

Properties of Moulding Sand

Moulding sand is used in the foundry industry for mould preparation during metal casting. The properties of the moulding sand improve the casting metal's quality. When adequate sand is used, casting faults that may occur during the mould preparation and casting process is considerably reduced.

Here, we will go over all of the properties that moulding sand must have to prepare an effective mould cavity.

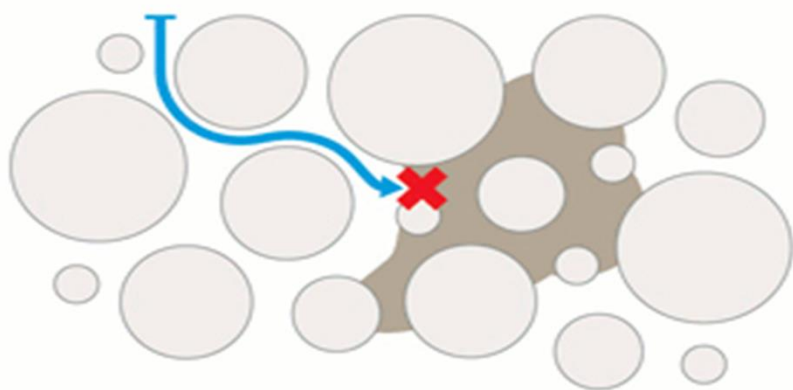
- Permeability
- Adhesiveness
- Cohesiveness
- Flowability
- Refractoriness
- Collapsibility

Permeability

Permeability, is the most important characteristic of moulding sand. It refers to the moulding sand's capacity to enable gases to pass through.

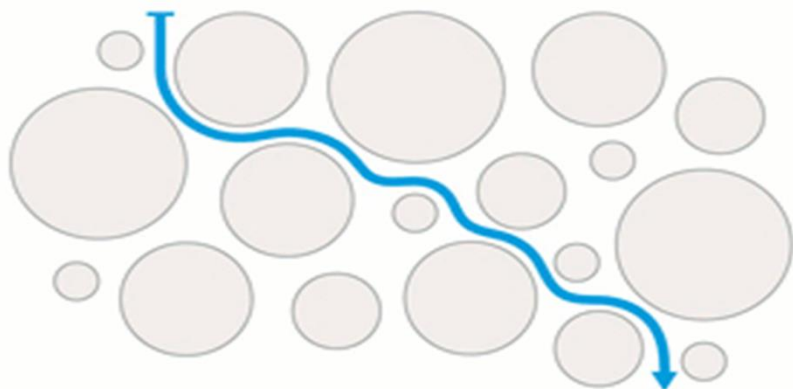
During the pouring of molten metal into the sand hole, gases and steam are produced.

This property is affected not only by the form and size of the sand particles but also by the amount of clay, binding substance, and moisture in the combination.



POOR PERMEABILITY

Cement blocks the pores, so the pores are not connected.



GOOD PERMEABILITY

The pores are connected.

Adhesiveness

The ability of sand particles to adhere to another body is called adhesiveness. Sand's adhesiveness causes sand particles to adhere to the sides of the moulding box.

Sand adhesion allows for properly lifting the cope together with the sand.

Cohesiveness

- Cohesiveness refers to the capacity of sand particles to cling together. The sand's strength is determined by how cohesive the sand particles are.
- The sand should be strong enough to hold its shape throughout carrying, twisting, closing, and pouring.
- If it is not of sufficient strength, it will be unable to keep its shape, and the mould may be damaged during the pouring of molten metal.

Flowability

- Flowability or plasticity is the ability of sand to adapt to the moulding process by flowing all around the pattern and taking the right mould shape when rammed.
- Moulding sand must have good plasticity to have a good impression of the pattern in the mould.
- Fine-grained sand is generally more plastic.

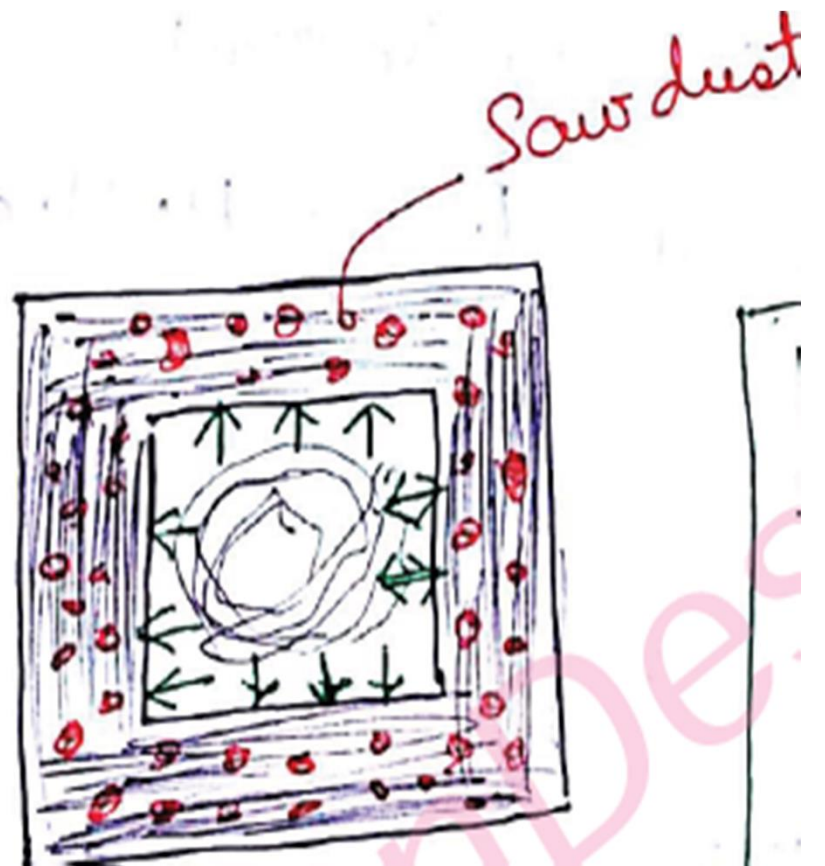
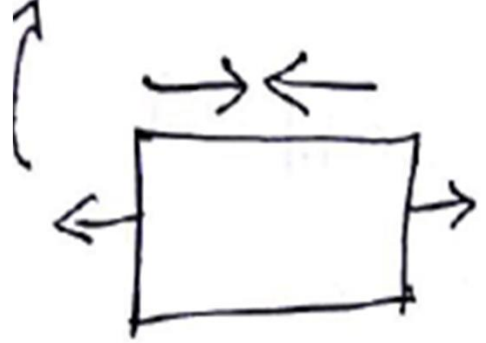
Refractoriness

- The moulding sand's capacity to survive the molten metal's high temperature without melting into it is referred to as refractoriness.
- The moulding sand must have sufficient refractoriness to produce a high-quality, defect-free casting.
- Sand with low refractoriness melts and fuses in the casting, lowering the quality of the cast metal.
- The refractoriness of sand is a measure of its sinter point, not its melting point.

Collapsibility

Collapsibility refers to the capacity of the moulding sand to collapse after the molten metal has solidified. When the casting is withdrawn from the mould, it should disintegrate into small particles of moulding sand with minimal force.

Resistance
Shrinkage



Moulding Sand:

Sand	Silica	—	70-85%	
	Clay	—	10-20%	— Bonding Material
	Water	—	2-8%	
	Additives	—	1-4%	

Silica — 1710°C — Refractory Temperature

Olivine — 1800°C

Refractoriness Temperature

Zirconium — 2700°C

Ceramic — 3500°C

Graphite — 4200°C

Refractoriness $>$ Pouring Temp. of
Liquid Metal