Technical Information

The Plaster Mold Process for Metal Casting

How, When, & Why To Use It

1) **To produce precision and premium quality aluminum and zinc castings**
2) **For aesthetic applications where appearance is critical**
3) **Prototyping - to assist engineering in debugging design before committing to hard tooling**
4) **For low volume applications where quantities do not justify die cast tooling**
5) **For high volume applications of complex or unusual shapes**
6) **For castings with thin walls or where weight is critical**
7) **To simulate die castings for prototype and pilot production**
8) **Tooling is low cost and allows ease of modification**
9) **To reduce "time to market" on new programs and evaluate market potential**
10) **To reduce time for machining and secondary operations**
11) **To fill the gap if dies are lost, damaged, or delayed**
12) **To assist and reduce time for U.L. approval**

Design and Technical Information

SIZE

No limitation but best range within 2" cube to 36" cube

FINISH

Can hold 63 micro-inch but normally 90 micro-inch

SHAPE

Considerable design freedom for unusual and complex shapes

WALL THICKNESS

Thin Wall	.030" - .060"
Average	.080" - .120"
Thick Wall	.180" - .500"

GENERAL TOLERANCES

0" - 2" ± .010	2" - 3" ± .012
3" - 6" ± .015	6" - 12" ± .020
12" - 18" ± .030	18" - 30" ± .040

Tighter tolerances can be negotiated

LIMITATIONS

The process is limited to non-ferrous metals with pouring temperatures below 2,000° F–this includes all aluminum, zinc casting alloys and some copper based alloys

HOLES

Not economical to cast small holes 1/4" or less unless odd shape or inaccessible areas for machining

ALLOYS

All aluminum and zinc casting alloys to the commercial and military specifications. See separate technical sheet.

DRAFT

Typically 1/2° to 2°

Zero draft is possible in specified areas

Corner radii and fillets as required, typ. 1/16" R.

MECHANICAL PROPERTIES

Tensile-Yield-Elongation - as per the appropriate commercial and military specifications

See separate technical sheet

TOOLING-PATTERN EQUIPMENT

A) Loose Pattern - to expedite for up to 20 pieces

B) Epoxy Resin - usually up to 500 pieces

C) Metal - Aluminum or Brass - used to obtain best tolerances and quality

D) Rubber - for quantities up to 1,000 pieces. Tooling can be duplicated easily from master tooling to expedite delivery or for higher volumes

COST

Rule of thumb for complex shapes in 15" cube

Range: Tooling - 10% of die cast tools

Piece Price - 10 times die casting price

DELIVERY

1-2 weeks for simple parts

6-8 weeks for complex parts

TYPICAL APPLICATIONS

1. Castings for telecommunications, business machines, medical equipment, computers, automotive, aerospace, electronics, robotics
2. Molds for plastics industry-rotational molds, vacuum form, expanded polystyrene molds, kirksite injection molds

Plaster and Sand Molding Combination

For castings requiring high metallurgical integrity verified by radiographic and fluorescent penetrant inspection.

When used in combination with no bake sand molds the properties of plaster mold castings can be enhanced considerably by taking advantage of the faster cooling rates inherent in sand molds in combination with the insulating aspect of plaster molds.