

INVESTMENT CASTING

Is the modern derivation of the ancient lost wax process.

Wax models are built, then placed in special tanks that contain synthetic resin and ceramic granules. These two together polymerize, creating a cladding. When the jet is poured into the form, the wax evaporates, leaving only the piece to solidify.

To produce any object you must first make a mold, pointing alternately two techniques:

- Preparation of a brass model geometrically identical to detail to produce, but for making a stamping die low melting point alloy
- Building from a mold made of aluminium or steel, with one or more representative of particular cavity to produce.

Later, injecting wax into the shell is "print" so many models as there are pieces to be produced. These models are then gathered in a cluster by means of casting attacks, then dipped into a ceramic mixture and finally coated with a refractory material shell powder. This is repeated several times until a shell thick enough to withstand the heat and pressure of molten metal. The forms, after the evacuation of the wax, high-temperature furnaces in order to acquire the necessary strength to cast. After the cooling of the metal on deletes of ceramic shell using a particular hammer. Every single piece is finished and started in the laboratory for quality control.

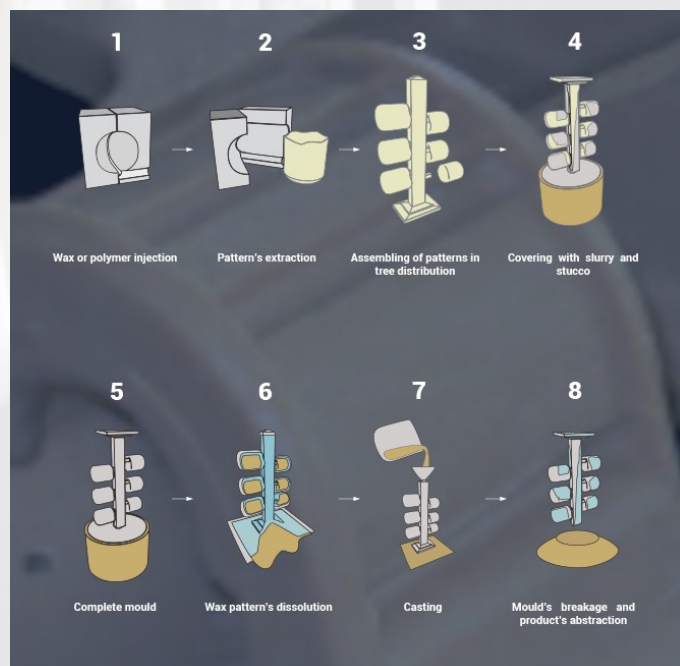


A casting made by investment casting allows the designer three main advantages:

- The first is that to realize complex geometries, the possibility to substitute with one casted part, small and large parts consisting of different pieces.
- The second is to be able to choose the most appropriate metal alloy for the project, since all the metal alloys can be casted, in fact the higher their melting points are and greater is the convenience to use this technology.
- The third major advantage of the process is that the tolerances which are achievable by casting are very precise and repeatable, so you can reduce or even eliminate the following machining, with consequent reduction of production costs.

To identify the type of technique that most suits to the own needs in order to choose the most economically favorable process to realize a certain type of part, you have to base the analysis on the following assessments:

- Melting temperature and type of alloy
- Size of the casting
- Complexity of the casting
- Number of pieces
- Tolerances and surface finishing



SHELL MOLD CASTING

The shell mould casting process is a transient forming method similar to the green sand casting, in which the molten metal is poured into an expendable mold. Here the mold is shell characterized by thin-walled shell generated by the application of a sand-resin mixture on a pattern. The pattern, made of metal as the piece to be produced, is reused for entire production of the shells. This allows high production quantities, something not achievable with the use of disposable molds.

This technique can be used with both ferrous and non-ferrous alloys, but a limitation consist in the dimensions of the castings which are small-medium where, however, high accuracy is required.

Benefit:

- Used on complex geometry items
- Possibility to use different alloys (ferrous and no-ferrous)
- High production quantities
- Low cost of machinings

