Pentz Cast Solutions: Molding Process Comparisons

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| **Aluminum Casting: Molding Process Comparisons** | | | | | | | |
| **Process** | **Benefits/Limitations**  **(See Terms & Concepts for more detailed descriptions)** | **Typical Part Weight** | **Typical Surface Finish (RMS)** | **Min. Draft Req.** | **Typical Linear Tolerances (as cast)** | **Typical**  **Tooling Cost** | **Typical**  **Volume** |
| **Automated**  **Precision**  **Green Sand Molding** | **Superior performance at any volume. Extremely efficient, flexible, and cost effective. Utilizes automated system for building and handling the green sand molds used to cast parts.** Pentz has a PLC-controlled state-of the-art Sinto FBO II automated molding system capable of:  - 16x20 mold sizes  - 5-minute tool changes  - 40 second mold cycle | **1 oz/ to**  **30 lbs.** | **Industry 250-1000**  **Pentz**  **200-400** | **1 °- 3°** | Industry Norm ±.030” .up to 6”. Over 6” add an additional ±.003’/in.  **Pentz Typical ±.020 up to 6”. Over 6” additional ±.002”/in.** | **Without Cores**  **$5,000 - $8,000**  **With Cores**  **$8,000 - $10,000** | **1-1 Million /year**  **Automated, efficient, and effective at any volume** |
| **Precision Manual Green Sand Molding** | **The most versatile casting Process. Produces castings with high strength and complex shapes in all sizes with excellent finish.** Utilizes manually formed green sand molds to make castings. Economical solution for many castings applications. | **1 oz. to 3,000 pounds** | **Industry**  **250-1000**  **Pentz**  **125-400** | **½°- 3°** | Industry Norm ±.030” .up to 6”. Over 6” add an additional ±.003’/in.    **Pentz Typical ±.020 up to 6”. Over 6” additional ±.002”/in.** | **Without Cores $1,000-$5,000**  **With Cores**  **$4,000 - $10,000** | **1-100,000/year**  **Any Volume** |
| **Precision Dry Sand Molding (AKA-No Bake, Airset, Cold Box CO2, etc.)** | **Excellent for producing parts that require high strength and pressure tight/vacuum tight sealing characteristics**. Utilizes chemically bonded dry sand to form molds used to cast parts. | **1 oz. to 3,000 pounds** | **Industry**  **250-750**  **Pentz**  **200-500** | **½°- 3°** | Industry Norm ±.030” .up to 6”. Over 6” add an additional ±.003’/in.  **Pentz Typical ±.020 up to 6”. Over 6” additional ±.002”/in.** |  | **1-10,000/year**  **Any Volume** |
| **Permanent Mold** | **Produces very high-density castings that are pressure tight and have excellent structural characteristics.** Parts are cast repeatable form the same cast iron mold. A mold typically lasts 20,000 castings. | **1 oz. to 100 lbs.** | **Industry**  **150-750**  **Pentz100-500** | **1° to 10°** | Industry Norm ±.015” .up to 3.875”. Add ±.020” up to 15”  **Pentz Typical ±.012”. Add additional ±.017” up to 15”** | **Without Cores $15,000-$60,000**  **With Cores**  **$20000 -$70,000** | **2,000 / year minimum**  **Medium to High Volume** |
| **Die Casting** | **Casting forms in steel dies. Well suited for high volume nonstructural components**. | **<1 oz.**  **To**  **35 lbs.** | **Industry**  **32-63** | **1 °- 3°** | Industry Norm ±.004” .up to 1”. Over 1” add an additional .0015”/in. up to 12” | **$15,000-$80.000** | **5,000 minimum**    **High Volume** |
| **Investment Casting (Lost Wax)** | **Casting formed in a ceramic mold. Generally used for small, intricate parts requiring very high dimensional stability** | **No minimum to 20 lbs.** | **Industry**  **10-85** | **No Minimum** | Industry Norm ±.005” .up to 1”. Over 1” add an additional ±.005’/in. | **$5,000 - $40,000** | **Under 1000**  **Low Volume** |
| **CNC Machined “Hog Out”** | **Cut aluminum from billet material using CNC** program. Typically used for one-off low volume prototypes. | **1 oz. to 100 lbs.** | **Industry**  **20-60** | **No Minimum** | **Industry Norm ±.001”** | **$2,000-$10,000** (Includes program & fixture costs) | **Low Volume** |
| Note: The above industry comparison depends on the casting supplier, metals, too design, and casting design. Actual part and tooling costs vary significantly based on size, complexity, and tolerance required.  Call 425-788-6490 to contact a sales engineer | | | | | | | |
| **www.pentzcastsolutions.com** | | | | | | | |