SLOVENSKI STANDARD

SIST EN 12269-2:2010

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Nadomešča:

SIST EN 12269-2:2004

Določevanje sprijemnosti med armaturnim železom in avtoklaviranim celičastim betonom s preskusom nosilca - 2. del: Dolgotrajni preskus

Determination of the bond behaviour between reinforcing steel and autoclaved aerated concrete by the beam test - Part 2: Long term test

Bestimmung des Verbundverhaltens zwischen Bewehrungsstahl und dampfgehärtetem Porenbeton mit Hilfe der Balkenprüfung - Teil 2: Langzeitprüfverfahren

Détermination du comportement d'adhérence entre les barres d'armature et le béton cellulaire autoclavé selon la méthode d'essai de poutre - Partie 2 : Essai de longue durée

Ta slovenski standard je istoveten z: **EN 12269-2:2010**

ICS:

91.100.30	Beton in betonski izdelki	Concrete and concrete products

SIST EN 12269-2:2010 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12269-2

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ICS 91.080.40; 91.100.30

Supersedes EN 12269-2:2003

English Version

Determination of the bond behaviour between reinforcing steel and autoclaved aerated concrete by the beam test - Part 2: Long term test

Détermination du comportement d'adhérence entre les barres d'armature et le béton cellulaire autoclavé selon la méthode d'essai de poutre - Partie 2 : Essai de longue durée

Bestimmung des Verbundverhaltens zwischen Bewehrungsstahl und dampfgehärtetem Porenbeton mit Hilfe der Balkenprüfung - Teil 2: Langzeitprüfverfahren

This European Standard was approved by CEN on 23 January 2010.

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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 CEN Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 12269-2:2010) has been prepared by Technical Committee CEN/TC 177 “Prefabricated reinforced components of autoclaved aerated concrete or lightweight aggregate concrete with open structure”, the secretariat of which is held by DIN.

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 September 2010, and conflicting national standards shall be withdrawn at the latest by September 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12269-2:2003.

The European Standard EN 12269 consists of the following parts:

— *Part 1: Short term test*;

— *Part 2: Long term test*.

In order to meet the performance requirements as laid down in the product standard for prefabricated components of autoclaved aerated concrete, a number of standardized test methods are necessary.

The main changes with respect to EN 12269-2:2003 are listed below:

a) the clause "Terms and definitions" has been added;

b) the normative references have been updated;

c) provisions on the conditioning of test specimens have been added;

d) the clause on "Apparatus" has been adapted to take account of the latest findings;

e) "long term loading" has been replaced by "cyclic loading" in the clause on "Testing procedure";

f) the requirements for the test report have been expanded.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This document specifies a method of determining the long term bond behaviour between reinforcing bars and autoclaved aerated concrete (AAC) in prefabricated reinforced components according to EN 12602. The test method is conceived to obtain values for the long term bond strength $f_{b,l}$ which are obtained in a final short term test. The test is performed for different combinations of AAC type, bar shape, and corrosion protection systems.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 678, *Determination of the dry density of autoclaved aerated concrete*

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

EN 1353, *Determination of moisture content of autoclaved aerated concrete*

EN 12269-1:2000, *Determination of the bond behaviour between reinforcing steel and autoclaved aerated concrete by the "beam test" — Part 1: Short term test*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
long term bond strength
$f_{b,l}$
bond stress (residual bond strength) achieved at the final short term test

4 Principle

The long term bond behaviour of reinforcing bars embedded in AAC is investigated in two steps as follows:

1) Cyclic loading of a prismatic test specimen by a transverse four point load alternating between F_{min} and F_{max} at a constant frequency for a specified number of cycles at a temperature of (20 ± 5) °C or at a temperature of (50 ± 5) °C. The test specimen contains in longitudinal direction one single reinforcing bar situated on the longitudinal median plane near the bottom surface (see EN 12269-1).

2) Final short term test (in the same condition as in step 1) according to EN 12269-1 on this test specimen in order to determine the long term bond strength $f_{b,l}$ obtained from final short term test.

3) Prior to the test, the test specimens shall be stored with enough free space around them enabling sufficient air circulation for a period of (48 ± 2) h in a room with a constant temperature of (20 ± 5) °C or (50 ± 5) °C.

5 Apparatus

5.1 Saw for cutting test specimens from reinforced components.

5.2 Core drill with a diameter of the cutting edge of (200 to 300) mm, depending on the specimen height (see 6.4), for removing the AAC in the tensile zone of the cross-section in the midspan area of the beam.

5.3 Straight-edge and 0,1 mm feeler gauges for checking the planeness of surface areas where loads and support reactions are transmitted.

5.4 Room capable of maintaining a temperature of (20 ± 5) °C or (50 ± 5) °C, for conditioning of test beams prior to the test and during the execution of the cyclic loading and the final short term test.

5.5 For the cyclic loading: cyclic loading machine with a capacity of at least 20 kN, allowing the application of an alternating transverse four point load (see Figure 1) on a test specimen with a span of 600 mm to 1 200 mm for a specified number of sinusoidal cycles at a constant frequency up to 5 Hz and alternating between load levels F_{min} and F_{max}.

The beam shall rest on two supporting rollers through steel distribution plates having a width of (50 ± 2) mm and a thickness of ≥ 10 mm, extending over the full width of the beam. At least one of the rollers shall be capable of being inclined in a plane perpendicular to the longitudinal axis of the beam.

The supporting rollers shall be placed at a distance of 50 mm from the end surfaces of the beam.

The load shall be applied equally to both beam parts, using a bridge profile resting on two rollers positioned perpendicularly to the longitudinal axis of the beam with a distance of (200 ± 2) mm. Between the rollers and the upper surface of the beam steel distribution plates with a width of (50 ± 2) mm and a thickness of ≥ 10 mm, extending over the full width of the beam, shall be inserted.

Both the supporting rollers and the load-applying rollers shall be manufactured from steel and shall have a circular cross-section with a diameter between 15 mm and 40 mm. Their length shall be at least equal to the width of the beam. The axes of all rollers shall be parallel to each other. Each roller, except one of the supporting ones, shall be capable of rotating around its longitudinal axis and of being inclined in a plane normal to the longitudinal axis of the beam. After correct centring in the testing machine, the axes of inclination of the three inclinable rollers shall be situated on a vertical plane which shall not deviate by more than ± 1 mm from the axis of the compression force of the testing machine.

The middle axis between the loading rollers or the supporting rollers, respectively, shall not deviate from the vertical axis of the testing machine (axis of the vertical compression force) by more than ± 1 mm.

5.6 For the final short term test: same or a similar loading system as for 5.5, but with a capacity of approximately 30 kN.

Deflections shall be determined at midspan by means of a transducer and shall be used for control of rate of movement of the platen of the testing machine or of the loading device.

5.7 Measuring system, capable of simultaneous measuring and registration of the following data:

— longitudinal strain in the bar at midspan (accuracy 2 % of the final measured value);

— slip of the bar at both ends relative to the end surface of the beam (accuracy 0,01 mm).

6 Test specimens

6.1 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.

6.2 Shape and size of test specimens

The test specimens shall be beams according to Figure 1 which are cut from a reinforced component in a way that the longitudinal bar, of which bond is to be tested, is disposed in the vertical centre plane of the beam with a cover of 10 mm to 30 mm with respect to the bottom face. If there are further longitudinal bars in the lower part (tension zone when tested) of the beam, they shall be cut at mid-span. The beam shall contain no transverse reinforcement.

For usual components the following dimensions shall be used:

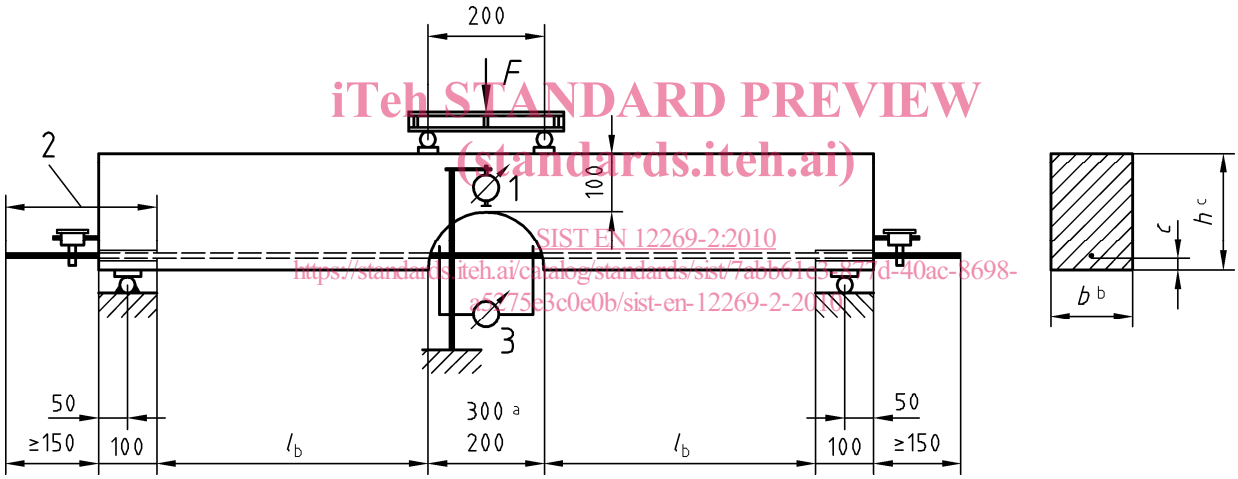
— total height: h = (200 ± 2) mm;

— width: b = (20 ϕ ± 2) mm, where ϕ is the nominal diameter of the steel bar (without corrosion protective coating), in millimetres;

— AAC cover: 10 mm ≤ c ≤ 30 mm.

The total length of the beam shall be chosen such that l_b = (40ϕ ± 50) mm on each side, where l_b is the bond length over which the bar is in contact with the AAC.

Dimensions in millimetres



Key

1 Transducer for vertical displacement
2 Free bar end
3 Strain measuring base
l_b Bond length = (40 ϕ ± 50) mm
c AAC cover
[a] (200 to 250) mm for AAC cover c = (10 to 30) mm or 300 mm for AAC cover c > 30 mm, respectively
[b] b = 20 ϕ, where ϕ is the diameter of the reinforcing bar
[c] h = 200 mm for AAC cover c = (10 to 30) mm and h = 300 mm for AAC cover c > 30 mm

Figure 1 — Test specimen and loading arrangement

If, in exceptional cases, the cover of the longitudinal bar exceeds 30 mm, beams with a total height of h = (300 ± 2) mm shall be used.

At both ends of the beam, the reinforcing bar to be tested shall protrude for at least 150 mm over the vertical end face of the AAC.

6.3 Number of test specimens

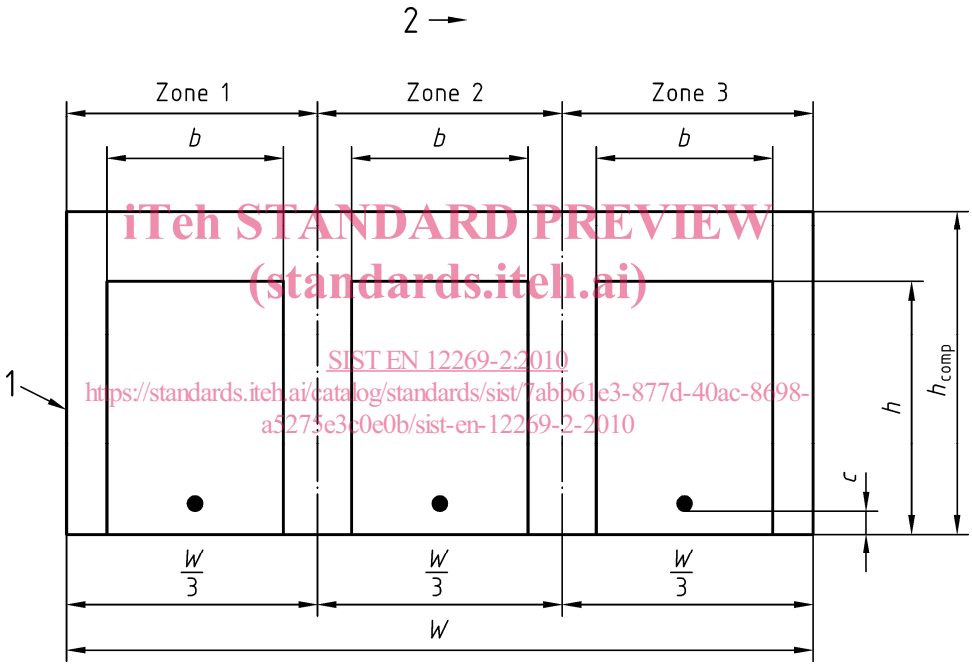
A test set shall consist of three test specimens.

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 2).

6.4 Preparation of test specimens

The test specimens shall be cut from the reinforced component, taking special care to avoid any early damage of bond. All surfaces shall be levelled sufficiently to ensure correct dimensions. The planeness of the surfaces shall be checked along the lines where the loading forces and the support reactions will be applied, by means of a straight edge and, if necessary, by means of feeler gauges. Deviations by more than 0,1 mm in these areas shall be corrected.

At both ends of the beam, the AAC shall be removed from around the bar to be tested over a length of (100 ± 2) mm in order to eliminate the influence of support pressure on bond.



Key

1	Cross-section of component
2	Direction of rise
b	Width of test specimens
c	AAC cover
h	Total height of test specimen
h_{comp}	Height of component
W	Width of component

Figure 2 — Sampling scheme for test specimens

At midspan the beam shall be provided with a semi-cylindrical hole, diameter (200 to 250) mm for beams with a total height of h = (200 ± 2) mm (used for AAC cover c = 10 mm to 30 mm) and (300 ± 2) mm for beams with a total height of h = (300 ± 2) mm (used for AAC cover c > 30 mm). This hole is drilled horizontally (or cut out otherwise), perpendicularly to the longitudinal axis, leaving the bar free over a sufficient length in order to fix a strain measuring device. The corrosion-protective coating shall be carefully removed by mechanical means from that part of the bar, where the strain measuring device is to be attached.