

DETERMINATION OF COMPRESSIVE STRENGTH

STANDARD

- IS 4031 (Part 6) 1988.

DEFINITION

- Compressive strength is defined as the ratio of the load per unit area.

APPARATUS

- Vibrating machine confirming to IS: 10080 – 1982.
- Poking rod confirming to IS: 10080-1982.
- Cube moulds shall be of 70.60mm size confirming to IS: 10080-1982.
- Gauging trowel having steel blade 100 to 150mm in length with straight edge weighing
210 ± 10gms.
- Balance of capacity 10Kg and sensitivity 1gram.

PROCEDURE

- Unless otherwise specified this test shall be conducted at a temperature $27^{\circ} \pm 2$ °C.
- Weigh the material required for each cube separately.
- The quantity of cement, standard sand and water required for each cube are as follows
Cement = 200gms
2mm to 1mm - 200gms
Standard Sand = 600gms 1mm to 500mic - 200gms
Conforming to IS: 650 –1991. 500mic to 90mic - 200gms

Water = $(P/ 4+ 3)$ Percentage of combined mass of cement and sand.

P is the consistency of cement as per IS: 4031 (Part 4) 1988.

- Place on a nonporous plate, a mixture cement and standard sand.
- Mix it dry with a trowel for one minute and then with water until the mixture is of uniform colour.

- The time of mixing shall in any event be not less than 3 minutes and should be the time taken to obtain uniform colour exceeds 4 minutes.
- In assembling the moulds ready for use, cover the joints between the halves of the mould with a thin film of petroleum jelly and apply a similar coating of petroleum jelly between the contact surface of the bottom of the mould and base plate in order to ensure that no water escapes during vibration.
- Place the assembled mould on the table of the vibration machine and hold it firmly in position by means of suitable clamp, attach a hopper of suitable size and shape securely at the top of the mould to facilitate filling and hopper shall not be removed until the completion of vibration period.
- Immediately after fixing the mould in the vibrating machine, place the mortar in the cube mould and prod with the rod.
- Prod the mortar 20 times in about 8 seconds to ensure elimination of entrapped air and honey combing.
- Place the remaining mortar in the cube mould and prod again as specified for the first layer and then compact the mortar by vibration.
- The period of vibration shall be two minutes at the specified speed of 12000 ± 400 vibrations per minute.
- Remove the mould from the vibrating machine and cut off the excess mortar with a straight edge.
- Store the test specimens in a place free from vibration, in moist air of at least 90 percent relative humidity and at a temperature of $27 \pm 2^{\circ}\text{C}$ for $24 \pm 1/2$ hours from the addition of water to the dry ingredients.



Casting of cement mortar cubes.

- After this period, mark the specimens and remove from the moulds and unless required for test within 24 hours.
- Immediately submerge the cubes in a clean, fresh water or saturated lime solution and keep there until taken out just prior to test.
- Renew the water or solution in which the specimens are submerged for every seven days, and the temperature of water is maintained with the specified limits.
- Conduct testing at recognized ages of the specimens, the most usual being 7 and 28 days.
- When it may be necessary to obtain the early strength, tests may be conducted at the age of 72 ± 2 hours.
- Calculate the ages from the addition of water to the dry ingredients.
- Test at least three specimens preferably from different batches at each selected age.

CALCULATIONS

- Compressive strength =
$$\frac{\text{Load}}{\text{Cross sectional area of the specimen}} \text{ N / mm}^2$$

REPORT

- Report the individual and the mean results to the second decimal and express in N / mm².

PRECAUTION

- The time of mixing is very important and in no case shall not be less than 3minutes and not to exceed 4 minutes.