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PROFESSIONAL CONSTRUCTION EQUIPMENT

Concrete Cube Testing Explained

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Why untested concrete risks the integrity of your work

As a building contractor, it's your job to ensure the integrity of any building work you oversee. That's why you care about the quality of the concrete you use. If you're wondering how you can make sure you're getting a high-quality product, read on to find out about cube testing. Carrying out regular cube tests is one of the main ways suppliers can guarantee their concrete is strong and safe to use.

Why does concrete need to be tested?

The purpose of a concrete cube test is to ensure that the concrete meets its expected compressive strength. If the concrete doesn't reach its design strength – or if it hasn't been correctly tested – the supplier can't guarantee its quality, and if the supplier can't guarantee quality, then there's a big risk that the concrete might not be up for the job. It could crack, crumble or collapse in just a few months.

You can only be 100% confident about the quality of your concrete if you use a supplier that cube-tests.

What is a concrete cube test?

A concrete cube test involves taking a sample of freshly mixed concrete, letting it cure, then crushing it and measuring its compressive strength. Many concrete suppliers carry out this process at a certified test house, away from their facilities in a temperature-controlled state-of-the-art testing laboratory.

A laboratory will features water tanks, a concrete cube crusher and measuring scales.

What happens during a concrete cube test?

A typical concrete cube test follows these main steps:

Take a sample of freshly mixed concrete.

Pour the concrete into 3 cube moulds – The sample concrete is poured into 2 or 3 cube moulds (depending on the customer's requirements). The concrete in each mould is then filled, levelled, compacted and tampered to BSI requirements. Each cube is taken to a temperature-controlled lab, where it is kept for 24 hours, before being cracked and put into our water tanks to cure.

Let the concrete cubes cure – The cubes are kept in our temperature-controlled water tanks for 1–4 weeks.

The cubes are removed from the curing tank, dried and grit removed. The cubes are tested using a calibrated compression machine. This can be carried out internally by competent personnel or by a certified test house.

The cubes are tested on the face perpendicular to the casting face. The compression machine exerts a constant progressing force on the cubes till they fail, the rate of loading is 0.6 ± 0.2 M/Pas ($N/mm^2/s$). The reading at failure is the maximum compressive strength of the concrete. BS EN 12390-2: 2009 / BS EN 12390-3:2009.

Crush the cubes to test their strength – When each cube is ready for testing, it is put into a concrete crusher. This machine exerts force onto the cube until it breaks. The rate at which it crushes is measured, and this is its compressive strength.

What size should the concrete cubes be?

Concrete cubes are typically made in moulds with dimensions of 150mm x 100mm x 150mm. The moulds have to meet the British Standard for testing hardened concrete (BS EN 12390-1:2000).

Steel or plastic concrete test moulds are used to to contain the concrete and create the cubes. These can be purchased from Speedcretes online shop.

When should the cubes be tested?

The concrete should be tested after 7 days and after 28 days. That's why 2 or 3 cubes are taken – so that the concrete can be measured after different lengths of time.

Usually 1 cube will be tested at 7 days and 2 cubes at 28 days, however this may vary depending of the requirements, check the design first.

Specifications

Concrete cube testing as with all methods of testing, fresh / hard concrete are governed by standards set by the British Standards Institute and or the client in-house specifications. These standards specify all aspects involved in the process of carrying out tests, from the equipment to the method of testing.

A list of the National Concrete Standards relevant to Cube Testing are:

Fresh Concrete:

BS EN 12350-1:2009 – Sampling
BS EN 12350-2:2009 – Testing Fresh Concrete, Slump Test
BS EN 206-1:2000 – Concrete. Specification, performance, production and conformity

Hard Concrete:

BS EN 12390-1:2000 – Shape, dimensions and other requirements for specimens and moulds
BS EN 12390-2:2009 – Making and Curing Specimens for Strength Test
BS EN 12390-3:2009 – Compression Strength of Test Specimens
BS EN 12390-4:2009 – Compression Strength – Specification of Test Machines

Conclusion

We can't stress enough the value of carrying out cubes tests on concrete within the Construction Industry. Not only does it verify compliance with design soon after construction but also can save time and costly investigations later if things go wrong.

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