



Compressive Strength Testing

- Making Test Cubes

ARMCON
CERTAINTY IN CONCRETE

Compressive Strength Testing – Making Test Cubes

Top Tips

- Label all cubes made (once they are finished) by using small paper tags, this will help with identification during the strength testing phase.
- Cubes that have had a full initial cure but require testing at a different site should be kept moist during transport.
- A cube mould should also be cleaned, dried and oiled after use as this stops the build up of hardened concrete and limits the need for aggressive cleaning.
- When tamping a layer it is important to only compact that layer and not allow the bar to pass into the layer(s) beneath.
- Always correctly assemble moulds to ensure cubes comply with flatness and perpendicularity parameters set out in EN 12390-1.

Note: Cube testing foam concrete will require polystyrene moulds and **NO** compaction.

Why Make Cubes?

- Health and safety – i.e. is my concrete what I say it is, and will it 'do' what I say it will do.
- Saving money, the more accurate your concrete the less cement needs to be used to produce a strong concrete.
- Comply with Concrete Standards.

Concrete can only be tested once it has started to cure and is self supporting. It is at its best strength at 28 days after it has been poured. However to overcome the problem of having to wait nearly a month for results it is possible to test after 7 days and use an established relationship to predict the final 28 day strength of the sampled concrete.

To test the strength of any concrete being used it must first be sampled (see BS EN 12350-1 for details on sampling) and then it can be made into concrete cubes that conform to the method used in BS EN 12390-2.

Equipment used

The equipment required to produce a single concrete cube in accordance with BS EN 12390-2 is:

- A cube mould, either 100mm or 150mm (*this will be dictated by the coarse aggregate size. Smaller than 20mm in size requires a 100mm mould to be used and between 20 to 40mm needs a 150mm mould*)
- A square compacting bar (*25mm square, 380mm long and weighing 1.8kg*)
- Mould release oil
- Medium sized paint brush
- Metal round mouth scoop
- A metal trowel or float
- Spanner to fit bolts on mould

Cube Making

It is essential that before any cubes are moulded that the mould(s) being used should be taken apart, cleaned completely so that no hardened concrete remains, reassembled correctly and give a thin coat of mould release oil.

When filling cube moulds from a sample of the concrete being tested it should be noted that the sample needs to be at least 1.5 times bigger than the volume of the mould, this is so that there is enough concrete to fill the mould completely and is finished properly.

It is important to fill the mould in equal layers, for a 100mm mould the concrete should be done in two layers and for a 150mm mould it is good practice to fill the mould in 3 layers. After each layer is placed in the mould it needs to be fully compacted so that all entrapped air is removed, but no entrained air is taken out and also without causing segregation of the concrete. Compaction can be done by a hand tamping bar or vibration, if the compaction is done by hand then at least 25 strokes of the tamping bar should be applied to the concrete layer that has just been placed and to complete the hand tamping method a mallet is used to tap the side of the mould, which will remove large air bubbles and level out depressions in the surface.



When the final layer is fully compacted the concrete should be finished flat and level with the top of the mould, this is done by using a steel trowel or a float. With the cube starting to cure it will need placing in room temperature (about 21 °C); protected from dehydration and vibration, the surface of the concrete will also need covering with either a sheet of polythene or damp sack type material. After an initial cure of 24 hours it should be possible to de-mould the test cube and place it in a temperature controlled water tank for the required time before it is tested for compressive strength.