



湖南富顺金属材料有限公司

HUNAN FUSHUN METAL CO., LTD.

Technical Datasheet

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904L Stainless Steel

1 What is 904L stainless?

Alloy steel 904L has the following characteristics:

904L is a highly alloyed austenitic stainless steel with very low carbon content. The steel is designed for harsh corrosion conditions. The alloy was originally developed to resist corrosion in dilute sulfuric acid. This feature has been proven to be very successful in practical applications for many years. 904L is now standardized in many countries and has been approved for use in pressure vessels.

2 What Feature do 904L have?

904L, like other commonly used CrNi austenitic steels, has good resistance to point and gap corrosion, high resistance to stress corrosion fracture, good resistance to intergranular corrosion, good processability and weldability. The maximum heating temperature during hot forging is up to 1180 degrees Celsius and the minimum stopping temperature is not less than 900 degrees Celsius. This steel can be thermoformed at 1000 - 1150 degrees Celsius. The steel is heat treated at 1100 - 1150 degrees Celsius and heated and then quickly cooled.

3 Welding of 904L stainless

Although this steel can be welded using a common welding process, the most appropriate welding methods are manual arc welding and tungsten-argon arc welding. When manual arc welding is used to weld the plate not more than 6 mm, the rod diameter is not more than 2.5 mm; when the plate thickness is more than 6 mm, the rod diameter is less than 3.2 mm. When heat treatment is required after welding, it can be done at 1075-1125 degrees Celsius with quick cooling. The filler metal in tungsten TIG welding can be used in the same material welding rod, after welding the seam shall be acid wash and passivation treatment.

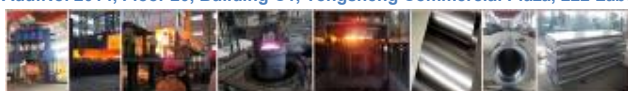
4 Metallographic structure of 904L

904L is a fully austenitic structure, which is insensitive to the precipitation of ferritic and alpha phases compared to austenitic stainless steels, which generally contain high molybdenum content.



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5 Corrosion resistance of 904L

Since the carbon content of 904L is very low (0.020% maximum), there is no carbide precipitation under normal heat treatment and welding conditions. This eliminates the risk of intergranular corrosion that occurs after general heat treatment and welding. Due to its high chromium-nickel-molybdenum content and the addition of copper, 904L can be passivated even in reducing environments such as sulfuric acid and formic acid. The high nickel content gives it a lower corrosion rate even in the active state. 904L can be used at temperatures up to 40 degrees Celsius in pure sulfuric acid at concentrations ranging from 0 to 98%. The corrosion resistance is excellent in pure phosphoric acid in the concentration range of 0 to 85%. In the industrial phosphoric acid produced by the wet process, impurities have a strong influence on corrosion resistance. 904L has better corrosion resistance than ordinary stainless steel of all phosphoric acid types. In strongly oxidizing nitric acid, 904L has lower corrosion resistance compared to highly alloyed steels that do not contain molybdenum. In hydrochloric acid, the use of 904L is limited to lower concentrations of 1-2%. In this concentration range, 904L has better corrosion resistance than conventional stainless steel, and 904L steel has a high resistance to point corrosion. The high nickel content of 904L reduces the rate of corrosion in pits and crevices. Ordinary austenitic stainless steels may be sensitive to stress corrosion in a chloride rich environment at temperatures above 60 degrees Celsius, and this sensitivity can be reduced by increasing the nickel content of the stainless steel. Due to its high nickel content, 904L has a high resistance to stress corrosion rupture in chloride solutions, concentrated hydroxide solutions and hydrogen sulfide rich environments.

6 Where can 904L stainless be used?

The 904L alloy is a versatile material that can be used in many industrial applications.

1. Petroleum, petrochemical equipment, such as reactors in petrochemical equipment, etc.
2. Sulphuric acid storage and transport equipment, such as heat exchangers, etc.
3. Power plant flue gas desulphurization device, the main parts of use are: the tower of the absorption tower, flue, door plate, internal parts, spraying system, etc.
4. Scrubbers and fans in organic acid treatment systems.

7 904L equivalent grades

GB/T	UNS	AISI/ASTM	ID	W.Nr
00Cr20Ni25Mo4.5Cu	N08904	904L	F904L	1.4539



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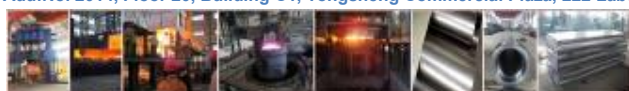
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8 904L chemical composition

C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Fe
0.02	1	2	0.045	0.035	19-23	23-28	4-5	1-2	Bal.

9 904L Mechanical properties

Mechanical properties			Density	melting point
Tensile Strength (MPa) min 490	Yield Strength 0.2% Proof (MPa) min 220	elongation A5 %	8.0g/cm ³	1300- 1390°C



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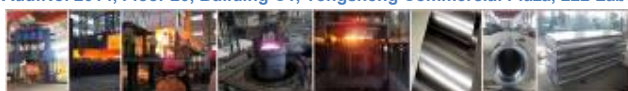
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