

ZWEK alloy fabrication procedure

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Abstract

Melting and alloying operations were performed in a low carbon steel crucible in an inert ultra-high purity argon environment, preventing the oxidation reactions of molten Mg. High purity Mg (99.97%) was heated to 710°C for 10 minutes until the slug was completely melted. Each alloying element was added separately and kept for 10 minutes before additional alloy was added to ensure complete dissolution of all alloying elements. Automated stirring was applied for 15 minutes to ensure a homogeneous distribution of elements throughout the melt. The melt was then raised to 730 °C, held for 15 minutes and then poured into a steel tube mold. A solution heat treat was carried out on the as-cast alloy at 510 °C for 10 h before it was extruded. The extrusion was conducted with an extrusion ratio 10, extrusion temperature 400 °C and ramp speed 1 mm/s.

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