

Alloy 718

Alloy 718 is a nickel - chromium alloy which can be heat treated to give high strength, good corrosion resistance, ease of formability and which can be welded with good resistance to strain age cracking. The alloy can be used at temperatures up to 700°C.

Alloy 718 was initially developed for the aerospace industry but its excellent strength and corrosion resistance were recognised by the oil industry and it is now widely used in this field also.

The majority of alloy 718 is vacuum induction melted (VIM) followed by vacuum arc remelting (VAR) or electro-slag remelting (ESR). However some material is electric arc melted, argon oxygen degassed (AOD) followed by double VAR. The major alloying elements are molybdenum, niobium + tantalum, aluminium and titanium. These give the alloy a combination of high strength and good corrosion resistance when the alloy is precipitation hardened. The heat treatment of alloy 718 differs depending on its application. This is because the aerospace material requires maximum strength for operation at high temperature whereas

the oilpatch material is limited to a maximum hardness in order to ensure it is resistant to stress corrosion cracking.

Alloy 718 for aerospace and power generation is heat treated to give maximum strength and high creep resistance with typical hardness values exceeding 42HRC. The major applications are components for gas turbines, aircraft engines, fasteners and other high strength applications.

Alloy 718 for the oil industry is heat treated such that the hardness does not exceed 40HRC which is the maximum allowed by NACE MR-01-75 to prevent stress corrosion cracking. The major applications in this field are gate valves, choke stems, fasteners, tubing hangers and fire safe valves.

Maher stock this alloy in the solution treated condition (with test results on a precipitation hardened test piece) for aerospace and power generation applications and in the solution treated and precipitation hardened condition for oil industry applications.

National Specifications

ASTM	UNS	SAE AMS	British Standard	Werkstoff
B637	N07718	5662 5663		2.4668

Material may also be released to Customer Specifications, subject to enquiry.

Technical Data

	C	Mn	Si	P	S	Cr	Ni	Mo	Cb+ Ta	Ti	Al	Co	B	Cu	Fe	-
Min	-	-	-	-	-	17.0	50.0	2.80	4.75	0.65	0.20	-	-	-	Bal	%
Max	0.08	0.35	0.35	0.015	0.015	21.0	55.0	3.30	5.50	1.15	0.80	1.0	0.006	0.30	-	%

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Typical Mechanical Properties (Oil patch)

Solution Annealed & Precipitation Treated(Aged)	PSI	MPa	%
Tensile Strength, min	150,000	1034	-
Yield Strength (0.2% offset), min	120,000	827	-
Elongation in 2" (or 50mm) or 4D, min	-	-	17
Reduction of Area	-	-	25
Hardness (Rockwell)	40Rc (max)	-	-

Typical Mechanical Properties (Aerospace)

Solution Annealed & Precipitation Treated(Aged)	PSI	MPa	%
Tensile Strength, min	185,000	1275	-
Yield Strength (0.2% offset), min	150,000	1034	-
Elongation in 2" (or 50mm) or 4D, min	-	-	12
Reduction of Area	-	-	15
Hardness (Rockwell)	331HB (min)	-	-