Primary Foundry Alloys

Technical Data Sheet AlSi7Mg0.3

❶ Typical Applications

Universal alloy used for intricate castings with medium or thick walls for a wide range of technical application. Due to the Mg-content, very good mechanical properties can be achieved by heat treatment. Very good corrosion resistance and welding properties.

❷ Designations others than EN: nearest corresponding standard

EN 1676 Chemical	EN 1676 Numerical	Hydro IMS	Italy UNI	USA AA	France NF	UK BS 1490	Germany DIN 1725-5
AB-AlSi7Mg0.3	AB-42100	4433xx	8024	A356.2	A-S7G03	LM 25	GB-AlSi7Mg

❸ Chemical Composition weight-% according to EN 1676, single values indicate maximum content

Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Pb	Sn	Ti	Others Each	Others Total
6.5-7.5	0.15	0.03	0.10	0.30-0.45	-	-	0.07	-	-	0.10-0.18	0.03	0.10

❹ Mechanical Properties

The achievable mechanical properties are strongly dependent on the casting method applied. The table refers to typical properties obtained in sand casting (S) and gravity die casting (G). Values in brackets indicate the minimum values according to EN 1706.

Casting method	Temper	Yield strength $R_{p0,2}$ [MPa]	Tensile strength R_m [MPa]	Elongation A_5 [%]	Hardness [HB]	Fatigue strength $50 \cdot 10^6$ [MPa]
S	F	80-140 (-)	140-220 (-)	2-6 (-)	45-60 (-)	60-80
S	T6	190-260 (190)	230-320 (230)	3-6 (2)	75-110 (75)	80-110
G	F	90-150 (-)	180-240 (-)	4-8 (-)	50-65 (-)	70-90
G	T6	210-280 (210)	250-340(290)	5-9 (4)	80-115 (90)	80-110

❺ Physical Properties typical values

Density [g/cm³]	Young´s modulus [GPa]	Lin. expansion coeff. 20-200°C [10^{-6}/K]	Thermal conductivity [W/(mK)]	Electrical conductivity [m/(Ωmm²)]	Solidifcation range [°C]
268,00	75	22	150-180	23-28	625-555

❻ Other Properties

- Castability — Very good for sand, gravity die, and low pressure die casting, good for high pressure die casting
- Shrinkage — Sand casting: 1.1–1.2%; gravity die casting: 0.8–1.1%; high pressure die casting: 0.5–0.7%
- Machinability — Very good
- Weldability — Very good
- Corrosion resistance — Excellent, very good against sea water
- Surface treatment — Anodizing for surface protection, not used for decorative purposes. Can be polished for decorative purposes.

❼ Melt Treatment

- Modification with Na or Sr, especially for sand castings and thick-walled gravity die castings. The alloy can be premodified with Na, Sr, or Sb.
- Grain refinement with Ti-B is recommended. Additions of Ti-B can also improve castability.
- Casting temperature: 680 to 750°C

❽ Heat Treatment

The standard heat treatment procedure for this alloy is solution treatment followed by artifical ageing, i.e. T6-conditions. The treatment time depends on the castings, for slowly solidified and thick walled castings, the longest holding times (8-12h) are recommended.

- Solution treatment at 520-540°C for 4-12h. The temperatures should not exceed 550°C due to the risk of local melting of low melting point phases.
- Quenching in water
- Ageing at 155-165°C for 6-12h.

The combination of strength and ductility is determined by the ageing time. Decreasing treatment time or temperature (T64-conditions) increase ductility at the expense of strength. If necessary, special heat treatment may be applied: stabilizing, soft annealing, stress relief annealing, or overageing.