

# Sand Casting



A sand casting or a sand molded casting is a cast part produced by forming a mold from a sand mixture and then pouring molten liquid metal into the cavity in the mold. The mold is then cooled until the metal has solidified. In the final stage, the casting is separated from the mold.

There are six basic steps in the sand casting process:

1. Place a pattern in the sand to create a mold.
2. Incorporate a gating system.
3. Remove the pattern.
4. Fill the mold cavity with molten metal
5. Allow the metal to cool.
6. Break away the sand mold and remove the casting.

There are two main types of sand used for molding. “green sand” is a mixture of silica sand, clay, moisture and other additives. The “air set” method uses dry sand bonded to materials other than clay, using a fast curing additive. The latter may also be referred to as “no bake” mold casting. When these are used, they are called “air set” sand castings to distinguish them from “green sand” castings. Two types of molding sand are natural bonded (bank sand) and synthetic (lake sand) which is generally preferred due to its more consistent composition.

With both methods, the sand mixture is packed around a master “pattern” forming a mold cavity. If necessary, a temporary plug is placed to form a channel for pouring the metal to be cast. Air-set molds, often form a two-part mold having a top and bottom. The sand mixture is tamped down as it is added, and the final mold assembly is sometimes vibrated to compact the sand and fill any unwanted voids in the mold. Then the pattern is removed with the channel plug, leaving the mold cavity. The casting liquid (typically molten metal) is then poured into the mold cavity. After the metal has solidified and cooled, the casting is separated from the sand mold. The mold is generally destroyed in the removal process.

The accuracy of the casting is limited by the type of sand and the molding process. Sand castings made from coarse green sand impart a rough texture on the surface of the casting. Air-set molds can produce castings with much smoother surfaces.

Overall, sand casting is generally less expensive than Investment or Ceramic casting and provides larger parameters in both size and dimensions. In comparison however, sand castings are generally less complex, with a lower surface quality, thereby requiring more grinding, shot blasting or machining.

