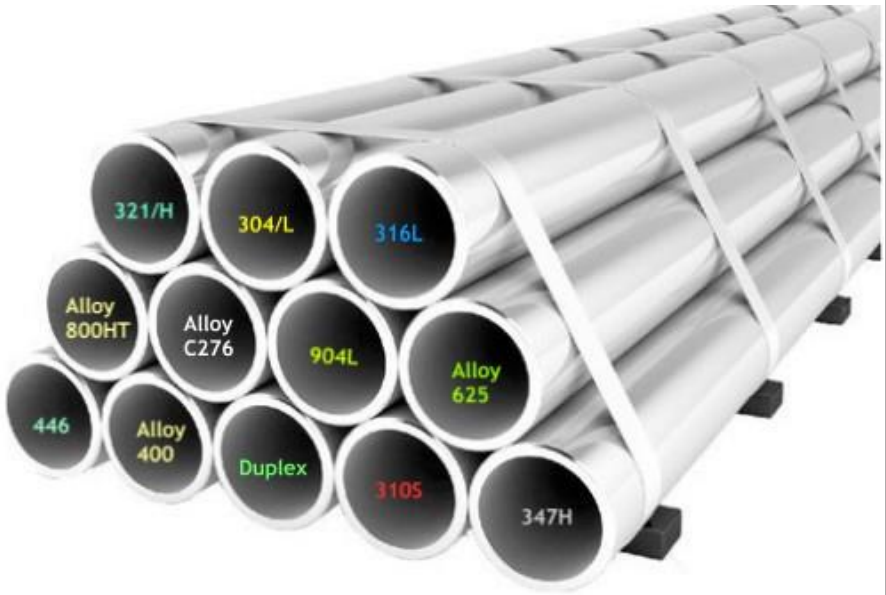
347/347H STAINLESS STEEL

Datasheet for Stainless Steel 347/347H

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



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Datasheet for Stainless Steel 347/347H

UNS S34700 / UNS34709, 1.4550 / 1.4961

What is 347/347H Stainless Steel?

- Type 347 is a niobium stabilized chromium nickel austenitic stainless steel with corrosion resistance similar to 304/304L. 347 stainless steel is a columbium/tantalum stabilized austenitic chromium-nickel stainless steel. This grade is typically used in the 800-1500˚F temperature range where it is stabilized against chromium carbide precipitation by the addition of niobium, which results in the precipitation of niobium carbides. Type 347 has excellent intergranular corrosion resistance after exposure to this temperature range, and this grade resists oxidation up to 1500˚F and has higher creep and stress rupture properties than 304/304L.
- SS 347 also possesses good low temperature toughness and is non-magnetic in the annealed condition. This material is stabilized against chromium carbide formation by the addition of columbium and tantalum. Since these elements have a stronger affinity for carbon than chromium, columbium-tantalum carbides precipitate within the grains instead of forming at the grain boundaries. 347 is non-magnetic.
- Stainless Steel 347H is another stainless steel in a class of metals labeled of precipitation-hardened steels. It possesses many of the same properties and characteristics of stainless steel 347. In addition to its higher carbon content, the alloy is stabilized with an addition of columbium, or sometimes tantalum. Both these properties allow 347H to be exposed to higher temperatures than both 347 and the 304 stainless steel grades can withstand.
- Because of its elevated resistance to corrosion, 347H is often applied in high stress, high corrosion environments where exposure tends to be severe. High temperature manufacturing, steam pipes, boiler tubes, chemical processes and steam servicing all benefit from 347H's resilience. This resilience in turn is due to the potentially elevated levels of chromium in 347H's composition.
- The metal displays high workability under most common welding techniques. It can be treated with heat, however, it will not respond. Only cold working is sufficient to increase 347H's toughness and strength.

Product Forms and Standards of 347/347H Stainless Steel

Product Forms	Material Standards
Plates, Sheets & Strips	ASTM A240
Billets, Bars & Rods	ASTM A276, A479, A484
Forgings (Flanges & Fittings)	ASTM A182

Wires	ASTM A313, A580.
Seamless and Welded Pipes	ASTM A312, A358, A213, A249, A269, A270
Wrought Buttweld Pipe Fittings	ASTM A403

- Metallica supplies SS347 in various grades such as ASTM A312 TP347 (Pipes), ASTM A182 F347H(Forgings), ASTM A403 WP347/347H (Buttweld Fittings, ASTM A240 TP347H (Sheets & Plates).

What is the Difference Between 347/347H Stainless Steel and Other Grades?

Alloy 347 stainless steel tubing offers higher creep and stress rupture properties than Alloy 304 and, particularly, Alloy 304L, which might also be considered for exposures where sensitization and intergranular corrosion are concerns. 347 stainless steel offers good mechanical properties with higher creep and stress rupture characteristics than other grades, such as 304.

Difference between 347 and other grades:

Type 304	The most common of austenitic grades, containing approximately 18% chromium and 8% nickel. It is used for chemical processing equipment, for food, dairy, and beverage industries, for heat exchangers, and for the milder chemicals.
Type 316	Contains 16% to 18% chromium and 11% to 14% nickel. It also has molybdenum added to the nickel and chrome of the 304. The molybdenum is used to control pit type attack. Type 316 is used in chemical processing, the pulp and paper industry, for food and beverage processing and dispensing and in the more corrosive environments. The molybdenum must be a minimum of 2%.
Type 317	Contains a higher percentage of molybdenum than 316 for highly corrosive environments. It must have a minimum of 3% “moly”. It is often used in stacks which contain scrubbers.
Type 317L	Restricts maximum carbon content to 0.030% max. and silicon to 0.75% max. for extra corrosion resistance.
Type 317LM	Requires molybdenum content of 4.00% min.

Type 317LMN	Requires molybdenum content of 4.00% min. and nitrogen of .15% min.
Type 321 Type 347	These types have been developed for corrosive resistance for repeated intermittent exposure to temperature above 800 degrees F. Type 321 is made by the addition of titanium and Type 347 is made by the addition of tantalum/columbium. These grades are primarily used in the aircraft industry.

Applications of Stainless Steel 347/347H

- Chemical Processing
- Food Processing equipment and storage
- Petroleum Refining fluid catalytic cracking units, Polythionic acid service
- Pharmaceutical Production
- Waste Heat Recovery recuperators
- Boiler casings
- Cabin heaters
- Furnace heating elements
- Heavy wall welded equipment
- Welded construction and parts subjected to heating in the carbide precipitation range
- Aircraft collector rings
- Aircraft exhaust stacks
- Stainless Steel Reheater Tubes
- Superheater Tubes for Boiler
- Exhaust manifolds
- Fasteners
- Fire walls
- Carburettor air intensifier tubes
- Flash boilers
- Flexible couplings
- Jet engine parts
- Large mufflers for stationary diesel engines
- Pressure vessel
- Stack liners

- All-welded tank car for carrying chemicals
- Annealing box inner covers
- Expansion joints
- Heat resistors
- Welded tanks for storing organic chemicals
- Wire cloth and screens (industrial).
- High temperature chemical processes
- Heat exchanger tubes
- High temperature steam service
- High pressure steam pipes
- Radiant superheaters
- Heavy duty exhaust systems
- General refinery piping.

Equivalents of Stainless Steel 347/347H

Standard	**347**	**347H**
UNS	S34700	S34709
WERKSTOFF NR.	1.4550	1.4961

Chemical, Mechanical & Physical Properties of Stainless Steel 347/347H

Chemical Composition

ELEMENT	347	347H
NI	17.0 – 20.0	17.0 – 19.0
C	0.08 max	0.04 – 0.10
MN	2.0 max	2.0 max

P	0.045 max	0.045 max
S	0.030 max	0.030 max
SI	1.0 max	1.0 max
CR	17.0 – 19.0	17.0 – 19.0
NB	10xC – 1.10	8xC – 1.10

Physical Properties

Units	Temperature in °C
Density	7.97 g/cm³
Specific Heat	0.12 Kcal/kg.C
Melting Range	1398 - 1446 °C
Modulus of Elasticity	193 KN/mm²
Electrical Resistivity	72 µΩ.cm
Coefficient of Expansion	16.0 µm/m °C
Thermal Conductivity	16.3 W/m -°K
Annealed	1040 – 1100 (°C) / 1900 – 2000 (°F)
Quenched	Rapid Air/Water

Mechanical Properties

Tensile Strength, min.		Yield Strength, min.		Elongation	Hardness	
ksi	Mpa	ksi	Mpa	%	HBW	Rockwell
75	515	30	205	40	201	92HRBW

Properties, Limitations and Processing Characteristics of Stainless Steel 347/347H

Characteristics

- Higher creep stress and rupture properties when compared with 304
- Ideal for high temperature service
- Overcomes sensitization and intergranular corrosion concerns
- Can be used in elevated temperature applications
- Due to stabilisation the material offers better overall corrosion resistance when compared to 304/304L

Creep Properties

The elevated temperature creep and stress rupture strengths of the stabilized steels are higher than those of unstabilized Alloys 304 and 304L. These superior properties for the 321 and 347 alloys permit design of pressure containing components for elevated temperature service to higher stress levels as recognized in the ASME Boiler and Pressure Vessel Code.

Limitation

Alloy 347 stainless steel materials doesn't perform well in chloride solutions, even in small concentrations, or in sulfuric acid.

Processing / Welding

- Austenitic stainless steels are considered to be the most weldable out of all high alloy steels
- Can be welded by all fusion and resistance welding processes

- Oxyacetylene welding is not preferred for 347H steel.
- **Superior general corrosion resistance over Type 321 due to stabilization with columbium.**
- Reduced tendencies to form continuous networks of chromium carbides at the grain boundaries.
- Better high temperature properties than 304 or 304L. Generally used for parts which are intermittently heated up to 1500 deg. F. For continuous service the maximum temperature is 1650 deg. F.
- Type 347H has high carbon (.04 - . 10) for better high temperature creep properties.
- Improved intergranular corrosion resistance.

Stainless Steel 347/347H Product Specification

Product	Stainless Steel 347/347H
Equivalents	AISI 347, AISI 347H, 1.4550/1.4961, UNS S34700/UNS34709
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 347/347H Sheet	Stainless Steel 347/347H Plate Cuttings/Profiles	Stainless Steel 347/347H Nuts, Bolts and Fasteners
Stainless Steel 347/347H Plate	Stainless Steel 347/347H Foil, Coil	Stainless Steel 347/347H Wire
Stainless Steel 347/347H Blocks/Slabs	Stainless Steel 347/347H Strip	Stainless Steel 347/347H Ingot
Stainless Steel 347/347H Rod/Bar	Stainless Steel 347/347H Pipes and Tubes	Stainless Steel 347/347H Forgings and Castings

Stainless Steel 347/347H Flanges	Stainless Steel 347/347H Forged Fittings	Stainless Steel 347/347H 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.
- Feel free to contact us on - Email: info@metallicametals.com | Tel: +91 8928722715 | +91-22-66581538, +91-22-67436694, +91-22-66109768

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)

INSTRUMENTATION TUBES & FITTINGS

Instrumentation Tube
Hydraulic Tubing
Seamless Tubing
Instrumentation Tube Fittings
Double Compression Tube Fittings
Precision Pipe Fittings
Needle & Guage 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

Super Duplex Steels (UNS S32760 / UNS S32750)

Stainless Steel 254 SMO (UNS S31254 / 1.4547)

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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