

Determination of the dry density of autoclaved aerated concrete

The European Standard EN 678:1993 has the status of a
British Standard

UDC 666.973.6.035.55:620.1:531.75

Cooperating organizations

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Switzerland	Association suisse de normalisation
United Kingdom	British Standards Institution

This British Standard, having been prepared under the direction of Technical Committee B/523, was published under the authority of the Standards Board and comes into effect on 15 March 1994

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Contents

	Page
Cooperating organizations	Inside front cover
National foreword	ii
<hr/>	
Foreword	2
Text of EN 678	3
<hr/>	
National annex NA (informative) Committees responsible	Inside back cover
National annex NB (informative) Cross-reference	Inside back cover
<hr/>	

National foreword

This British Standard has been prepared under the direction of Technical Committee B/523, Prefabricated components of reinforced autoclaved aerated concrete and lightweight aggregate concrete with open structure. It is the English language version of EN 678:1993 *Determination of dry density of autoclaved aerated concrete* published by the European Committee for Standardization (CEN).

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 4, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Descriptors: Concrete, aerated concrete, tests, measurements, density, dry density

English version

Determination of the dry density of autoclaved aerated concrete

Détermination de la masse volumique sèche du béton cellulaire autoclavé

Bestimmung der Trockenrohichte von dampfgehärtetem Porenbeton

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.

This European Standard exists 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

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/CENELEC 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 and United Kingdom.

Contents

	Page
Foreword	2
1 Scope	3
2 Normative references	3
3 Principle	3
4 Apparatus	3
5 Test specimens	3
5.1 Sample	3
5.2 Shape and size of test specimens	3
5.3 Number of test specimens	3
5.4 Preparation of test specimens	3
6 Testing procedure	4
6.1 Determination of the volume of the test specimens	4
6.2 Determination of the dry mass of the test specimens	4
7 Test results	4
8 Test report	4
Figure 1 — Sampling scheme	4

1 Scope

This European Standard specifies the procedure for the determination of the dry density 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 it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 679, *Determination of compressive strength of autoclaved aerated concrete*.

3 Principle

Test specimens are taken from prefabricated components. The dry density is determined as the ratio between the mass of the test specimens after drying to constant mass at (105 ± 5) °C and their volume.

4 Apparatus

- a) a *saw*, (for cylindrical test specimens also a core drill) for cutting test specimens;
- b) a *straightedge*, at least 200 mm long, and a 0,1 mm-feeler gauge;
- 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 ± 5) °C;
- e) a *balance*, capable of determining the mass of the test specimens to an accuracy of 0,1 %.

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 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 prisms, cubes, or cylinders with a minimum dimension of at least 50 mm and a volume of at least $0,5 \times 10^{-3} \text{ m}^3$ each.

It is recommended that the dry density be determined on the test specimens used for the determination of the compressive strength according to EN 679.

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.

Alternatively, one single test specimen is sufficient, if it extends over the full height of the rise of the mass and if its volume is at least $1,5 \times 10^{-3} \text{ m}^3$. The dry density determined on such a test specimen is equivalent to the mean value of three individual test specimens.

5.4 Preparation of test specimens

The test specimens shall be cut by means of a saw (or a core drill in the case of cylindrical test specimens).

Plane surfaces shall not deviate from planeness by more than 0,1 mm. Planeness shall be checked across the two diagonals of each surface, using a straightedge and a 0,1 mm-feeler gauge. Deviations shall be corrected by means of grinding, milling, or a similar process.

NOTE Preferably, the test specimens should not contain any reinforcement. If the inclusion of reinforcement cannot be avoided, the mass and the volume of the reinforcement including anticorrosion coating shall be considered in the calculation of the dry density.

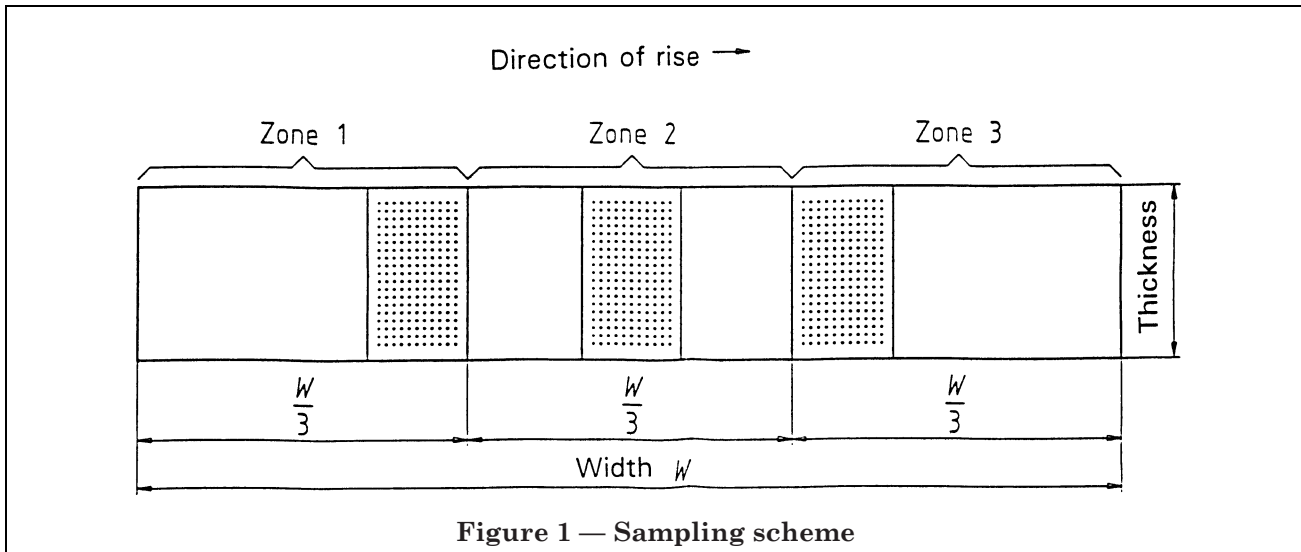


Figure 1 — Sampling scheme

6 Testing procedure

6.1 Determination of the volume of the test specimens

The volume of the individual test specimens is calculated from their dimensions. For this purpose, the dimensions shall be measured at different places to an accuracy of 0,1 mm by means of calipers. The necessary number of individual measurements from which the mean dimensions are calculated depends on the shape, size, and regularity of the surfaces and shall enable determination of the volume V of the test specimen with an error not exceeding 1 %.

6.2 Determination of the dry mass of the test specimens

The test specimens are placed in a ventilated drying oven at $(105 \pm 5) ^\circ\text{C}$ until constant mass is attained. Immediately after removal from the drying oven, the dry mass, m_{di} , of the individual test specimens shall be determined. The error in determining the mass shall not exceed 0,1 % of the mass of the test specimen. The mass of the test specimen is considered constant if after 24 h of further drying it has not changed by more than 0,2 %.

7 Test results

The dry density ρ_i , in kilograms per cubic metre, of each individual test specimen i is calculated as follows:

$$\rho_i = \frac{m_{\text{di}}}{V_i} \quad i = 1, 2, 3$$

where:

m_{di} is the dry mass of the test specimen, determined according to 6.2, in kilograms;

V_i is the volume of the test specimen, determined according to 6.1, in cubic metres.

The dry density of each individual test specimen, ρ_i , shall be expressed to the nearest 5 kg/m³.

The dry density of the product, ρ , in kilograms per cubic metre, is defined as the mean value of the dry densities ρ_i of the three test specimens of the test set:

$$\rho = \frac{1}{3} (\rho_1 + \rho_2 + \rho_3)$$

The dry density of the product, ρ , shall be expressed to the nearest 5 kg/m³.

8 Test report

The test report shall include the following:

- identification of the product;
- date of manufacture or other code;
- place and date of testing, testing institute and person responsible for testing;
- number and date of issue of this European Standard;
- shape, size, and relative position of the test specimens;
- dry density of each individual test specimen and mean value;
- observations on the appearance of the test specimens.

National annex NA (informative)

Committees responsible

The United Kingdom participation in the preparation of this European Standard was entrusted to Technical Committee B/523 upon which the following bodies were represented:

Aggregate Concrete Block Association
Autoclaved Aerated Concrete Products Association
British Masonry Society
British Precast Concrete Federation Ltd.
Department of the Environment (Building Research Establishment)
Federation of Civil Engineering Contractors
Local Authority Organizations

National annex NB (informative)

Cross-reference

Publication referred to	Corresponding British Standard
EN 679:1993	BS EN 679:1994 <i>Determination of compressive strength of autoclaved aerated concrete</i>

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