



Alloy 904L (UNS N08904)

UNS N08904, commonly known as 904L, is a low carbon high alloy austenitic stainless steel which is widely used in applications where the corrosion properties of AISI 316L and AISI 317L are not adequate.

The addition of copper to this grade gives it corrosion resistant properties superior to the conventional chrome nickel stainless steels, in particular to sulphuric, phosphoric and acetic acids. However, there is limited use with hydrochloric acids. It also has a high resistance to pitting in chloride solutions, a high resistance to both crevice and stress corrosion cracking. Alloy 904L performs better than other austenitic stainless steels due to the higher alloying of nickel and molybdenum.

The grade is non-magnetic in all conditions and has excellent formability and weldability. The austenitic structure also gives this grade excellent toughness, even down to cryogenic temperatures.

The high chromium content promotes and maintains a passive film which protects the material in many corrosive environments. 904L has a greater resistance to precipitation of ferrite and sigma phases on cooling and welding than other stainless steels containing molybdenum such as 316L and 317L. There is no risk of intercrystalline corrosion on cooling or welding due to the low carbon content. Its maximum service temperature is at 450°C.

This grade is particularly useful in control and instrumentation tubing applications where 316 and 317L are not suitable.

AVAILABLE TUBE PRODUCT FORMS

STRAIGHT

COILED

SEAMLESS

TYPICAL MANUFACTURING SPECIFICATIONS

ASTM A213

ASTM A312

ASTM A269

BS EN 10216 pt.5

Also individual customer specifications.

TYPICAL APPLICATIONS

SEAWATER COOLING EQUIPMENT

CHEMICAL PROCESSING FOR SULPHURIC, PHOSPHORIC AND ACETIC ACIDS

GAS WASHING

CONDENSER TUBES

HEAT EXCHANGERS

CONTROL AND INSTRUMENTATION

INDUSTRIES PREDOMINANTLY USING THIS GRADE

CHEMICAL PROCESSES

OIL AND GAS

PHARMACEUTICAL



Technical Data

MECHANICAL PROPERTIES

Temper	Annealed	
Tensile Rm	71	ksi (min)
Tensile Rm	490	MPa (min)
R.p. 0.2% Yield	32	ksi (min)
R.p. 0.2% Yield	220	MPa (min)
Elongation (2" or 4D gl)	35	% (min)

PHYSICAL PROPERTIES (Room Temperature)

Specific Heat (0-100°C)	450	J.kg ⁻¹ .°K ⁻¹
Thermal Conductivity	11.5	W.m ⁻¹ .°K ⁻¹
Thermal Expansion	15.8	µm/µm/°C
Modulus Elasticity	190	GPa
Electrical Resistivity	9.52	µohm/cm
Density	7.95	g/cm ³

CHEMICAL COMPOSITION

(% by weight)

Element	Min	Max
C	-	0.2
Mn	-	2
Ni	23	28
Cr	19	23
S	-	0.3
Mo	4	5
N	-	0.1
Cu	1	2
P	-	0.03
Si	-	0.7