

Alloy 188 is a cobalt base superalloy with a unique combination of high temperature strength and oxidation resistance, along with adequate ductility after prolonged exposure to the 1400-1600°F temperature range.

Cobalt alloys have an inherent advantage over the nickel base grades in high temperature creep. Alloy 188 is solid solution strengthened by a 14% tungsten addition, and further by M_6C and $M_{23}C_6$ carbides. Alloy 188 is readily fabricated, being welded by both manual and automatic methods including electron beam, gas tungsten arc and resistance welding.

Specifications

UNS: R30188 W. Nr./EN: 2.4683 AMS: 5608, 5801 PWA: 1042

Chemical Composition, %

	Cr	Ni	Co	W	La	B	C	Fe	Mn	Si	P	S
MIN	20.0	20.0	—	13.0	0.02	—	0.05	—	—	0.2	—	—
MAX	24.0	24.0	balance	16.0	0.12	0.015	0.015	3.0	1.25	0.5	0.02	0.015

Features

- Strength and oxidation resistant to 2000°F
- Good post-aging ductility
- Resistant to sulfate deposit hot corrosion

Applications

- Gas turbine engine combustor cans, spray bars, flame-holders and afterburner liners

Density: 0.324 lb/in³ Melting Range: 2375-2570°F

Temperature, °F	70	800	1000	1200	1400	1600	1800
Coefficient* of Thermal Expansion, in/in°F x 10 ⁻⁶	—	7.8	8.2	8.6	9.0	9.4	9.9
Thermal Conductivity Btu • ft/ft ² • hr • °F	—	10.4	11.5	12.7	13.9	14.5	15.8
Modulus of Elasticity Dynamic, psi x 10 ⁶	34	29	28	26	25	24	22

* 70°F to indicated temperature.

Mechanical Properties

Representative Tensile Properties, Sheet

Temperature, °F	70	1200	1400	1600	1800	2000
Ultimate Tensile Strength, ksi	137	103	90	60	35	19
0.2% Yield Strength, ksi	67	40	39	36	19	9
Elongation, %	53	59	63	64	59	32

Typical Stress-Rupture Strength, Sheet

Temperature, °F	1400	1500	1600	1700	1800
100 Hours, ksi	32	22	14	9	5
1,000 Hours, ksi	23	15	9	6	2



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