

SS 310 / 310S

STAINLESS STEEL 310 IS AN AUSTENITIC HEAT RESISTANT ALLOY WITH PHENOMENAL RESISTANCE TO OXIDATION UNDER MILDLY CYCLIC CONDITIONS THROUGH 2000°F. ITS NICKEL AND HIGH CHROMIUM CONTENTS PROVIDE SIMILAR CORROSION RESISTANCE, SUPERIOR RESISTANCE TO OXIDATION AND THE RETENTION OF A LARGER FRACTION OF ROOM TEMPERATURE STRENGTH THAN THE COMMON AUSTENITIC ALLOYS LIKE TYPE 304. STAINLESS 310 IS FREQUENTLY UTILIZED AT CRYOGENIC TEMPERATURES, WITH EXCELLENT TOUGHNESS TO -450°F. TEMPERATURES, WITH EXCELLENT TOUGHNESS TO -450°F, AND LOW MAGNETIC PERMEABILITY.

STAINLESS STEEL 310S IS AUSTENITIC CHROMIUM, NICKEL STAINLESS STEEL (.08% MAX CARBON) WITH GOOD OXIDATION RESISTANCE AND STRENGTH AT HIGH TEMPERATURES. IT RESIST OXIDATION IN CONTINUOUS SERVICE UP TO 2000 OF GAVE DECREASING SULPHUR GASSES ARE NOT PRESENT. IT IS ADDITIONALLY UTILIZED FOR INTERMITTENT SERVICE AT TEMPERATURES UP TO 1900°F DUE TO IT RESISTS RESCALING AND HAS A LOW COEFFICIENT OF EXPANSION. THIS FACTOR REDUCES THE TENDENCY OF THE STEEL TO WARP IN HEAT SERVICE. 310S ARE SAME AS 310 ASIDE FROM LOWER CARBON CONTENT TO MINIMIZE CARBIDE PRECIPITATION DURING WELDING.

APPLICATIONS

- KILNS
- HEAT EXCHANGERS
- RADIANT TUBES
- MUFFLES, RETORTS, ANNEALING COVERS
- TUBE HANGERS FOR PETROLEUM REFINING AND STEAM BOILERS
- COAL GASIFIER INTERNAL COMPONENTS
- SAGGERS
- FURNACE PARTS, CONVEYOR BELTS, ROLLERS, OVEN LININGS, FANS
- FOOD PROCESSING EQUIPMENT
- CRYOGENIC STRUCTURES

CHARACTERISTICS

- OXIDATION RESISTANCE TO 2000°F
- MODERATE STRENGTH AT HIGH TEMPERATURE
- RESISTANCE TO HOT CORROSION
- STRENGTH AND TOUGHNESS AT CRYOGENIC TEMPERATURES

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FABRICATION

TYPE 310/310S IS PROMPTLY FABRICATED BY A STANDARD COMMERCIAL PROCESS. IN COMPARISON TO CARBON STEEL, STAINLESS STEELS ARE TOUGHER AND TEND TO WORK HARDEN QUICKLY. BY USING ALL OF THE COMMON WELDING PROCESSES TYPE 310/310S CAN BE EASILY WELDED.

MACHINING

THIS ALLOY MACHINES SAME AS TYPE 304 STAINLESS STEEL. THE CHIPS OF THIS ALLOY ARE STRINGY AND IT WILL WORK HARDEN VERY QUICKLY. IT IS COMPULSORY TO KEEP THE TOOL CUTTING AT ALL TIMES AND UTILIZE CHIP BREAKERS.

WELDING

BY USING FUSION OR RESISTANCE TECHNIQUE MOST OF THE AUSTENITIC STAINLESS STEELS CAN BE QUICKLY WELDED. OXYACETYLENE WELDING IS NOT RECOMMENDED. FILLER METAL SHOULD BE AWS E/ER 310.

HOT WORKING

AFTER UNIFORM HEATING TO 2150 F (1177 C) MOST COMMON HOT WORK TECHNIQUES CAN BE SUCCESSFULLY PERFORMED. DO NOT FORGE DOWN 1800 F (982 C). FAST COOLING IS REQUIRED TO MAXIMIZE CORROSION RESISTANCE.

COLD WORKING

IN SPITE OF THE FACT THAT THIS ALLOY HAS A HIGH WORK HARDENING RATE, THIS ALLOY CAN BE DRAWN, HEADED, UPSET AND STAMPED. TO REMOVE INTERNAL STRESS FULL ANNEALING IS REQUIRED AFTER COLD WORK.

ANNEALING

1900-2050 F (1038-1121 C) WATER QUENCH.

HARDENING

THIS ALLOY DOESN'T REPLY TO HEAT TREATMENT. COLD WORK WILL CAUSE AN INCREASE IN BOTH HARDNESS AND STRENGTH

CHEMICAL PROPERTIES

Grade	C	Si	P	S	Cr	Mn	Ni	Fe
310	0.025 max	1.50 max	0.045 max	0.03 max	24.0-26.0	2.0 max	19.0-22.0	Reminder
310S	0.08 max	1.50 max	0.045 max	0.03 max	24.0-26.0	2.0 max	19.0-22.0	Reminder

MECHANICAL PROPERTIES

Grade	Tensile Strength (ksi)	0.2% Yield Strength (ksi)	Elongation% in 2 inches
310	75	30	40
310S	75	30	40

PHYSICAL PROPERTIES

Properties	310	310S	Temperature in C
Density	8.0 g/cm ₃	9.01 g/cm ₃	Room
Specific Heat	0.12 Kcal/kg.C	0.12 Kcal/kg.C	22°
Melting Range	1400-1455°C	1399-1454°C	-
Modulus of Elasticity	193-200 KN/mm ²	200 KN/mm ²	22°
Electrical Resistivity	77 μΩ.cm	94 μΩ.cm	Room
Coefficient of Expansion	15.8 μm/m °C	14.4 μm/m °C	20-100°
Thermal Conductivity	16.2 W/m-°K	13.8 W/m-°K	20°

ASTM SPECIFICATIONS

Pipe / Tube (SMLS)	Sheet / Plate	Bar	Forging	Fitting
A 213, A 249 A	167, A 240	A 276	A 182	A 403

AVAILABILITY

MANUFACTURING	RAW MATERIALS
Refractory anchors	Pipes
Fasteners	Tubes
Custom Machining	Bars
Custom Fabrication	Sheets
Piping / Spools	Plates
Stamped Parts	-
B/W Fittings	-
S/W Fittings	-
Flanges	-
Compression Fittings	-