



Casting Procedure of Different Metals and Metalloids Based on its Properties

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DESCRIPTION

Casting is the traditional method for producing components by solidifying the liquid molten metal in a desired shape of the cavity. For the ferrous and non-ferrous metals processing different casting methods are followed in industries. The casting process depends on the characteristics of liquid metal to take the shape of the cavity containing it. With this technique, intricate parts can be produced. They require machining for dimensional accuracy. In the casting process, the melt is poured into the mould cavity until the cavity is filled. When the molten metal gets solidified in the cavity, it obtains the shape and size of the mould cavity [1]. The castings are not in the exact shape and size of the mould and there is a volume loss about 2% to 9%. For obtaining the desired shape and size of the components, allowances are provided during pattern/mould design. Hollow parts can be cast by introducing a core element into the mould. The casting process index for the material is high if the fluidity is high with a low level of affinity for absorbing gases by moulding sand, low shrinkage of molten metal, low stresses and uniform strength in the entire structure of the casting. These characteristics are found mainly in pure metals and eutectics, which have a definite melting point. Alloys in particular are mostly cast for many applications because of the reliability in its characteristics. However, the pure metals are not recommended because of low strength [2].

The shaped castings are used for different applications. The size of the castings may vary from a few grams to many tons. One of the Seven Wonders of the World, the bronze statue of Colossus of Rhodes, is the heaviest object made by the casting process. However, nowadays the heavy castings often include the machine structures, flywheels and turbine base plates, etc. which are made from different casting technique. Cast iron castings have good compressive strength, poor elongation and low tensile strength due to its brittleness. However, alloy materials have better casting property when compared with cast iron [3]. Apart from cast iron, the alloys of copper, zinc, nickel, aluminium and magnesium are

also widely in use. The foundry is an industry to produce different application components made from different metals by the conversion of the liquid metal to the solid. The final product, namely casting is in the solid-state with required dimensional parameters [4]. For some applications, the castings produced in the foundry unit have been used after the completion of the casting, finishing process such as cleaning, fettling, shot peening, coating etc.

CONCLUSION

The castings are machined to attain the desired geometrical dimensions and surface finish. In the foundry, different types of casting techniques are followed to produce castings from ferrous and non-ferrous materials. The molten metal is poured into die without external pressure in gravity die casting. Moulds are made of cast iron or steel for longer life. Hence, this casting process is known as permanent mould casting. The metal used for the mould should withstand the high temperature, and hence the material with high resistance to thermal shock is (grey cast iron) used. For very high temperature, corrosion-resistant alloy steels or non-ferrous alloys are used.

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