310S / 310H

310S and 310H are high-temperature austenitic stainless steels with excellent oxidation resistance and strength at elevated temperatures. Both are based on the 310 grade, which contains high chromium (24–26%) and nickel (19–22%) for superior heat resistance.

- **310S:** Low carbon version (≤0.08%) for improved weldability and reduced risk of sensitization.
- **310H:** High carbon version (≥0.04%) for enhanced creep strength at high temperatures.

Corrosion Resistance: Excellent resistance at normal temperatures and when in high temperature service exhibits good resistance to oxidation and carburizing atmospheres. Resists fuming nitric acid at room temperature and fused nitrates up to 800^{0}F. **310S** is preferred for welded structures; **310H** for high-temperature creep strength.

Heat Resistance: Good resistance to oxidation in intermittent service in air at temperatures up to 1900^{0}F and 2100^{0}F in continuous service. Good resistance to thermal fatigue and cyclic heating. Widely used where sulfur dioxide gas is encountered at elevated temperatures. Continuous use in 800 - 1575^{0}F range not recommended but often performs well in temperatures fluctuating above and below this range.

Heat Treatment: Annealing – heat to 1900 - 2100^{0}F and cool rapidly for maximum corrosion resistance. This treatment is also recommended to restore ductility after each 1000 hours of service at 1200 - 1900^{0}F. This grade cannot be hardened by heat treatment; strength achieved through cold work.

Welding: Good characteristics suited to all standard methods. Type **310S** electrodes are generally recommended for fusion welding. **310S** minimizes carbide precipitation during welding; **310H** may require post-weld heat treatment for critical applications.

Typical Applications:

- furnace parts
- carburizing boxes
- oil burner parts
- heat treatment baskets and jigs
- welding filler wire and electrodes
- heat exchangers

A.I.S.I. Analysis		C	Mn	P	S	Si	Cr	Ni
	310S	.08 max	2.0 max	.045 max	.030 max	1.5 max	24.0 to 26.0	19.0 to 22.0
	310H	.04 - .10	2.0 max	.045 max	.030 max	1.5 max	24.0 to 26.0	19.0 to 22.0

Typical Mechanical Properties - Annealed	Yield Strength .2% Offset psi	Ultimate Strength psi	Elongation % in 2"	Hardness		Impact Charpy ft. – lbs.	Modules of Elasticity in Tension - psi
				Rb	BHN		
	45,000	95,000	45	85	170	110	29.0 x 10^6

Other Properties	Creep Strength 1% Flow in 10,000 hrs at 1,000^{0}F psi	Magnetic Permeability at 200 H-Annealed	Electrical Resistivity Microhm – Cm at 68^{0}F	Coefficient of Thermal Expansion (In/In/^{0}F x 10^{-6}) 32^0 - 212^{0}F	Thermal Conductivity BTU/Ft.2/Hr./^{0}F/Ft.	
					at 212^{0}F	at 932^{0}F
	17,500	1.01	78	8.0	8.0	10.8