



FOUNDRY

CASTINGS: Casting is a process for making components by pouring molten metal into a cavity and allow to solidify. The solidified metal is called Casting.

PATTERN: Pattern is the model of the required casting.

MOULD: Mould is a cavity or the required shape made in moulding sand.

CLASSIFICATION OF PATTERNS: Patterns are classified into Size and Shape, Number of parts to be produced and Method of castings.

TYPES OF PATTERNS:

Solid or Single piece Patterns: Exact shape is obtained.

Split pattern: Made into two halves i.e. Upper pattern and lower pattern. A line separating is called parting line.

Loose piece Patterns: After making mould first solid piece is removed and loose piece is removed.

Match plate Patterns: Runner and gates are required. Used in machine moulding and for large volume.

Sweep Patterns: Surfaces like cylinder, cone and spheres these patterns are used.

Skeleton Patterns: Larger in size. Used for water pipes, turbines.

Segmental Patterns: Circular parts like rings, wheels, rims are produced by using segmental patterns.

Shell Patterns: Hollow pattern and used in pipes and short bends.

PATTERN MATERIALS: The materials used for making patterns are Wood (Teak, Mahogany, White pine), Metals (Cast iron, Steel, Brass, Aluminium), Plasters, Plastics and wax.

Wood: Advantages: Light weight, cheap, easily available, repairs are easily made.

Disadvantages: Absorbs water, High wear and tear, Not used for mass production & M/c moulds.

Metal: Used for mass production. It can be used in machine moulding. Advantages : Long life, Used for mass production, Not absorbing moisture, Resistance to wear and abrasion. Limitations: Costly, Not easily repaired.

Plasters: Plaster of paris or gypsum cement, Difficult shapes can be made easily, Not affected by moisture and used for small patterns.



Plastics: Made from master pattern, light weight, Not affected by moisture.

Wax: Paraffin wax, Shellac wax, and Micro crystalline wax are used. Good surface finish can be obtained. Not affected by moisture. Cost is less and used for small patterns.

PATTERN ALLOWANCES: Extra size given to the pattern is called Pattern Allowance. Various allowances are Shrinkage allowance, Machining allowance, Draft or Taper allowance, Distortion & Shake allowances

Shrinkage allowance: Metal shrinks during solidification and contracts on cooling. Compensation is required. For Cast iron 1mm per 100mm, Aluminium 1.7 mm per 100 mm, Brass 1.5 mm per 100 mm, Steel 2 mm per 100 mm are the recommended shrinkage allowances.

Machining Allowance: Extra size given for machining. For Cast iron 2.5 mm and for non ferrous metals 1.6mm and for cast steel 3 mm are the recommended machining allowances.

Draft or Taper allowance: For removal of pattern from the mould.

Distortion allowance: The metal get distortion during cooling and not shrinks uniformly. To avoid the bend the distortion allowance is provided in the pattern.

PROCEDURE FOR MAKING GREEN SAND MOULD

- a. Two piece split pattern. The pattern is placed at the centre of the moulding board.
- b. The drag box is placed around the pattern, Dowel pins are connected to the box.
- c. 20 mm layer of facing sand is first placed around the pattern and then drag is filled with green sand.
- d. Sufficient ramming is done by the rammer and add sand if necessary.
- e. Excess sand is removed by strike of bar.
- f. Vent holes are made by vent wire to escape the gases during pouring of metal.
- g. The top surface is made smooth by trowel.
- h. Then the drag is tilted upside down as shown in figure.
- i. The parting sand is sprinkled over the drag box.
- j. Top half of the pattern is placed correctly in position.



UNIT III OVERVIEW OF MECHANICAL ENGINEERING



- k. Cope box is placed correctly in position on the drag using dowel pins.
- l. Riser pin and sprue pins are correctly placed in position.
- m. Filling and ramming and venting of the sand are done similar to that of drag.
- n. Sprue and riser pins are removed.
- o. The pattern is removed from the box slowly.
- p. A gate is cut on the top surface of the drag. It should be exactly below the sprue.
- q. The mould surfaces are coated with coating material like graphite to get smooth surface to the casting.
- r. The core is set in position if necessary.
- s. Finally, the cope and drag box are assembled. Weight is placed on the cope to prevent the cope from floating or lifting up when the molten metal is poured.
- t. The mould is ready for pouring the metal.

