RPM ALUMINUM CASTING

Advantages:

- Extremely short lead times
- Low tooling costs
- Less porosity, metal shrinkage & distortion of castings than with other processes
- Metallurgically superior process
- Superior surface finish (63 RMS), ideal for cosmetic, painted parts
- Zero to 1 degree of draft possible
- Supports complex geometries - thin wall sections (.060" - .080" min.), better dimensional accuracy, and smoother surface finish than sand castings
- Near net shape process with minimal machining required after casting
- Allows the highest design freedom (breaking many of the die casting rules), and supports hollow features, undercuts and thick-to-thin wall conditions
- Ideal for running low volume long term production (10 - 1,000pcs EAU)
- Very similar characteristics to die castings, often used as a bridge to high volume
- Viable, economical alternative to investment casting for Aerospace parts

The RPM Casting Process

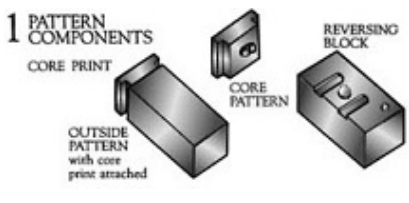
Step 1 - PATTERN COMPONENTS

Customer drawing and/or CAD file is used to create the pattern components which will be used to create the Master Mold/Tooling.

These components can represent either a positive or negative feature of the finished part and they include any metal shrinkage, draft & added machine stock as required.

The best and most accurate patterns are CNC machined and can consist of several components in positive or negative form.

Pattern components can also be made by using Stereolithography (SLA or FDM) however accuracy could be somewhat compromised.



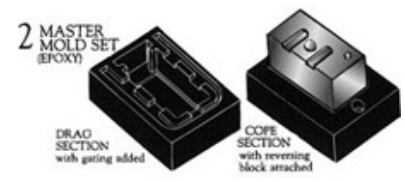
Step 2 - TOOLING or MASTER MOLD

Master Mold (Negative) is made of tooling epoxy, that had been either cast against a positive pattern and/or integrated with the necessary negative pattern component(s).

Most castings are tooled with a positive exterior pattern and a separate negative interior pattern.

Core plugs are made from negative epoxy molds.

Gating and Runner systems are added as a permanent part of the master mold/tooling.



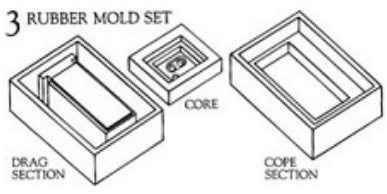
Step 3 - RUBBER MOLD

A (positive) Rubber Mold is either cast against a master mold or against a core pattern to create a mold set which include Cope & Drag sections and any necessary Core molds.

The rubber molds are used repeatedly for making the production plaster molds and can be easily duplicated for replacement, or for higher volume production requirements.

Rubber molds typically require replacement (at no cost to the customer) after around 1,000 uses.

Rubber molds which remain inactive for an extended time may require a modest rejuvenation charge (paid by the customer).

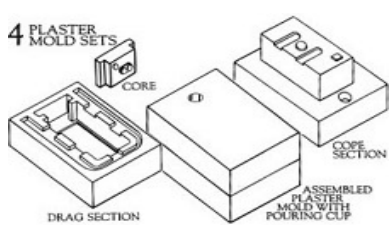


Step 4 - PLASTER MOLD

A liquid gypsum plaster slurry is poured into the rubber Cope & Drag mold sections and into any required core boxes creating a production plaster mold set.

The plaster used for the production molds is an extremely fine-grained material of low heat conductivity, enabling production of castings with smooth surfaces, accurate dimensions, thin section and uniform density.

Once the plaster has hardened, the mold sections are removed from the rubber molds and baked to cure the plaster and remove any residual moisture.



Step 5 - METAL POURING

After the plaster mold components have fully dried, they are assembled together, preheated, and molten aluminum or zinc is poured into them.

After the metal has solidified, the plaster is broken away using mechanical knock-out and/or high pressure waterjet.

Any gates and risers are removed from the finished parts manually.

Step 6 - SECONDARY FINISHING

Parts are given a light bead blast to remove any remaining flash or excess metal and to homogenize the surface finish and expose any potential sub-surface defect/porosity.

Castings are now ready for:

Heat Treatment
Radiographic Inspection
Penetrant Inspection
Machining
Chem Film, Chromate, Paint or other Finish
Mechanical Assembly