



SLOVENSKI STANDARD
SIST EN 679:2001
01-april-2001

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Determination of the compressive strength of autoclaved aerated concrete

Bestimmung der Druckfestigkeit von dampfgehärtetem Porenbeton

Détermination de la résistance à la compression du béton cellulaire autoclavé

Ta slovenski standard je istoveten z: EN 679:1993

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ICS:

91.100.30	Beton in betonski izdelki	Concrete and concrete products
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EUROPEAN STANDARD

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English version

Determination of the compressive strength of autoclaved aerated concrete

Détermination de la résistance à la compression
du béton cellulaire autoclavéBestimmung der Druckfestigkeit von
dampfgenähtem Porenbeton

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This European Standard was approved by CEN on 1993-12-07. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by CEN/TC 177 "Prefabricated reinforced components of autoclaved aerated concrete or lightweight aggregate concrete with open structure".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 1994, and conflicting national standards shall be withdrawn at the latest by June 1994.

The Standard was approved and in accordance with the CEN/CENELC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.



1 Scope

This European Standard specifies the procedure for the determination of the compressive strength of autoclaved aerated concrete.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in the amendment or revision. For undated references the latest edition of the publication referred to applies.

- ISO 4012:1978 Concrete - Determination of compressive strength of test specimens
- EN 678 Determination of dry density of autoclaved aerated concrete
- EN 1353¹⁾ Determination of moisture content of autoclaved aerated concrete.

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3 Principle

The compressive strength is determined on test specimens as the ratio between the rupture load in axial compression and the section of the test specimen perpendicular to the loading direction.

4 Apparatus

- a) a saw for cutting test specimens;
- b) a compression testing machine, preferably hydraulically operated, which meets the requirements of ISO 4012:1978, clause 5;
- c) calipers, capable of reading the dimensions of the test specimens to an accuracy of 0,1 mm;
- d) a ventilated drying oven, capable of maintaining a temperature of $(105 \pm 5)^\circ\text{C}$;
- e) a straight edge, at least 200 mm long, a 0,1 mm-feeler gauge, a 1 mm-feeler gauge, and a square;
- f) a balance, capable of determining the mass of the test specimens to an accuracy of 0,1 %.

1) At present at the draft stage

5 Test specimens

5.1 Sample

The sample for the preparation of the test specimens shall be taken in such a manner that it is representative of the product to be investigated.

NOTE 1: The test specimens may be prepared from prefabricated reinforced components. Alternatively, they may be taken from prefabricated unreinforced components of the same mould.

5.2 Shape and size of test specimens

The test specimens shall be cubes with an edge length of 100 mm. Test specimens of other shapes or sizes may be used, provided that the compressive strength determined on such test specimens can be directly related to the compressive strength determined on 100 mm-cubes.

5.3 Number of test specimens

A test set shall consist of three test specimens.

Whenever possible, one test specimen shall be prepared from the upper third of the component, one from the middle and one from the lower third, in the direction of rise of the mass during manufacture (see figure 1).

The position of the test specimens in the material relative to the rise of the mass shall be shown by the numbering, and the direction of rise shall be marked on the test specimens.

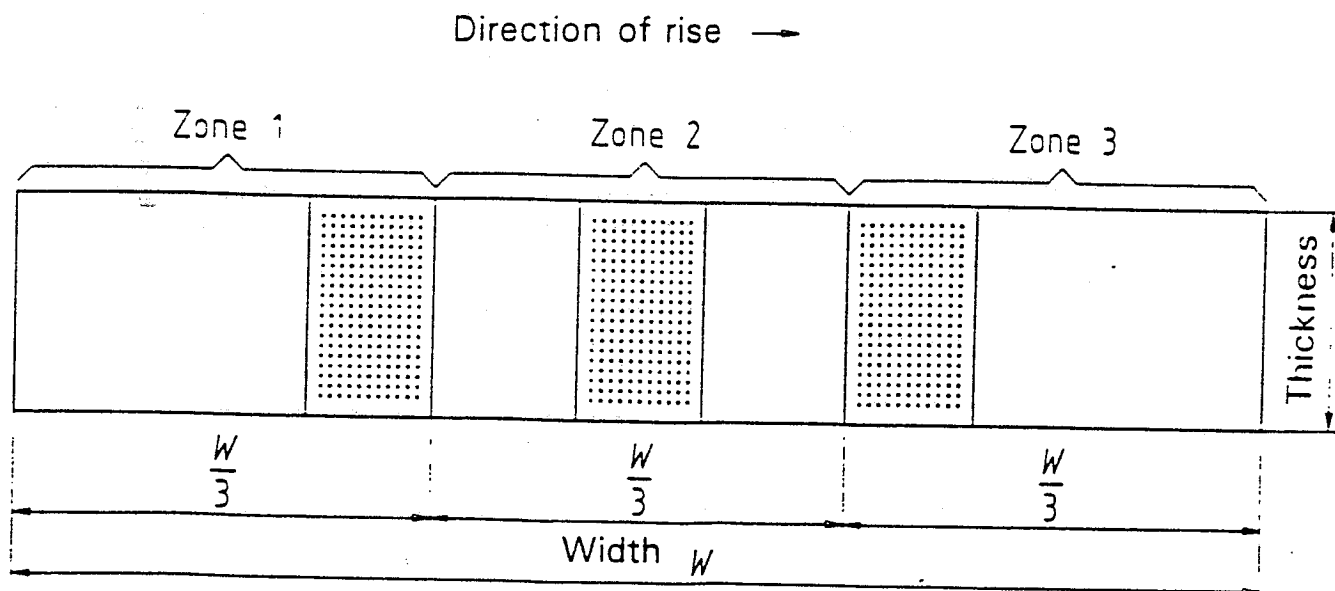


Figure 1: Sampling scheme

5.4 Preparation of test specimens

The test specimens shall be cut by means of a rotating carborundum blade or similar equipment. They shall not contain any reinforcement. All surfaces shall be plane and clean.

The surfaces of the test specimens shall not deviate from planeness by more than 0,1 mm. Planeness shall be checked across the two diagonals using a straight edge and a 0,1 mm-feeler gauge.

The angle between the loadbearing surfaces and the adjacent surfaces shall not deviate from a right angle by more than 1 mm/100 mm. This shall be checked along both orthogonal middle axes of the loadbearing surfaces by means of a square and a 1 mm-feeler gauge or similar instrument.

5.5 Measurement of test specimens and determination of their volume

The dimensions of the test specimens shall be measured to an accuracy of 0,1 mm, using calipers.

Length and width of the loadbearing cross-sectional area, A_c , shall be measured in mid height at two opposite sides, and the cross-sectional area shall be calculated by multiplying the mean values of length and width measurements.

The height perpendicular to the loadbearing cross-sectional area shall be measured in the middle of two opposite sides adjacent to the loadbearing surfaces.

The volume V of the test specimen shall be calculated by multiplying A_c by the mean value of the height measurements.

5.6 Conditioning of test specimens

The test specimens shall be conditioned at a temperature not exceeding 60°C until their moisture content is expected to be $(6 \pm 2) \%$ by mass. This may be estimated by comparing their moist density with the dry density determined in accordance with EN 678 on companion specimens extracted from the same area of the same component (see note 2).

After reaching the specified moisture content, the test specimens shall be stored, protected against moisture changes, for at least 2 h for ensuring thermal equilibrium with the laboratory at $(20 \pm 5)^\circ\text{C}$ prior to the compression test. Immediately before the compression test the moist mass, m_m , of the test specimens shall be determined again, to an accuracy of 0,1 %.

NOTE 2: The expected moisture content $\mu_{m,exp.}$, in % by mass, of a test specimen may be calculated as

$$\mu_{m,exp.} = \frac{\rho_{m,t} - \rho_{comp.}}{\rho_{comp.}} \times 100$$

where:

$\rho_{m,t}$ = m_m/V is the moist density of the test specimen, calculated by dividing its moist mass m_m by its volume V determined according to 5.5, in kilograms per cubic metre;

$\rho_{comp.}$ is the dry density of the companion specimen determined according to EN 678, in kilograms per cubic metre;

6 Testing procedure

6.1 Compression test

The platens of the testing machine shall be wiped clean, and the conditioned test specimen (see 5.6) shall be centred in the testing machine. The load shall be applied axially and perpendicular to the direction of rise.

The test specimen shall be loaded gradually and without shock at a constant rate corresponding to a stress increase of $(0,1 \pm 0,05)$ N/mm² per s until rupture of the test specimen occurs.

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The maximum load carried by the test specimen shall be recorded.

6.2 Determination of actual moisture content and dry density of test specimens

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After the compression test the test specimens shall be dried at (105 ± 5) °C until constant mass in order to determine their actual moisture content at the moment of testing in accordance with EN 1353¹⁾ and their dry density in accordance with EN 678. Care shall be taken that no material is lost.

NOTE 3: If material is lost, the crushed test specimen shall be weighed immediately after the compression test, and its residual volume shall be calculated by multiplying its original volume V by the ratio of the moist masses determined immediately after and before the compression test.

7 Test results

The compressive strength f_{ci} , in newtons per square millimetre, of the test specimen i is determined as follows:

$$f_{ci} = \frac{F_i}{A_{ci}} \quad i = 1, 2, 3$$

¹⁾ See page 3