

## AN ALUMINIUM ALLOY WITH THE STRENGTH OF STEEL

### 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 by Kaiser Aluminum, and exclusively stocked and supplied in Europe by Advanced Metals International, 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.

It should be stressed that, although the above standards form the basis for 7068 alloy supply, a consistent, optimised property combination is only achieved by Kaiser Aluminum by the targetting of a much tighter composition window and proprietary knowledge of the heat treatment regime and metal processing techniques that only the alloy developer, with the experience of long term, volume production, can possess.

### 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.

### MACHINABILITY

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

#### PRODUCT ATTRIBUTES

Very high tensile, high compressive, bearing & shear strength

#### CUSTOMER BENEFITS

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

Good retention of strength at elevated temperature	Alloy can be successfully employed up to 200°C
Good fatigue strength	Suitable for cyclic loading, eg: IC engines
Corrosion resistance similar to 7075	7068 can replace 7075 with far greater strength
High thermal conductivity	Good heat dissipation
Good machinability	Reduced machining time
Dimensional stability	Complex, close tolerance machining possible
Good anodising response	Good engineering surfaces can be produced
Low tendency to peripheral course grain (PCG)	Good cosmetic anodised finish possible

### STOCK RANGE

Extruded round bar*	Stock availability in T6511 temper up to 6" (152.4mm) diameter
Extruded square & rectangular bar*	Several sizes available from stock in T6511 temper
Forgings	Available to order in T6 temper
Tube	Trial drawn tube has been produced (Please enquire if of interest)

\* *Bar size not stocked available to order on relatively short production lead-time. Random lengths supplied or cut to customer requirements.*

### 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.

### 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.

<b>CHEMICAL COMPOSITION %</b>											
Weight (%)	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Zr	Others Each	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

<b>MINIMUM MECHANICAL PROPERTIES (EXTRUDED BAR)</b>				
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

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

<b>TYPICAL PHYSICAL PROPERTIES</b>	
Density at 20 <sup>0</sup> C	2.85 kg/dm <sup>3</sup>
Melting Range	476 - 635 °C
Specific Thermal Capacity at 100 <sup>0</sup> C	1050 J.Kg <sup>-1</sup> .K <sup>-1</sup>
Mean Coefficient of Thermal Expansion ( 20 - 100 °C )	23.4 10 <sup>-6</sup> .K <sup>-1</sup>
Thermal Conductivity at 20 <sup>0</sup> C	190 W.m <sup>-1</sup> .K <sup>-1</sup>
Electrical Conductivity at 20 <sup>0</sup> C	T6511 31 % IACS
	T76511 39 % IACS
Young's Modulus	73.1 GPa

<b>COMPARATIVE MINIMUM DATA FOR VARIOUS ALUMINIUM ALLOY EXTRUSIONS</b>					
	<b>7068 T6511 0.25" - 3.00"</b>	<b>7150 T6511 0.80" - 2.40"</b>	<b>7075 T6511 0.50" - 3.00"</b>	<b>2014A T6511 1.00" - 3.00"</b>	<b>2618A T6 0.40" - 4.00"</b>
UTS (MPa)	683	615	559	480	420
YTS (MPa)	655	580	496	440	340
Elongation (%)	5	8	7	7	7

**TECHNICAL SALES ASSISTANCE**  
Our resident team of qualified metallurgists and engineers will be pleased to assist further on any technical topic.

<b>Biggleswade</b> 01767 604704	<b>Birmingham</b> 01889 576117	<b>Bristol</b> 0117 971 2800	<b>Chelmsford</b> 01245 466664	<b>Ferndown</b> 01202 893755	<b>Gateshead</b> 0191 469 5428
<b>Horsham</b> 01403 261981	<b>Leeds</b> 0113 307 5167	<b>London</b> 020 7241 2430	<b>Nottingham</b> 0115 925 4801	<b>Norwich</b> 01603 789878	<b>www.smithmetal.com</b> <b>sales@smithmetal.com</b>

All information in this data sheet is based on approximate testing and is stated to the best of our knowledge and belief. It is presented apart from contractual obligations and does not constitute any guarantee of properties or of processing or application possibilities in individual cases. Our warranties and liabilities are stated exclusively in our terms of trading. © Smiths Metal Centres Ltd 2007