

601 alloy is a nickel-chromium alloy, that is highly resistant to oxidation through 2200°F. 601 alloy develops a tightly adherent oxide scale which resists spalling even under severe thermal cycling. The alloy has good high temperature strength, and retains its ductility after long service exposure. 601 alloy has good hot corrosion resistance under oxidizing conditions. 601 alloy is not suggested for use in strongly reducing, sulfur bearing environments.

For maximum oxidation resistance, 601 alloy should be welded with matching composition 601 alloy GTAW wire. The weld fillers developed for RA 602 CA® can also provide a weld which is stronger and more oxidation resistant than the 601 alloy base metal. 601 alloy is more difficult to machine than 304 stainless steel. Its machinability rating is 15-21% relative to AISI B1112 steel.

Specifications

UNS: N06601 W. Nr./EN: 2.4851 AMS: 5870, 5715 ASTM: B 167, B 168 ASME: SB-167, SB-168

Chemical Composition, %

	Ni	Cr	Al	C	Mn	Cu	Si	S	Fe
MIN	58.0	21.0	1.0	—	—	—	—	—	—
MAX	63.0	25.0	1.7	0.1	1.0	1.0	0.5	0.015	balance

*ASTM specification 0.20 max C.

Features

- Outstanding oxidation resistance to 2200°F
- Highly resistant to carburization
- Good creep and rupture strength
- Metallurgical stability

Applications

- Copper brazing, annealing and sintering muffles and retorts
- Radiant tubes
- Strand annealing tubes
- Steam superheater tube supports
- Rotary kilns and calciners
- Thermocouple protection tubes

Physical Properties

Density: 0.293 lb/in³ Melting Range: 2375 - 2495°F

Temperature, °F	70	1000	1200	1400	1600	1800	2000
Coefficient of Thermal Expansion* in/in°F x 10 ⁻⁶	—	8.5	8.9	9.2	9.5	9.8	10.2
Thermal Conductivity Btu•ft/ft ² •hr•°F	6.5	11.6	12.7	13.7	14.8	15.8	16.9
Modulus of Elasticity, Dynamic psi x 10 ⁶	29.95	25.43	24.12	22.48	20.54	18.43	16.20

* 70°F to indicated temperature.

Mechanical Properties

Short-Time Elevated Temperature Tensile Properties

Temperature, °F	70	1000	1200	1400	1600
Ultimate Tensile Strength, ksi	100	90	60	34	18
0.2% Yield Strength, ksi	54	48	41	26	15
Elongation, %	45	44	45	70	120

Typical Creep-Rupture Properties

Temperature, °F	1400	1600	1800	2000
Minimum Creep 0.0001%/hour, ksi	4.1	2.0	0.76	0.43
10,000 hour Rupture, ksi	6.2	2.6	1.2	0.62*

* Extrapolated

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