

Magsimal[®]-plus [AlMg6Si2MnZr]

Sequence of work when producing high pressure die casts from Magsimal[®]-plus

1 Melting down the ingots	As quickly as possible in efficient furnaces to keep Mg melting loss, gas absorption and oxidation of melts low; replenish preheated ingots and returns in small volumes to avoid segregation
2 Salt treatment	Prohibited to use usual salt ! There is a risk of Sodium (Na) pick up
3 Magnesium burnout	Normally melting loss of 0.1-0,2 % per fusion, correction not normally needed; if the Mg content is significantly below 6.0 %, add pure magnesium of maximum 0.5 %
4 Skimming	Needed after melting down
5 Temperature after melting down	Maximum of 780 °C (check temperature !)
6 Temperature in holding furnace	Holding furnace temperature: 700 – 720 °C Do not allow to fall below 650 °C and keep melt moving by means of: <ul style="list-style-type: none">• convection• rotor (impeller)• use bottom injection of Nitrogen-gas (N₂)• melt pouring Do not use deep furnace with cover heating, if melt stays calm !
7 Degassing and refining the melts	<ul style="list-style-type: none">• Effective refining and fastest method using quick-running rotor for gas feeding, 7 – 10 l/min argon or nitrogen, 6 – 10 min• Gas flushing lance with fine porous head, needs longer treatment times (cooling !)• Gas flushing tablets do not achieve the necessary effect !
8 Skimming	Careful skimming needed ! Only totally Na-free salts may be used to reduce the metal content
9 Grain refining	Prohibited !
10 Modification with Na or Sr	Prohibited ! The elongation achievable would be reduced considerably
11 Pouring temperature (approx. values)	690 – 730 °C, varies depending on design, size and wall thickness of HPDC
12 Die and die chamber temperature	Die surface temperature 250 °C to 350 °C, depending on cast design and requirements of mechanical properties As a rule: the warmer the mould, the higher the elongation and the lower the strength. Preheat the chamber electrical or with oil > 200 °C
13 Quenching casts after removal from mould	Immediate quenching in water reduces the yield tensile strength and increases elongation. Stable mechanical properties are achieved after 20 days
14 Heat treatment with solutionising	Normally none
15 Rapid annealing with T5	If necessary, age T5 at 170 °C up to 250 °C and for 30 up to 90 min, the yield tensile strength will increase and elongation decrease slightly
16 Stress-relief annealing like temper O	If necessary, age at temperature between 320 - 380 °C and for up to 90 min, the yield tensile strength will decrease and elongation increase