

Alloy X is one of the most widely used nickel base superalloys for gas turbine engine components. This solid solution strengthened grade has good strength and excellent oxidation resistance to 2000°F. Alloy X has excellent resistance to reducing and carburizing atmospheres, making it suitable for furnace components. Due to its high molybdenum content, Alloy X may be subject to catastrophic oxidation at 2200°F.

Alloy X is welded by all common methods such as gas tungsten arc, gas metal arc, shielded metal arc, electron beam and resistance welding. Use matching filler metal, keep interpass temperature low. After severe forming, fabrications may be annealed 2150°F, 15 minutes per 1/8" of thickness, rapid air cool.

Specifications

UNS: N06002 W. Nr./EN: 2.4665 ASTM: B 435, B 572 AMS: 5536, 5754, 5798 GE: B50A436, B50TF24, B50T83
ASME: SB-435, SB-572, SFA-5.14, Section IX P No. 43 PDS: 15102QFC PDS: 1038 (X-low)

Chemical Composition, %

	Ni	Cr	Mo	Co	W	Al	Ti	B	C	Fe	Mn	Si	P	S	Cu
MIN	—	20.5	8.0	0.5	0.2	—	—	—	0.05	17.0	—	—	—	—	—
MAX	balance	23.0	10.0	2.5	1.0	0.5	0.15	0.01	0.15	20.0	1.0	1.0	0.04	0.03	0.5

Features

- Good high temperature strength
- Oxidation resistance through 2000°F
- Carburization resistant

Applications

- Combustion liners
- Turbine exhaust components
- Aircraft cabin heaters
- Transition Ducts

Physical Properties

Density: 0.297 lb/in³ Melting Range: 2300-2470°F

Temperature, °F	70	1000	1200	1400	1600	1800
Coefficient* of Thermal Expansion, in/in°F x 10 ⁻⁶	—	8.4	8.6	8.8	9.0	9.2
Thermal Conductivity, Btu • ft/ft ² • hr • °F	—	11.3	12.7	13.9	15.2	16.4
Modulus of Elasticity Dynamic, psi x 10 ⁶	30	26	25	23	22	20

* 70°F to indicated temperature.

Mechanical Properties

Representative Tensile Properties

Temperature, °F	70	1000	1200	1400	1600
Ultimate Tensile Strength, ksi	111	89	83	67	45
0.2% Yield Strength, ksi	55	36	35	34	28
Elongation, %	44	49	54	53	58

Typical Stress-Rupture Strength Plate & Bar, Stress To Rupture At Indicated Time

Temperature, °F	1200	1500	1800
100 Hours, ksi	48	14	4.0
10,000 Hours, ksi	34	10	2



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Exclusive Representative of Rolled Alloys®, Inc.

CLAUDIO CZARNOBAI

COMMERCIAL MANAGER

ClaudioCzarnobai@intwinds.com

F +55 11 3825 2966

C +55 11 99112 2703

