



SNS COLLEGE OF TECHNOLOGY



AN AUTONOMOUS INSTITUTION

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COIMBATORE

DEPARTMENT OF CIVIL ENGINEERING

19CEB204 – CONSTRUCTION MATERIALS

II YEAR / III SEMESTER

Unit 2 : Lime – Cement – Aggregates

Topic 5 : Grades of Cement



Grades of Cement

- The grade indicates the strength of cement.
- Strength is generally measured as compressive strength.
- Before buying the cement, you should check the grades because it highly affects the strength of your structure.
- The strength gets further measured as the comprehensive strength, which is the moulded cement in the standard cube.
- After 28 days of curing, it gets estimated.
- The measurements are in Mega-Pascal or N/mm.



Types of Cement Grades

There are different grades of cement, which are specified by IS 1489: 1991 as below of cement grade list.

1. OPC 33 Grade Cement
2. OPC 43 Grade Cement
3. OPC 53 Grade cement



OPC 33 Grade Cement

The Cement, which has Compressive strength of 33 N/mm^2 after the 28 days when tested, is known as 33-Grade Cement.

Fineness (specific area) of 33 Grade Cement = $300 \text{ m}^2/\text{kg}$

- 3 days compressive strength = 16 N/mm^2
- 7 days compressive strength = 22 N/mm^2
- 28 days compressive strength = 33 N/mm^2



OPC 33 Grade Cement

Properties of 33-Grade Cement:

- This grade of cement has high workability and is mainly used for **masonry work** and for plastering work.
- The initial strength of 33 Grade Cement continues to gain even after 28 days.
- The heat of hydration of 33 Grade Cement is lower as compared to the 43 grade and 53-grade cement.



OPC 33 Grade Cement

Uses of 33-Grade Cement:

- It is widely used in plastering work.
- It is also used for the brickwork of walls.
- In the tiling work.
- It is generally used for work, which required low compressive strength of below M20.
- The Code of reference for 33-grade cement is IS Code – IS 269: 1989.



OPC 43 Grade Cement

The Cement, which has Compressive strength of 43 N/mm^2 after the 28 days when tested, is known as 43-Grade Cement.

Fineness (specific area) of 43 Grade Cement = $225 \text{ m}^2/\text{kg}$

- 3 days compressive strength = 23 N/mm^2
- 7 days compressive strength = 33 N/mm^2
- 28 days compressive strength = 43 N/mm^2



OPC 43 Grade Cement

Properties of 43-Grade Cement:

- It has low chloride content, so it doesn't cause corrosion of steel reinforcement.
- It gives good workability of concrete.
- The initial strength of 43 Grade Cement continues to gain even after 28 days.
- The heat of hydration of 43 Grade Cement is medium.
- This will give a better surface finish to the structures.
- It is moderately sulfate resisting.



OPC 43 Grade Cement

Uses of 43 Grade Cement

- It is used in the preparation of Ready Mix Concrete (RMC).
- It is used for PCC and RCC work.
- It is used in the construction of RCC bridges.
- For Construction of Silos and Chimneys.
- It is used for finishing of all types of structures like buildings, bridges, roads, and water retaining structures.
- It is used in precast and prestressed concrete.
- It is also used in Ship form Construction.
- It is used in the construction where a grade of concrete up to M30.
- The Code of reference for 43-Grade Cement is IS Code – IS 8112: 1989.



OPC 53 Grade Cement

The Cement, which has Compressive strength of 53 N/ mm² after the 28 days when tested, is known as 53-Grade Cement.

Fineness (specific area) of 53 Grade Cement = 225 m²/kg

- 3 days compressive strength = 27 N/mm²
- 7 days compressive strength = 37 N/mm²
- 28 days compressive strength = 53 N/mm²



OPC 53 Grade Cement

Properties of 53 Grade Cement:

- It is a Sulphate resisting cement.
- It has low chloride content.
- It can be used in speedy Construction.
- It saves shuttering cost due to early removal.
- The initial strength of 53 Grade Cement continues to gain even after 28 days.



OPC 53 Grade Cement

Uses of 53 Grade Cement:

- It is used the construction of concrete sleepers for Railways.
- It is used in pre-stressed girders.
- The 53-Grade Cement achieves early strength.
- It is used in industrial buildings roads and runways.
- It is used in the construction of RCC bridges and precast concrete.
- Generally used for M25 and above concretes.
- It is used in the construction of all RCC components like a beam, columns, footings, and slabs.
- The Code of reference for 53-Grade Cement is IS Code – IS 12269: 1987.



Thank You!!