

Functions of Cement Ingredients

The main features of these cement ingredients along with their functions and usefulness or harmfulness are given below:

Lime: Lime is calcium oxide or calcium hydroxide.

Presence of lime in a sufficient quantity is required to form silicates and aluminates of calcium.

- Deficiency in lime reduces the strength of property to the cement.
- Deficiency in lime causes cement to set quickly.
- Excess lime makes cement unsound.
- Excessive presence of lime causes cement to expand and disintegrate.

Silica: Silicon dioxide is known as silica, chemical formula SiO_2 .

- Sufficient quantity of silica should be present in cement
- Silica imparts strength to cement.

Silica usually presents to the extent of about 30 percent cement.

Alumina: Alumina is Aluminium oxide. The chemical formula is Al_2O_3 .

- Alumina imparts quick setting property to the cement.
- Excess alumina weakens the cement.

Magnesia: Magnesium Oxide. Chemical formula is MgO .

- Magnesia should not be present more than 2% in cement.
- Excess magnesia will reduce the strength of the cement.

Iron oxide: Chemical formula is Fe_2O_3 .

- Iron oxide imparts color to cement.
- It acts as a flux(Purifying agent)
- At a very high temperature, it imparts into the chemical reaction with calcium and Aluminum to form tricalcium alumino-ferrite.

- Tricalcium alumino-ferrite imparts hardness and strength to cement.

Calcium Sulfate: Chemical formula is CaSO_4

- This is present in cement in the form of gypsum($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$)
- It slows down or retards the setting action of cement.

Sulfur Trioxide: Chemical formula is SO_3

- Should not be present more than 2%.
- Excess Sulfur Trioxide causes cement to unsound.

Alkaline:

- Should not be present more than 1%.
- Excess Alkaline matter causes efflorescence.