



ASM Aerospace Specification Metals Inc.

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Special Metals INCONEL® Alloy 718

Subcategory: Metal; Nickel Base; Superalloy

Key Words: IN718, INCONEL 718, AFNOR NC 19 Fe Nb, UNS N07718; ASTM B637, B670; ASME Boiler Code Sections I, III; AMS 5589, AMS 5590, AMS 5596, AMS 5597, AMS 5662, AMS 5663, AMS 5664, AMS 5832, Werkstoff Nr. 2.4668; WL Nr. 2.4668; MIL-N-24469; NACE MR-01-75; AECMA Pr EN 2404, 2405, 2407, 2408, 2952, 2961, 3219

Component	Wt. %	Component	Wt. %	Component	Wt. %
Al	0.2 - 0.8	Cu	Max 0.3	Ni	50 - 55
B	Max 0.006	Fe	17	P	Max 0.015
C	Max 0.08	Mn	Max 0.35	S	Max 0.015
Co	Max 1	Mo	2.8 - 3.3	Si	Max 0.35
Cr	17 - 21	Nb	4.75 - 5.5	Ti	0.65 - 1.15

Material Notes:

Nickel content above includes cobalt. Iron content as remainder. Developed in the early 1960's, IN718 is still considered the material of choice for the majority of aircraft engine components with service temperatures below 1200°F (650°C). Inconel 718 is a precipitation-hardenable nickel-chromium alloy containing also significant amounts of iron, niobium, and molybdenum along with lesser amounts of aluminum and titanium. It combines corrosion resistance and high strength with outstanding weldability including resistance to postweld cracking. The alloy has excellent creep-rupture strength at temperatures to 1300°F (700°C).

Applications: Aerospace, gas turbines, rocket motors, spacecraft, space shuttles, nuclear reactors, pumps, turbo pump seals, and tooling.

Forms: round, flat, extruded section, pipe, tube, forging stock, plate, sheet, strip and wire.

Data provided by the manufacturer, Special Metals.

Physical Properties	Metric	English	Comments
Density	<u>8.19 g/cc</u>	0.296 lb/in ³	

Mechanical Properties

Tensile Strength, Ultimate	<u>1375 MPa</u>	199000 psi	Precipitation Hardened. Value at room temperature.
Tensile Strength, Ultimate at Elevated Temperature	<u>1100 MPa</u>	160000 psi	Precipitation Hardened prior to test; 650°C
Tensile Strength, Yield	<u>1100 MPa</u>	160000 psi	Precipitation Hardened. Value at room temperature; 0.2% offset.
Tensile Strength, Yield at Elevated Temperature	<u>980 MPa</u>	142000 psi	Precipitation Hardened prior to test; 0.2% offset; 650°C
Elongation at Break	<u>25 %</u>	25 %	Precipitation Hardened
Elongation at Break at Elevated Temperature	<u>18 %</u>	18 %	Precipitation Hardened prior to test.; 650°C

Electrical Properties

Electrical Resistivity	<u>0.000125 ohm-cm</u>	0.000125 ohm-cm	
Magnetic Permeability	1.0011	1.0011	at 200 oersted (15.9 kA/m)
Curie Temperature	<u>-112 °C</u>	-170 °F	

Thermal Properties

CTE, linear 20°C	<u>13 µm/m-°C</u>	7.22 µin/in-°F	20-100°C
Specific Heat Capacity	<u>0.435 J/g-°C</u>	0.104 BTU/lb-°F	
Thermal Conductivity	<u>11.4 W/m-K</u>	79.1 BTU-in/hr-ft ² -°F	
Melting Point	1260 - 1336 °C	2300 - 2440 °F	
Solidus	<u>1260 °C</u>	2300 °F	
Liquidus	<u>1336 °C</u>	2440 °F	

Some of the values displayed above may have been converted from their original units and/or rounded in order to display the information in a consistent format. Users requiring more precise data for scientific or engineering calculations can click on the property value to see the original value as well as raw conversions to equivalent units. We advise that you only use the original value or one of its raw conversions in your calculations to minimize rounding error.