

Waspaloy is an age hardening nickel base superalloy with useful strength at temperatures up to 1400-1600°F, and good oxidation resistance in gas turbine engine atmospheres up to 1600°F. The creep-rupture strength of Waspaloy is superior to that of alloy 718 at temperatures above 1150-1200°F. Short time hot tensile strength is inferior to alloy 718 at temperatures up to 1350°F.

Welding is difficult, and best performed on material in the solution annealed condition. Limit currents and the size of the fusion zone. Rapid cooling from welding is necessary to minimize aging stresses. Copper backup bars or water cooled fixtures are desirable. After welding, the fabrication should be solution treated, using rapid heating and cooling rates through the aging range. Follow anneal by stabilization and aging treatments.

A typical heat treatment is a solution heat treat at 1825°F for 2 hours, air cool. Stabilize heat treat at 1550°F for 4 hours, air cool. Precipitation heat treat at 1400°F for 16 hours, air cool.

Specifications

UNS: N07001 W. Nr./EN: 2.4654 AMS: 5544, 5828

Chemical Composition, %

	Cr	Ni	Mo	Co	Al	Ti	B	C	Zr	Fe	Mn	Si	P	S	Cu
MIN	18.0	—	3.5	12.0	1.2	2.75	0.003	0.02	0.02	—	—	—	—	—	—
MAX	21.0	balance	5.0	15.0	1.6	3.25	0.01	0.1	0.08	2.0	0.1	0.15	0.015	0.015	0.1

Features

- High strength
- Oxidation resistant to 1750°F

Applications

- Shafts
- Fasteners

Physical Properties

Density: 0.296 lb/in³ Melting Range: 2425 - 2475°F

Temperature, °F	400	1000	1200	1400	1600	1800
Coefficient* of Thermal Expansion, in/in°F x 10 ⁻⁶	7.0	7.8	8.1	8.4	8.9	9.7
Thermal Conductivity Btu • ft/ft ² • hr • °F	7.3	10.4	11.6	12.7	13.9	—
Modulus of Elasticity Dynamic, psi x 10 ⁶	30	27	26	24	23	21

* 70°F to indicated temperature.

Mechanical Properties

Representative Tensile Properties Heat Treated, Sheet

Temperature, °F	70	1200	1400	1600
Ultimate Tensile Strength, ksi	193	173	140	79
0.2% Yield Strength, ksi	132	112	112	60
Elongation, %	27	21	12	12
Hardness, Rockwell C	34-40	—	—	—

Typical Rupture Strength, Heat Treated, Sheet - Stress to Rupture at Indicated Time

Temperature, °F	1200	1300	1400	1500	1600
100 Hours, ksi	92	75	53	32	18
1,000 Hours, ksi	80	57	35	19	10



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