMoCuN25-20-5	1.4539	-

Typical uses include wiring in electrostatic precipitators, oil refinery components, seawater cooling devices, gas scrubbing plants, pulp and paper processing industries, acetic, phosphoric and sulphuric acid processing plants. "Super austenitic" grade with very high corrosion resistance, especially to strong acids and chlorides. Frequently used in sulphuric acid service.

Cored Wires
Stainless and Heat resistant steels

Fluxinox 904L is a rutile flux cored wire for welding austenitic stainless steel type AISI 904L. Good weldability, easy slag removal, good bead appearance. Suitable for welding in all positions.

Classification	Approvals	Grades
AWS A5.22: similar to E385LT1-1/4		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	1.60	0.50	0.020	0.020	21	26	4.50	-	1.40	-	-

All-weld metal Mechanical Properties


Heat Treatment	Yield Strength N/mm ²	Tensile Strength N/mm ²	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
As Welded	430	640	32	70	-

Gas test: Acc. To EN 439: M21(Arcal 21-Atal 6)

Shielding Gas: Acc. To EN 439: M21(Arcal21 -Atal6) or C1(Arcal 2)

Materials

URANUS 86; AISI 904L; 1.4539 (X1NiCrMoCu25-20-5); 1.4439 (X2CrNiMoN17-13-5); 1.4537 (X1CrNiMoCuN25-25-5)

Storage	Current condition and welding position
Keep dry and avoid condensation	<p>DC+</p> 

Packaging data: K300 kg. 16

Diameters	1,2					
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