

304/304L STAINLESS STEEL

Datasheet for Stainless Steel 304/304L

- Pipes & Tubes
- Sheets & Plates
- Bars & Rods, Forgings
- Fittings & Flanges
- Nuts & Bolts
- Valves



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Datasheet for Stainless Steel 304/304L

UNS S30400 (1.4301), UNS S30403 (1.4307)

What is 304/304L Stainless Steel?

- Grade 304 stainless steel has a minimum of 18% chromium and 8% nickel, combined with a maximum of 0.08% carbon. The remainder of its composition is made up of carbon, manganese, silicon and very small amounts of phosphorous and sulfur. It is defined as a Chromium-Nickel austenitic alloy. Grade 304 is the standard "18/8" stainless that you will probably see in your pans and cookery tools. Additionally, the metal is pliable under both hot and cold working, though it responds better to cold working; it will only work harden under cold working. Extended exposure to temperatures between 800–1500°F can lead to embrittlement and should be carefully monitored.
- Grade 304L is the low carbon version of 304, and although the two types share many of the same properties, it is the differences in carbon content that differentiates them. It does not require post-weld annealing to effectively maximize corrosion resistance and so is extensively used in heavy gauge components (over about 6mm). Grade 304H with its higher carbon content finds application at elevated temperatures. Additionally, it also possesses a higher work hardening rate. 304L exhibits excellent resistance in a variety of atmospheres and temperatures, along with the corrosion and oxidation that occurs over time. However, like many stainless steels, it is susceptible to warm chlorine environments and can potentially pit and crack.
- Stainless Steels 304 and 304L can be commonly found dually certified. This utilized the widely applicable properties of both metals and meets the individual specifications for each. Grade 304/304L is the most widely used commercial grade of stainless steel supplied into numerous industry sectors. It has excellent corrosion resistance in ordinary atmospheric conditions, it is easily machined and is also easy to weld. Whilst performing well when exposed to relatively high temperatures, this grade of stainless steel like most austenitic stainless grades, also maintains its strength and toughness at sub-zero temperatures, making this an excellent choice for various applications and industries such as food & drink processing, petrochemical and construction.

Product Forms and Standards of 304/304L Stainless Steel

Product Forms	Material Standards
Plates, Sheets & Strips	ASTM A240, A666
Billets, Bars & Rods	ASTM A276, A314, A479
Forgings (Flanges & Fittings)	ASTM A182, A473.
Wires	ASTM A313, A368, A478, A492, A493, A580.

Seamless and Welded Pipes	ASTM A312, A358, A813, A814.
Wrought Pipe Fittings	ASTM A403
Castings (Cast Fittings & Valve Parts)	ASTM A351, A743, A744

Applications of Stainless Steel 304 Materials

SS 304 is a stainless steel with applications ranging from the manufacturing of chemical equipment, kitchen and cooking utensils and equipment, to surgical tools and textile dyeing equipment. SS 304L is used for applications where a low carbon count is required, such as in heavy gauge components. It is often applied in areas of higher temperatures than Type 304 can endure, and its low carbon allow it to be resistant against carbon precipitation. It is used for a wide variety of home and commercial applications, this is one of the most familiar and most frequently used alloys in the stainless steel family. Typical applications include tanks and containers for a large variety of liquids and solids:

- Food industry
- Domestic tools industry
- Architectural panelling, railings & trim
- Chemical containers, including for transport
- Heat Exchangers
- Woven or welded screens for mining, quarrying & water filtration
- Dyeing industry
- In the marine environment, because of it slightly higher strength and wear resistance than type 316 it is also used for nuts, bolts, screws, and other fasteners.

Chemical Composition of Stainless Steel 304/304L

Material	UNS	EN	Chemical Component %						
			C	Mn	P	S	Si	Cr	Ni
304	S30400	1.4301	≤0.08	≤2.00	≤0.045	≤0.030	≤1.00	18.00-20.00	8.00-10.00
304L	S30403	1.4307	≤0.03	≤2.00	≤0.045	≤0.030	≤1.00	18.00-20.00	8.00-10.00

Mechanical Properties of Stainless Steel 304/304L

Material	UNS	EN	Tensile Strength	Yield Strength	Elongation	Heat Treatment
			(Mpa) min	(Mpa) min	(%)	°C
304	S30400	1.4301	515	205	35	1040
304L	S30403	1.4307	485	170	35	1040

Properties and Processing Characteristics of Stainless Steel 304/304L

- The metal is characterized by its corrosion resistance, especially in cases of oxidation and salt water. Otherwise referred to as Grade 304 or Type 304, it is the most commonly utilized grade of stainless steel, being extremely versatile in application, form, and finishes. This makeup ensures that SS 304 has a well-balanced level of performance in terms of weldability, corrosion resistance and anti-oxidation properties.
- Alloy 304/304L has excellent strength and toughness at cryogenic temperatures. Alloy 304/304L is non-magnetic in the annealed condition, but can become slightly magnetic as a result of cold working or welding. It can be easily welded and processed by standard shop fabrication practices.
- Good oxidation resistance in intermittent service to 870°C and in continuous service to 925°C. Continuous use of 304 in the 425- 860°C range is not recommended if subsequent aqueous corrosion resistance is important. Grade 304L is resistant to carbide precipitation and can be heated into this temperature range.
- Heat treatment - Solution Treatment (Annealing) to 1010-1120°C and cool rapidly. These grades cannot be hardened by thermal treatment.

Equivalents of Stainless Steel 304/304L

STANDARD	SS 304	SS 304L	SS 304H
UNS	S30400	S30403	S30409
WERKSTOFF NR.	1.4301	1.4306	1.4948

Physical Properties of Stainless Steel 304/304L

- Density: 8.03g/cm³
- Electrical resistivity: 72 microhm-cm (20C)

- Specific Heat: 500 J/kg °K (0-100°C)
- Thermal conductivity: 16.3 W/m-k (100°C)
- Modulus of Elasticity (MPa): 193×10^3 in tension
- Melting Range: 2550-2650°F (1399-1454°C)

Corrosion Resistance of 304/304L Stainless Steel

- Alloy 304/304L has good resistance to atmospheric corrosion, foods and beverages and to many organic and inorganic chemicals in moderately oxidizing to moderately reducing environments. The high chromium content of the alloy provides resistance to oxidizing solutions such as nitric acid up to 55% weight and up to 176°F (80°C). Alloy 304/304L also resists moderately aggressive organic acids such as acetic. The nickel present in the alloy provides resistance to moderately reducing solutions such as pure phosphoric acid, whatever the concentration, in cold solutions and up to 10% diluted hot solutions. The alloy can also operate successfully in caustic solutions free of chlorides or fluorides at moderate temperatures.
- Alloy 304/304L does not perform well in more highly reducing environments such as those containing chlorides and sulfuric acid. Alloy 304/304L performs well in fresh water service with low levels of chlorides (less than 100ppm). At higher chloride levels the grade is susceptible to crevice corrosion and pitting. For successful performance under these more severe conditions, higher molybdenum content is need such as 316/316L. Alloy 304/304L is not recommended for service in marine environments.
- In most instances, the corrosion resistance of Alloys 304, 304L and 304H will be roughly equal in most corrosive environments. However, in environments that are sufficiently corrosive to cause intergranular corrosion of welds and heat-affected zones Alloy 304L should be used because of its low carbon content.

Fabrication Data of Stainless Steel 304/304L

Alloy 304/304L can be easily welded and processed by standard shop fabrication practices.

- **Hot Forming:-** Working temperatures of 1652–2102°F (750–1150°C) are recommended for most hot working processes. For maximum corrosion resistance, the material should be annealed at 1900°F (1038°C) minimum and water quenched or rapidly cooled by other means after hot working.
- **Cold Forming:-** The alloy is quite ductile and forms easily. Cold working operations will increase the strength and hardness of the alloy and might leave it slightly magnetic.
- **Welding:-** Alloy 304/304L can be readily welded by most standard processes. A post weld heat treatment is not necessary.
- **Machining:-** Alloy 304/304L is subject to work hardening during deformation and is subject to chip breaking. The best machining results are achieved with slower speeds, heavier feeds, excellent lubrication, sharp tooling and powerful rigid equipment.

Stainless Steel 304/304L Product Specification

Product	Stainless Steel 304/304L
Equivalents	AISI 304, AISI 304L, UNS S30400, UNS S30403, WNR.1.4301/1.4307,
Items	Pipe, Tubes, Tubing, Fittings, Flanges, Valves, Fasteners, Sheet, Square Bar, Threaded Bar, Plate, Hexagon Bar, Fasteners and Fixings, Round Bar, Flat Bar, Rebar, Angle, Tube & Pipe, Wire
Size	1/4" - 60"
Pipe Type	Seamless, Welded, ERW, Fabricated, Custom Size Pipes
Specifications	ASTM, ASME, DIN, GOST, JIS
Certification	EN 10204 3.1
Fittings Type	Butt Weld, Screwed & Socket Weld, Flanges, Instrumentation
Other Fittings	Elbows, Tees, Reducers, Caps, Stub Ends, Flanges (ANSI, Table E, D and H), Nuts, Bolts, Screws, Threaded Bars

Our Key Products

Stainless Steel 304/304L Sheet	Stainless Steel 304/304L Plate Cuttings/Profiles	Stainless Steel 304/304L Nuts, Bolts and Fasteners
Stainless Steel 304/304L Plate	Stainless Steel 304/304L Foil, Coil	Stainless Steel 304/304L Wire
Stainless Steel 304/304L Blocks/Slabs	Stainless Steel 304/304L Strip	Stainless Steel 304/304L Ingot
Stainless Steel 304/304L Rod/Bar	Stainless Steel 304/304L Pipes and Tubes	Stainless Steel 304/304L Forgings and Castings
Stainless Steel 304/304L Flanges	Stainless Steel 304/304L Forged Fittings	Stainless Steel 304/304L Buttweld Fittings

About Metallica Metals – The Steel Pipes Factory

- Established in 1975, the Metallica Metals Group (The Steel Pipes Factory) has its operations spread across major cities in India. We are a pioneer in the stainless steel pipes, nickel alloy products, titanium products, carbon steel pipes and alloy steel pipes manufacturing and processing industry. Our products including pipe fittings, flanges, pipes, sheet plates and valves are exported to over 70 countries across the world, while in India we have supplied to even the remote areas. With over 250 tons of sale in stainless steel and carbon steel pipes every day, Metallica has emerged as a prominent vendor for many buyers in India and Overseas
- More than 3000 tons ready from stock and new production ready in just a few weeks.

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Our Key Products

STAINLESS STEEL & NICKEL ALLOYS

Pure Nickel Alloys
Monel Alloys (Ni-Cu Alloys)
Inconel (Ni-Cr-Mo) Alloys
Incoloy Alloys (Ni-Cr-Fe)
Hastelloy Alloys
Stainless Steel 304/304L
Stainless Steel 309S/309H
Stainless Steel 310/310S
Stainless Steel 316/316L
Stainless Steel 316Ti
Stainless Steel 317/317L
Stainless Steel 321/321H
Stainless Steel 347/347H
Stainless Steel 904L
Duplex Steels (UNS S32205, UNS S31803)
Super Duplex Steels (UNS S32760 / UNS S32750)
Stainless Steel 254 SMO (UNS S31254 / 1.4547)

INSTRUMENTATION TUBES & FITTINGS

Instrumentation Tube
Hydraulic Tubing
Seamless Tubing
Instrumentation Tube Fittings
Double Compression Tube Fittings
Precision Pipe Fittings
Needle & Gauge Valves
Manifold Valves

PRODUCTS

Steel Sheet & Plate
Steel Coil & Strip
Steel Pipes
Steel Tubes
Electropolish Tube
Heat Exchanger Tubes
Steel Bars/Rods & Wire
Fasteners (Nut, Bolt, Washer)
Steel Angle Bars
Hex Steel Bars
Round Steel Bars & Rod
Flat Steel Bars
Forgings, Rings & Forged Blocks
Stainless Steel Pipe
Stainless Steel Seamless Pipe
Stainless Steel Welded Pipe
Stainless Steel Tubes
Stainless Steel Furnace Tubes
Stainless Steel Seamless Tubing
Stainless Steel Heat Exchanger Tubes
Large Diameter Pipe

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