

COMPRESSIVE STRENGTH TESTING

MATERIALS AND TOOLS:



Bucket, damp cloth and a slump cone, lump tray, measuring tape, round-mouthed shovel, sample of freshly mixed AfriSam concrete, small concrete scoop, tamping rod (16mm diameter by 600mm long with at least one rounded end), thermometer, wheelbarrow.

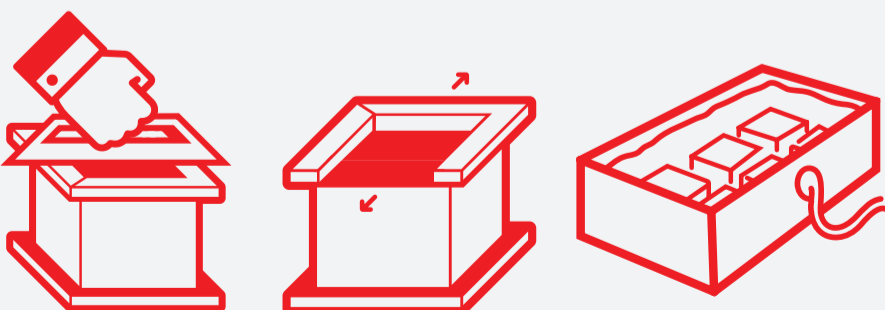
MEASURING THE SLUMP:

- Get a concrete sample and fill a wheelbarrow halfway. Use a concrete thermometer to ensure the temperature does not exceed 30°C.
- Mix the fresh concrete three times with a round-mouthed shovel or concrete scoop ensuring that it's properly blended.
- Ensure the slump table and cone are damp before placing the slump cone on a level table and standing on the built-in foot-pieces. The slump table must be stable and should not vibrate while placing the concrete.
- Fill the cone with concrete to three equal heights in turn. After pouring the first layer it must be rodded 25 times with a 16mm diameter rounded steel. Repeat twice more making sure that the rod penetrates the surface of each preceding layer.
- Before lifting the cone make sure that the table around it is clean. Carefully lift the cone straight up to a count of between 5 and 10.
- Place the upturned cone just beside the slumped concrete and lay the rod above it. Measure the slump from the underside of the rod to the topmost portion of the concrete.



MAKING CUBES:

- Remix the concrete sample in the wheelbarrow after completing the slump test.
- It's recommended that three cubes should be prepared for every age to be tested (a total of six cubes for 7-day and 28-day strength test results).
- Ensure the test moulds are clean as well as free from dust and dirt.
- The moulds should be assembled correctly with all the bolts tightened and with the corners at a 90° angle.
- Apply a release agent thinly onto the inside faces of the mould.
- Lay the mould on a smooth surface before filling each one with 50mm layers.
- Tamp each layer with a compaction rod at least 45 times for 150mm cubes and 20 times for 100mm cubes to ensure that all trapped air is removed.
- Where vibrating tables are used make sure that the cubes are completely compacted.
- Using a steel float strike off the surface of the concrete so that it's level with the top of the mould.
- On a paper label, using a pencil, write the company name, contact/reference number and date of test on each cube.



TESTING CUBES:

- Dry the surface of the cube with a cloth to remove all grit and projecting fins.
- Record both the mass (accuracy of at least 1%) and the dimensions (to the nearest mm) before continuing.
- Measure the cube dimensions: the height, depth and width must all measure 100mm. Any other reading will affect the test.
- Wipe clean the bearing surfaces of the platens of the compression testing machine.
- Position the cube in the compression testing machine with the cast faces against the platens.
- Centre the cube in the middle of the platens using location pins or guides.
- Apply the load without shock and increase at a steady rate of 0.3MPa per second until the cube can sustain no greater weight.
- Compressive strength formula:

$$\text{Compressive strength (MPa)} = \frac{\text{Maximum load (kN)} \times 1000}{\text{Surface area (mm}^2\text{)}}$$

PROTECTING CUBES:

Once the cube moulds have been made they should be covered in a sheet of plastic and stored in a protected environment (avoid exposed sunlight and store indoors).

STRIPPING CUBES:

- Strip cubes 24 hours after manufacture, remembering that cubes made in the late afternoon should not be stripped in the early morning.
- Loosen the bolts on the mould.
- Gently loosen and remove the sides of the mould.
- Transfer the information to the cube using a lumber crayon.

CURING CUBES:

- Place the cubes in a curing bath.
- The recommended temperature for the water in the curing bath should be between 22°C and 25°C.
- Record the maximum load applied and check the appearance of the specimen for any signs of failure.
- Repeat the procedure twice more with the second and third cubes.
- The result is the average strength of all three sample cubes.
- A result is only valid if the difference between the lowest and the highest is no more than 15% of the average.
- The result needs to be rounded off to the nearest 0.5MPa.

VALID FAILURES:



INVALID FAILURES (T = TENSILE CRACK):

