

Investment Casting



Investment casting, also called “lost-wax casting” is an industrial process, and one of the oldest known metal forming techniques known to man. Investment castings allow for the production of components with accuracy, repeatability, versatility, and integrity in a variety of metals and high-performance alloys.

The investment casting process is generally used for small castings, but can produce items of much larger size and dimension. Investment casting can produce complicated shapes that would be extremely difficult to impossible with die casting or sand casting. Investment casting requires little surface finishing, like the die casting process, as well as machining when compared to sand casting.

There are 10 basic steps that we use in the investment casting process:

- (1) From an Idea:** Create a print and a Solid Model.
- (2) Tooling:** Usually an Aluminum Die is cut using the Solid Model.
- (3) Patterns:** Wax patterns are produced by injecting wax into the die. You must produce the same number of wax patterns as the number of parts that you need. Rapid Prototype patterns can be made from the solid model, but these are quite costly for more than simple patterns.
- (4) Assembly of Patterns:** Multiple wax patterns are attached to a Sprue (Tree). The casting weight and physical size determine the number of pieces per Tree.
- (5) Ceramic Mold:** The ceramic mold, known as the Shell, is formed by repeating the following three steps.
 - (1) Dipping the tree in a ceramic slurry, then draining of the excess slurry.
 - (2) Before drying the tree is then covered with a stucco (sand).
 - (3) The tree is then allowed to dry. After drying completely, the three steps are repeated until the desired thickness had been built up. This is accomplished by starting with a fine sand to pick up detail, and using a coarser sand for the backup dips

After the last dip the entire mold is allowed to completely dry. This is accomplished with air movement of controlled humidity and steady temperature. Normally this takes 24 hours, but holes and deep pockets may take longer.



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