Data Sheet
Alloy 825

Alloy 825 is generally similar to Alloy 20 in aqueous corrosion. It has useful resistance to boiling sulfuric acid up to 40% concentration, to 60% concentration at 176°F and in all concentrations to 150°F. Alloy 825 is stabilized annealed at the mill to resist intergranular corrosion as-welded. If exposed for long times to the sensitive temperature range 1200-1400°F the alloy may exhibit severe intergranular corrosion in certain very aggressive environments.

Specifications

UNS: N08825 **W. Nr./EN:** 2.4858 **ASTM:** B 163, B 423, B 424, B 425, B 366, B 705
ASME: SB-163, SB-423 ,SB-424, SB-425, SB-366, SB-705 Boiler & Pressure Vessel Code Section 1, Section III Class 3 Section VIII to 1000°F
NACE: MR0175 **ISO:** 15156-3

Chemical Composition, %

	Ni	Cr	Mo	Mn	Cu	Si	C	S	Ti	Al	Fe
MIN	38.0	19.5	2.5	–	1.5	–	–	–	0.6	–	22.0
MAX	46.0	23.5	3.5	1.0	3.0	0.05	0.05	0.03	1.2	0.2	–

Features

- Excellent resistance to sulfuric and phosphoric acids
- Resists intergranular corrosion in the as-welded condition
- Practical immunity to chloride stress corrosion cracking (SCC)
- Resists polythionic acid SCC

Applications

- Valves
- Phosphoric acid production
- Chemical process vessels
- Catalytic cracking units

Physical Properties

Density: 0.294 lb/in^3 **Melting Range:** 2500 - 2550°F **Magnetic Permeability:** 70°F (H=Oersted) 1.005

Temperature, °F	80	100	200	400	600	800	1000	1200	1400	1600	1800	2000
Coefficient of Thermal Expansion* in/in°F x 10^{-6}	–	–	7.7	8.3	8.5	8.7	8.8	9.1	9.5	9.7	–	–
Thermal Conductivity Btu • ft/ft^2 • hr • °F	6.4	6.5	7.1	8.1	9.1	10.0	10.9	11.8	12.9	14.3	16.0	–
Electrical Resistivity, ohm - circ mil/ft	678	680	687	710	728	751	761	762	765	775	782	793

** 70°F to indicated temperature.*

Mechanical Properties

Minimum Specified Properties, ASME B 168

Ultimate Tensile Strength, ksi	85
0.2% Yield Strength, ksi	35
Elongation, %	30

Temperature, °F	80	500	1000	1200	1350	1500	1600	1700	1800
Ultimate Tensile Strength, ksi	100	–	85.9	–	–	–	–	–	–
0.2% Yield Strength, ksi	43.5	–	32.2	–	–	–	–	–	–
Modulus of Elasticity Dynamic, psi x 10^6	28.3	26.4	23.8	22.7	21.7	20.3	19.4	18.3	17.3

** 70°F to indicated temperature.*

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