Alloy 600 is a nickel-based alloy with excellent carburization, and good oxidation resistance at elevated temperatures. The alloy has long been used in the heat treating industry for many of the same applications as RA330®. Alloy 600 has useful resistance to dry Cl_2 and HCl gases at moderately elevated temperatures. Alloy 600 is not suggested for use at red heat when sulfur is present due to its elevated nickel content.

Nickel grades 200 and 201 are normally preferred for handling concentrated, high temperature caustic. However, when sulfur compounds are present as well, or for ammonium hydroxide service, alloy 600 is suggested. Alloy 600 is subject to stress corrosion cracking in hot, concentrated caustic alkalies. To avoid stress corrosion cracking, the alloy 600 fabrication should be fully stress relieved prior to use. A minimum treatment of 1650°F for 1 hour is suggested, but 1800-1850°F for 1 hour preferred.

Specifications

UNS: N06600 **W. Nr./EN:** 2.4816 **AMS:** 5540, 5665 **ASTM:** B 168, B 166, B 167 **ASME:** SB-168, SB-166, SB-167

Chemical Composition, %

	Ni	Cr	C	Mn	Cu	Si	S	Fe
MIN	72.0	14.0	–	–	–	–	–	6.0
MAX	–	17.0	0.15	1.0	0.5	0.5	0.015	10.0

**ASTM specification 0.20 max C.*

Features

- Virtually immune to chloride ion stress corrosion cracking
- Good caustic corrosion resistance
- Resistant to dry Cl_2 to about 1000°F
- Oxidation resistance to 2000°F
- Carburization resistance

Applications

- Heat treating muffles and retorts
- Vacuum furnace fixtures
- Chlorination equipment to 1000°F
- Titanium dioxide plants

Physical Properties

Density: 0.304 lb/in^3 **Melting Range:** 2470-2575°F **Poisson's Ratio:** 0.29 **Electrical Resistivity:** 620 Ohm-circ mil/ft

Temperature, °F	70	1000	1200	1400	1600	1800
Coefficient of Thermal Expansion* in/in°F x 10^6	–	8.4	8.6	8.7	9.1	9.3
Thermal Conductivity Btu•ft/ft^2•hr•°F	8.6	13.2	14.3	13.0	16.7	–
Modulus of Elasticity, Dynamic psi x 10^6	30.0	25.6	24.5	23.6	22.2	20.4

** 70°F to indicated temperature.*

Mechanical Properties

Representative Tensile Properties

Temperature, °F	70	1000	1200	1400	1600	1800
Ultimate Tensile Strength, ksi	93	84	65	27.5	15	7.5
0.2% Yield Strength, ksi	37	28.5	26.5	17	9.0	4.0
Charpy Impact V-notch, ft-lbs	45	47	39	46	80	118

Static Corrosion in Molten Caustic Soda

Corrosion Rate, Mils Per Year

Temperature, °F	750	932	1076	1256
Alloy 600	1.1	2.4	5.1	66.4
Alloy 201	0.9	1.3	2.5	37.8
Alloy 400	1.8	5.1	17.6	–

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