

# Mortar

Mortar is a mixture of cement, sand and lime. The mortar is just used for the binding material. It has the ingredients in fixed proportions for a particular kind of structure. Mortar questions based on this concept can be seen in the [GATE exam](#). The mortar mix is similar to the concrete but has no aggregate material. It is generally used for the construction of brick masonry or stone masonry for the binding of bricks or stones.

Building mortar has only a combination of cement and sand. It has some different properties that will be explained further. Properties of mortar include its workability, compressive strength and bond strength etc. Mortar properties also include its water retention capacity, mobility and other properties.

## Mortar Meaning

The definition of a mortar mix can be said that a mixture of cement, sand, lime and water. These ingredients are mixed together in a definite proportion. These mortars are used to hold bricks and stones in masonry-type structures. Mortar is a workable paste material used as a binding material in many masonry structures.

A mortar is a mixture of sand with a binding agent. Cement or lime is generally used as the binding agent of the mortar. Water in the mix will be added in definite proportions. It can bind the stone or bricks in the masonry structure.

## Bulking of Sand

- In the case of aggregates, there is another effect of the presence of moisture, viz. bulking, which is an increase in the volume of a given mass of sand (fine aggregate) caused by the films of water pushing the sand particle apart. For a moisture content of about 5-8%, this volume increase may be as much as 20-40% depending upon the grading of the sand.
- The finer the materials, the more the volume increase for a given moisture content.

## Classification Parameters of Mortars

Mortars can be classified based on the ingredients used and their strength. These classification parameters are listed below:

- Bulk density
- Kind of binding materials
- Nature of application
- Special mortars

## Types of Mortar

Different types of mortar will depend on the ingredients used to mix the mortar. Mortar can be classified into different types based on their bulk density, binding materials, nature of its

applications, etc. Using sand in the mortar improves its density, setting time, shrinkage strength, etc. Different types of mortar have different properties, which can be used to formulate the MSQ-based questions in the [GATE CE question paper](#). Based on the properties of mortar, they can be used for multiple purposes. Here are some classifications of mortar given below based on their properties.

- Stone laying mortar
- Cement mortar
- Lime mortar
- Gauged mortar
- Gypsum mortar
- Surakhi mortar
- Aerated cement mortar

## Uses of Brick and Mortar in a Structure

Brick is a type of block that is used to construct walls. And mortar is the binding material used to bind bricks and stones. A structure consists of many members connected properly so that load is transferred properly from one point to another.

Various structural binding materials can be found, like cement paste, mortar slurry, etc. These binding materials have different compositions based on their use for different purposes. In a structure, mortar can also carry out plastering work.

## Functions of Sand in Mortar

Mortar generally consists of sand, cement and water. These different ingredients have different properties. Here a few properties of mortar are listed below that come into the mortar mix by adding sand material.

- Bulk
- Setting
- Shrinkage
- Strength

## Properties of Mortar

Mortar has different properties based on the ingredients used to make the mortar. Generally, it is a mixture of cement, sand, lime and water. Its properties can be described below based on the ingredients used to make mortar.

- A good mortar should develop proper adhesion with the bricks or stones.
- It should also be capable of withstanding the designed level of stress.
- A good mortar should have the least possible cost.
- It should be durable so that it can sustain the joined material.
- It should be working properly.
- It should be set properly in sufficient time.

## Tests for Mortars

A mortar should be properly designed so that it works properly. So, it's necessary to find mortars' strength and other characteristics before use. Tests on mortar are briefly mentioned in the [GATE syllabus](#). Here some tests are given to determine the different characteristics of mortars.

- **Crushing strength test:** Masonry structures are tested for the crushing strength of mortar so they can resist the load properly. The load at which masonry structures fail is known as the crushing strength.
- **Tensile strength:** A sample for this is tested in the testing machine. Tensile strength is measured to determine the capability of mortar against the tensile load over the structure.
- **Adhesive strength:** It is required for the determination of the joint strength of the masonry structure.

## Guniting

Guniting is the most effective process of repairing concrete work damaged due to inferior work or other reasons. It is also used for providing an impervious layer. Guniting is a mixture of cement and sand, the usual proportion being 1:3. A cement gun is used to deposit this mixture on the concrete surface under a pressure of about 2 to 3 kg/cm<sup>2</sup>. The surface to be treated is cleaned and washed. The gun's nozzle is generally kept at a distance of about 75 cm to 85 cm from the surface to be treated, and the velocity of the nozzle varies from 120 to 160 m/sec.