Aluminum Casting Process Comparison

1. Pressure die casting

In the pressure die casting process the metal is forced into a high grade steel tool at high speed and pressure. The casting temperature is roughly 700¡C when casting aluminum and 650¡C when casting magnesium. The use of vacuum casting technique is a must in order to achieve superior quality for extremely light and thin walled components.

Pressure die casting is a competitive casting method when the components are needed at high volumes or when better tolerances and surface finish are required than can be achieved by gravity die casting. The need for machining is very low due to the close casting tolerances. Heat treatment of pressure die casting is not possible but due to the high rate of solidification the mechanical properties are good. The tooling costs are considerably higher than for gravity die casting.

Important applications are found in the components for mobile telephone base stations and certain mobile telephone applications. The more important reasons for using light metal casting are low weight, mechanical strength, stiffness and electrical properties. Other applications are e.g. components for the power transmission line in the vehicle industry and electronics industry.

2. Sand casting(Aluminum alloy)

The sand cast method consists of a furan resin bonded sand model into which melted metal is poured at about 750¡C. The furan resin reacts at room temperature with acid mixed with the sand. As material for the casting pattern are aluminum and wood, it is a relatively low cost.

Sand casting is suitable for relatively large castings used in small or medium quantities. The casting method is often used also for prototype manufacturing. The surface finish and casting tolerances are adequate for most purposes.

3. Gravity die casting(Aluminum alloy)

In gravity die casting molten aluminum is poured into a metallic tool. The casting temperature is about 750¡C. The tolerances and surface finish are good. The use of sand cores enables casting of very complex components.

Gravity die casting method is competitive when the lot size is relatively small or when heat treatment is needed to improve the mechanical properties. This

casting method gives better tolerances and surface finish than sand casting. The tooling costs are somewhat higher than by sand casting

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