EXTRUSION INGOT

Technical Datasheet

AlMgSi alloy 608250

APPLICATION

Typical examples for use of this alloy are:

- Road and rail transport
- Scaffolding
- Bridges
- Cranes and heavy structures
- Automotive

STRENGTH

Obtainable mechanical properties may vary with the production equipment, process parameters used in extrusion and consistency of the process parameters. We recommend that this is checked out for each production line.
However, the alloy is developed to satisfy the following mechanical properties:

Temper (AA)	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Hardness Brinell
T4	125	225	20	65
T6 *	290	315	10	100

* Aged for 5 hours at 185 °C

ALLOY

Chemical composition **

%	Si	Fe	Cu	Mn	Mg	Zn	Ti			Other elements		Al
										Each	Total	
Min.	0.95	0.15	-	0.50	0.62	-	-			-	-	Balance
Max.	1.05	0.23	0.03	0.57	0.70	0.02	0.02			0.02	0.10	

** Analysis is performed on Supplier's spectographs using Supplier's selection of calibration standards. Analysis made on other instruments using other standards may show deviations.

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PROPERTIES

Strength

Strength depends upon the intermediate storing time before artificial ageing and ageing practice. For this alloy the strength will decrease with increased intermediate storing time. Storing for 24 hours prior to artificial ageing will decrease the strength with approx. 3 %.

Ageing at low temperatures (for longer time) generally gives higher strength than ageing at high temperatures (for shorter time). For details, see enclosed curves.

Special properties

Formability..... :	Good
Machinability ..... :	Good
Weldability..... :	Good, particularly for arc welding (MIG, TIG)
Corrosion resistance……..……..:	Good against attack by atmosphere, fresh water and several types of earth. Can be used in industrial and seacoast atmospheres without protection
Surface treatment..... :	Responds well to polishing
Anodizing ……..:	Less suitable, but is anodized for surface protection

Physical properties - typical values

Density		2.71	kg/dm^3
Modulus of elasticity		69	kN/mm^2
Shear modulus		25	kN/mm^2
Linear expansion coefficient	20-100 °C	23	$\mu°C^{-1}$
Thermal conductivity	20 °C	180	W/(m•K)
Specific heat capacity	0-100 °C	897	J/(/kg•k)
Resistivity	20 °C	38	nΩ•m
Conductivity	20 °C	46	% IACS
Melting range		580-650	°C

k = kilo μ = micro (10^{-6}) n = nano (10^{-9})

Corresponding or closely approximating norms and designations

Norway NS	Sweden SIS	France NF	Germany DIN	UK BS	USA AA	ISO	Italy UNI
17305	4212	6082	AlMgSi1 F31	6082	6082	Al-SiMgMn	9006-4

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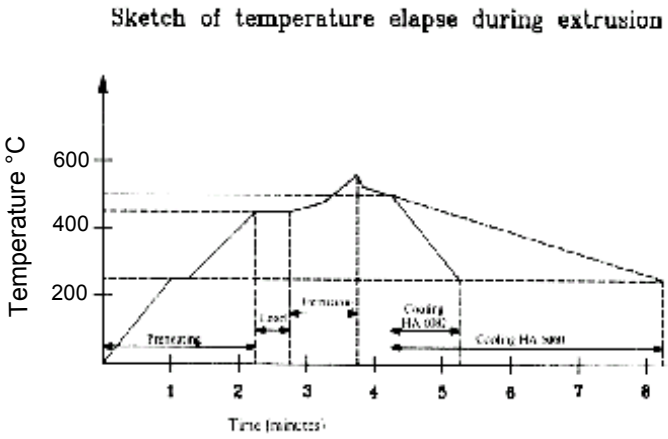
EXTRUSION

Preheating

The preheating temperature should preferably be as low as possible to obtain the best possible speed in extrusion, but high enough to secure a good material flow and the necessary solution temperature. A too long stay at elevated temperature (i.e. in connection with a stop on the press) may destroy the optimized microstructure of the ingot and give reduced extrudabillity and mechanical properties.



Flow

The material flow is depending upon:

- Friction against the container (container temperature)
- Deformation resistance (Mg and Si in solid solution)
- Condition of the container
- Lubrication of the dummy block
- Temperature difference between front and back end of the ingot (taper).

Cooling

To obtain maximum strength the exit temperature must be above the solution temperature for Mg_2Si, and the cooling fast enough to depress precipitation.
For this alloy this means that cooling with forced air is usually satisfactory on open profiles with a thickness up to 3 mm.
Normally the rear end of the run out length obtains the slowest cooling (=lowest strength).

Recommended production parameters for an open section:

Preheating temp. (°C)	Taper (°C)	Container temp. (°C)	Minimum exit temp. (°C)	Typical extrusion speed (m/min.)	Maximum recommended cooling time from 500 to 250 °C
460-510	50-90	400	535	20	1 min.

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HEAT TREATMENT

The mechanical properties of the alloy after artificial ageing at different temperatures are given in the curves below. The data are recorded on extruded sections, which have been solution treated at 540 °C (20 minutes), water quenched and stored 4 hours before ageing.