



IIT ROORKEE



NPTEL ONLINE
CERTIFICATION COURSE

GATING SYSTEM DESIGN

Types of Gates

Dr Pradeep Kumar Jha

MIED



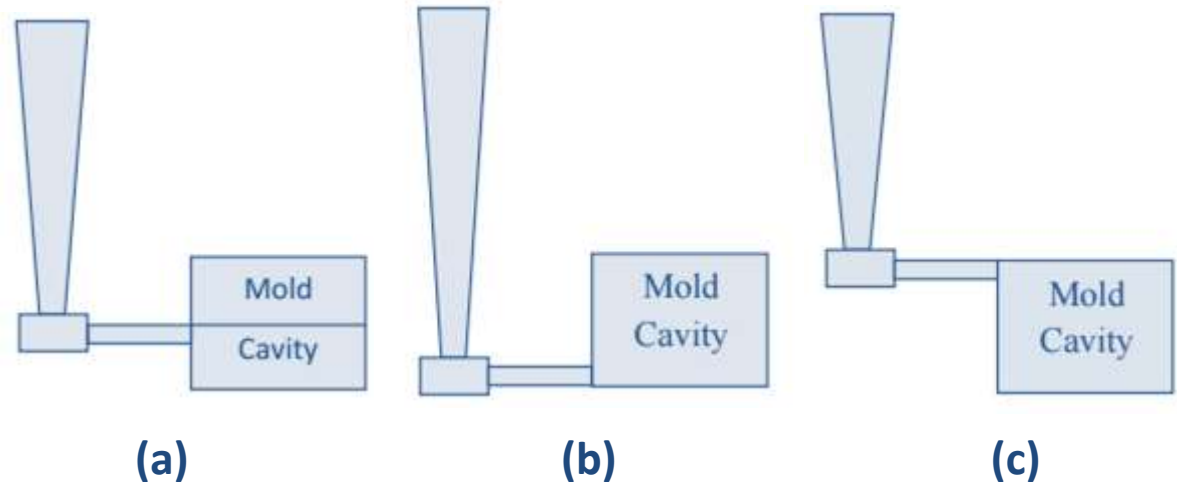
TYPES OF GATES

➤ According to their position in the mold cavity

a. Parting Gate

b. Bottom Gate

c. Top Gate

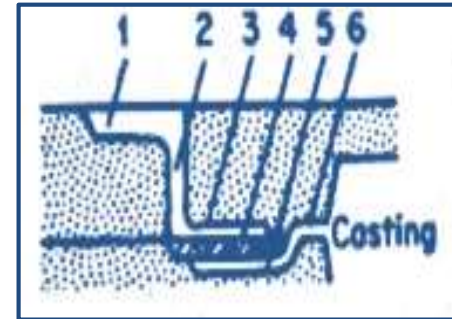


PARTING GATES

- These gates enter the mold cavity along mold parting line (Separating cope & drag)
- They may contain devices such as skim bobs or relief sprues, shrink bobs, core inserts, dam in pouring basin etc.
- Shrink Bob: Serving dual function of slag/dross collector & metal reservoir to feed casting as it shrinks.



PARTING GATES



BOTTOM GATE

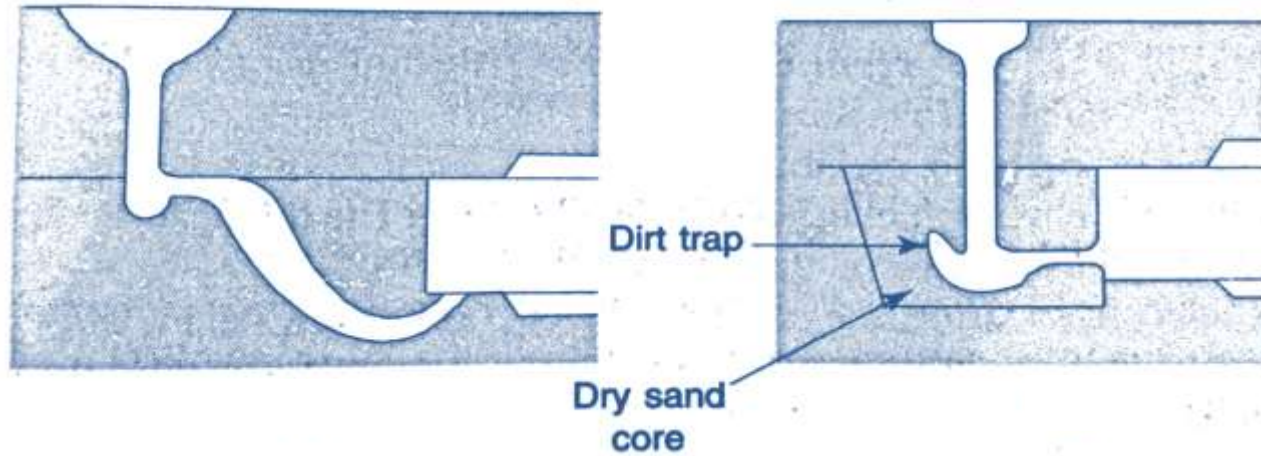
Bottom gate: Bottom gate enters the casting cavity at the bottom of drag half of the mold.

- Advocated for steel castings in particular to reduce erosion & gas entrapment and to prevent splashing, which may result in cold shuts.

Disadvantages:

- Metal continuous to loose heat, as it rises in mold cavity. Directional solidification solidification difficult to achieve.
- Horn gate & bottom gate with dry sand core

BOTTOM GATE



TOP GATE

- Molten metal poured down the head or riser of casting.
- Metal falling directly into cavity, so erosion chances are high.
- Hot metal at top, so directional solidification is achieved.
- Use of strainer core may be there in pouring cup.
- In case of light castings, wedge shaped gates are used.
- Pencil gates are used for massive iron castings where a minimum weight of head is desired & slag is effectively checked from collecting mold cavity.

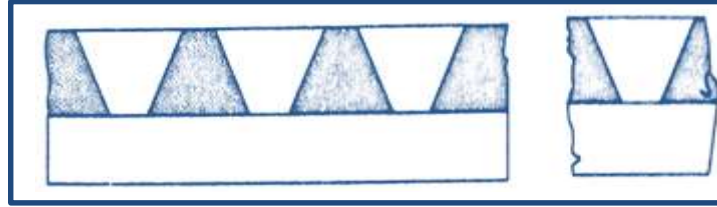


TOP GATE

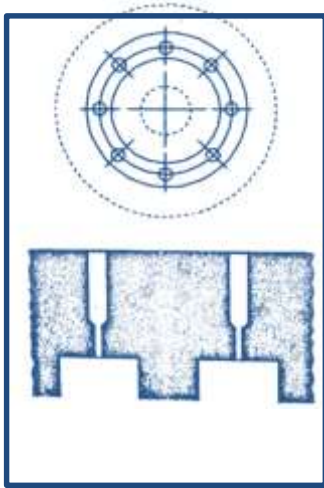
- In finger gates(a modification of wedge gate), metal is allowed to reach the mold in a number of streams.
- Ring gate→ Uses a core to break the stream of molten metal besides directing the metal into the desired position in the mold, and at the same time, retaining the slag.



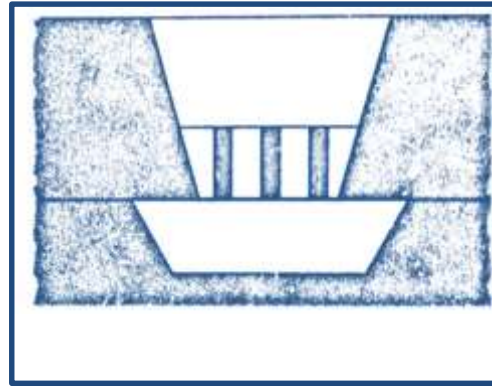
TOP GATE



Wedge gate



Pencil gate



Finger gate



Ring gate

CHOKE

- Smallest area in feeding channel that controls flow rate into mold cavity and controls pouring time.
- It normally occurs at bottom of sprue for early establishment of proper flow characteristics.

GATING RATIO

- It is defined as ratio of sprue area to total runner area to total ingate area.
- It may be classified as pressurized and non-pressurized system.
- In pressurized system, total gate area is not greater than area of sprue. Back pressure is maintained on the gating system by a restriction of flow at the gates.
- In non-pressurized gate system, total gate area is larger than the area of the sprue.



THANKS

