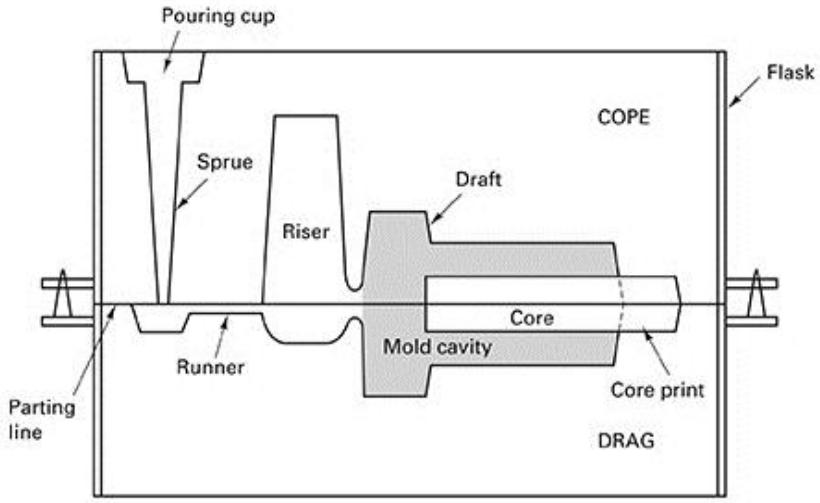
Casting

Process

- Mould cavity is produced having the desired shape and size of the part
  - Takes shrinkage into account
  - Single use / permanent mould (sand / diecast)
- Melting process
  - Provides molten material at the proper temperature
- Treated to modify its chemical makeup
- Pouring
  - Molten metal is poured into the mould at a proper rate to ensure that erosion and or defects are minimised.
- Solidification process
  - Controlled solidification allows the product to have desired properties
  - Mould should be designed so that shrinkage is controlled
  - Two stages to solidification; nucleation and growth
- Mould removal
  - The casting is moved away from the mould
    - ❖ Single use moulds are broken away from casting
    - ❖ Permanent moulds must be designed so that removal does not damage the part

Cross section image of mould



Terminology

- Pattern: Approximate duplicate of part to be cast
- Moulding material: Material that is packed around the pattern to provide the mould cavity
- Flask: Rigid frame that holds the moulding aggregate
- Cope: Top half of the pattern
- Drag: Bottom half of pattern
- Core: Sand or metal shape that is inserted into the mould to create internal features
- Mould cavity: Combination of the mould material and cores
- Riser: Additional void in the mould that provides additional metal to compensate for shrinkage. It is usually insulated so that it cools last.
- Gating system: Network of channels that delivers the molten metal to the mould
- Pouring cup: Portion of the gating system that controls the delivery of the metal
- Sprue: Vertical portion of the gating system
- Runners: Horizontal channels
- Parting line: Separates cope and drag
- Draft: Angle or taper on a pattern that allows for easy removal of the casting from the mould
- Casting: describes both the process and the product when molten metal is poured and solidified.

Advantages of casting