

7068 Aluminium Alloy

Technical Datasheet



An Aluminium Alloy with the Strength of Steel

Service. Quality. Value.

Typical Applications

Connecting rods, Autosport gearbox actuators, Automobile shock absorbers, Fuel pumps for racing engines, Rocker arms for racing engines, Motorcycle gears, Racing motorcycle chain tensioners, Bearing caps in high performance engines, Autosport wheel components, Prosthetic limbs, Ordnance, 25mm Sabot, Load cells, Hydraulic valve components, High pressure solenoid, Mountain climbing equipment, Tent, ski and backpack rods, Survival rifles, Flexible shaft coupling, Snowmobile engine shaft, Quick disconnects for fluid conveying devices.

Product Description

7068 alloy provides the highest mechanical strength of all aluminium alloys and matching that of certain steels. This outstanding alloy combines a yield strength of up to 700 MPa (up to over 30% greater than that of 7075 alloy) and good ductility with corrosion resistance similar to 7075 and other features beneficial to high performance component/equipment designers. Developed in the mid 1990's, 7068 alloy was designed as a higher strength alternative to 7075 for ordnance applications. The highly attractive overall combination of mechanical properties (retained at elevated temperatures better than 7075) and other important characteristics of 7068 have resulted in the widespread specification of the alloy to markedly reduce the weight/cross section or significantly increase the strength of critical components in diverse market sectors.

Technical Description

7068 alloy is a 7000 series aluminium-zinc alloy registered with the US Aluminium Association and produced to AMS 4331 (chemical composition and mechanical properties) and AMS 2772 (heat treatment). 7068 alloy 'A' and 'B' tensile data and fatigue properties have been ratified for inclusion in MIL Handbook 5 / MMPDS. The standard supply temper condition is T6511. For applications requiring greater resistance to stress corrosion cracking the T76511 condition is available to order.

Weldability

In common with other 7000 series aluminium alloys, 7068 alloy can only be welded with great care. This form of joining is not usually employed. If welding is contemplated please consult our Technical Sales Dept.

Product Attributes

Very high tensile, high compressive, bearing & shear strength

Good retention of strength at elevated temperature

Good fatigue strength

Corrosion resistance similar to 7075

High thermal conductivity

Good machinability

Dimensional stability

Good anodising response

Low tendency to peripheral coarse grain (PCG)

Customer Benefits

Ability to reduce weight /increase strength of aluminium alloy components or substitute steel or titanium alloy

Alloy can be successfully employed up to 200°C

Suitable for cyclic loading, eg: IC engines

7068 can replace 7075 with far greater strength

Good heat dissipation

Reduced machining time

Complex, close tolerance machining possible

Good engineering surfaces can be produced

Good cosmetic anodised finish possible

Anodising

7068 alloy responds well to all the different standard anodising techniques. It is generally similar in behaviour to 7075 but in hard anodising 7068 alloy tends to form a more abrasion resistant surface.

Machinability

The machinability of 7068 alloy is good and is similar to that of 7075.

Corrosion Resistance

The corrosion resistance of 7068 alloy is similar to that of 7075.

General Resistance

T6511 & T76511 Rated C based on relative rating A to E in decreasing order of merit after exposure to sodium chloride solution by intermittent spraying or immersion.

Stress Corrosion Cracking

T6511 Rated C
T76511 Rated B
Relative rating A to D based on service experience and laboratory tests of specimens exposed to 3.5% sodium chloride alternate immersion test.

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Chemical Composition (weight %)

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Zr	Others (ea)	Others (total)
Min.			1.6		2.2		7.3		0.05		
Max	0.12	0.15	2.4	0.10	3.0	0.05	8.3	0.10	0.15	0.05	0.15

Minimum Mechanical Properties (Extruded Bar)

Temper	Section (in)	UTS (MPa)	YTS (MPa)	Elongation (%)
T6 / T6511	0.250 - 3.000	683	655	5
T6 / T6511	3.001 - 6.500	648	621	5
T76 / T76511	0.250 - 3.000	593	552	7

Typical Mechanical Properties

Extruded Bar T6511	UTS (MPa)	YTS (MPa)	Elongation (%)	Brinell Hardness
L Direction	710	683	9	190
LT Direction	645	603	7	-
Forging T6				
L Direction	628	524	10	160

Typical Physical Properties

Density at 20°C		2.85 kg/dm ³
Melting Range		476 - 635°C
Specific Thermal Capacity at 100°C		1050 J.Kg ⁻¹ .K ⁻¹
Mean Coefficient of Thermal Expansion (20 - 100°C)		23.4 10 ⁻⁶ .K ⁻¹
Thermal Conductivity at 20°C		190 W.m ⁻¹ .K ⁻¹
Electrical Conductivity at 20°C	T6511	31 % IACS
	T76511	39 % IACS
Young's Modulus		73.1 GPa

Comparative Minimum Data for Various Aluminium Alloy Extrusions

	7068 T6511 0.25" - 3.00"	7150 T6511 0.80" - 2.40"	7075 T6511 0.50" - 3.00"	2014A T6511 1.00" - 3.00"	2618A T6 0.40" - 4.00"
UTS (MPa)	683	615	559	480	420
YTS (MPa)	655	580	496	440	340
Elongation (%)	5	8	7	7	7

Technical Assistance

Our knowledgeable staff backed up by our resident team of qualified metallurgists and engineers, will be pleased to assist further on any technical topic.

UK Service Centres:

Smiths Belfast **02895 908 897**
 Smiths Biggleswade **01767 604 704**
 Smiths Birmingham **0121 728 4940**
 Smiths Bristol **0117 971 2800**
 Smiths Chelmsford **01245 466 664**
 Smiths Gateshead **0191 469 5428**
 Smiths Horsham **01403 261 981**

Smiths Leeds **0113 307 5167**
 Smiths Manchester **0161 794 8650**
 Smiths Norwich **01603 789 878**
 Smiths Nottingham **0115 925 4801**
 Smiths Redruth **01209 315 512**
 Smiths Verwood **01202 824 347**
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Quality & Testing:



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