CONCRETE, HARDENED:
COMPRESSIVE STRENGTH OF TEST SPECIMENS

1. SCOPE AND FIELD OF APPLICATION

This NORDTEST method is intended for the determination of the compressive strength of cast or drilled test specimens of hardened concrete made with normally existing rock-type aggregate.

The compressive strength of hardened concrete determined according to this method refers to the medium compressive stress at rupture occurring in a cubical or cylindrical test specimen, when the stress is determined acc. to 4.4.

The method does not state the number of test specimens, nor their age, at the time of testing.

In the main, the method agrees with ISO 4012. With regard to any deviations, see Comments.

2. REFERENCES

NT BUILD 191 CONCRETE, FRESH: SAMPLING
NT BUILD 200 CONCRETE, HARDENED: DIMENSIONS OF TEST SPECIMENS
NT BUILD 201 CONCRETE - MAKING AND CURING OF MOULDED TEST SPECIMENS FOR STRENGTH TESTS

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3. SAMPLING

See NT BUILD 191 and 201 or NT BUILD 202.

The test specimens shall fulfill the demands on shapes, dimensions and flatness acc. to NT BUILD 200.

Test specimens should be manufactured and cured acc. to NT BUILD 201. The measure of the smallest cross section must be three times larger than the nominal maximum particle size in the aggregate.

Core drilled test specimens shall be taken and stored acc. to NT BUILD 202.

4. METHOD OF TEST

4.1 Principle

The compressive strength is determined by loading the test specimen until it breaks in a machine for compressive strength testing.

4.2 Apparatus

Compressive strength testing machine of class 3 or better acc. to NT MECH 001, which, within the area of ultimate load permits the determination of the load with an accuracy within ± 3 % and a progressive increase of the load within the area of 0 – 25 kN/s. The press shall be so constructed that its own deformation during tests does not influence the results.

One should be able to follow the increase in load on a scale, or it should be shown in digits or recorded by a logger.

It should be possible to read the load at the same time as the
machine is being operated and to see the ultimate load when the break occurs.

The loading platens of the machine shall be so rigid and level that their deviations from the starting position during the load does not exceed 0.05 mm within the pressure area. (See Note 1). The surfaces shall have the hardness of HRC 55. The upper loading platen shall be attached to a spherical seat whose tortional center shall be within the pressure area of the platen. In a unloaded condition it should be easily movable.

The lower pressure platen should have marks for facilitating the positioning of the test specimens.

Auxiliary platens may be placed under the test specimen if they fullfill the conditions for flatness and hardness for the pressure platens and if their thickness is at least 25 mm.

Moulds for the manufacture of test specimens acc. to NT BUILD 201 or equipment for the core drilling of test specimens should be acc. to NT BUILD 202.

4.3 Preparation of Test Samples

Test specimens stored in water should be removed from the water at the earliest 30 minutes prior to the testing and be dried so that there is no free water on the load-bearing surfaces.

4.4 Procedure

The following should be performed for each test specimen:

The loading platens in the testing machine should be dried off.

Prior to any levelling, the measures of the test specimen is determined through measuring acc. to NT BUILD 200 and its weight is determined. The density is also calculated.

Note 1 Pressure platens 25 mm thick and with a deviation from their level within ± 0.02 mm in an unloaded condition normally meet these conditions.
The test specimen is placed in the center of pressure platens of the testing machine with an accuracy of ± 1 mm.

Cast cubes should be so placed that they are tested with the load being exerted perpendicularly to the direction of casting.

When the upper loading platen comes into contact with the test specimen, the loading platen should be adjusted so that the platen and the load-bearing surface are parallel.

The compressive load is continuously increased at the rate of 0.8 ± 0.2 MPa/s. The highest load is noted as the ultimate load.

The compressive strength is calculated as the ultimate load divided by the cross section area taken from the measured dimensions as stated above.

**4.5 Expression of Results**

The compressive strength is expressed in MPa (N/mm²) with one decimal figure.

The density is expressed in kg/m³ with the ten unit digit rounded off to 0 or 5.

**4.6 Test Report**

If a test report is submitted, it should contain at least the following information:

a) Name and address of the testing laboratory
b) Date and identification symbols of the report
d) Test method (number and title)
d) Any deviation from the test method
e) Name and address of the person or institution who ordered the test
f) Name and address of the person performing the test
g) Name and address of the manufacturer of the concrete
h) The composition and age of the concrete, if possible
The method deviates from the ISO 4012 with regard to the editing and the content of the test report and the following points:

Point 4.4 ISO states that the rate of load increase should be within $0.6 \pm 0.4$ MPa/s.