SLOVENSKI STANDARD
SIST EN 1740:2001

01-april-2001

Preskus obnašanja montažnih armiranih elementov iz avtoklaviranega celiļ astega betona ali betona iz lahkega agregata z odprto strukturo pod prevladujoļ o vzdolžno obtežbo (navpiļ ni elementi)

Performance test for prefabricated reinforced components made of autoclaved aerated concrete or lightweight aggregate concrete with open structure under predominantly longitudinal load (vertical components)

Bestimmung des Tragverhaltens von vorgefertigten bewehrten Bauteilen aus dampfgehärtetem Porenbeton oder aus haufwerksporigem Leichtbeton unter vorwiegend in Längsrichtung wirkender Belastung (vertikale Bauteile)

Détermination de la résistance des éléments préfabriqués réalisés en béton cellulaire autoclavé ou en béton de granulats légers a structure ouverte sous charge longitudinale prédominante (composants verticaux)

Ta slovenski standard je istoveten z: **EN 1740:1998**

ICS:

91.100.30	Beton in betonski izdelki	Concrete and concrete products

SIST EN 1740:2001 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1740

April 1998

ICS

Descriptors: concrete, cellular concrete, aggregates, reinforcing materials, prefabricated elements, mechanical tests, determination, mechanical strength, breaking load

English version

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This European Standard was approved by CEN on 25 March 1998.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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

Ref. No. EN 1740:1998 E

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 177 " Prefabricated reinforced components of autoclaved aerated concrete or light-weight aggregate concrete with open structure", the secretariat of which is held by DIN.

In order to meet the performance requirements as laid down in the product standards for prefabricated components of autoclaved aerated concrete and of lightweight aggregate concrete with open structure, a number of standardized test methods are necessary.

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 October 1998, and conflicting national standards shall be withdrawn at the latest by October 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies a method of determining the mechanical performances of pre-fabricated components made of autoclaved aerated concrete (AAC) according to prEN 12602 or lightweight aggregate concrete with open structure (LAC) according to prEN 1520 under longitudinal load which may be combined with transverse load. These performances include:

- the deflections and maximum crack width in the serviceability limit state;
- the loadbearing capacity (failure load);
- the load-(vertical)deformation diagram, if required.

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 678	Determination of dry density of autoclaved aerated concrete
EN 679	Determination of the compressive strength of autoclaved aerated concrete
EN 991	Determination of the dimension of prefabricated reinforced components of autoclaved aerated concrete or lightweight aggregate concrete with open structure
EN 992	Determination of dry density of lightweight aggregate concrete with open structure
EN 1353	Determination of moisture content of autoclaved aerated concrete

EN 1354	Determination of compressive strength of lightweight aggregate concrete with open structure
prEN 1520	Prefabricated components of lightweight aggregate concrete with open structure
prEN 12602	Prefabricated reinforced components of autoclaved aerated concrete

3 Principle

The component is simply supported at its ends in a vertical position and loaded until collapse by a vertical line load with the required eccentricity with respect to the plane of the component, in order to determine the deflection, cracking behaviour, and the loadbearing capacity.

Alternatively, the support at the bottom of the component may be chosen as a rigid support.

The component may be loaded additionally in a horizontal direction by two line loads acting in the outer quarter points of the span and distributed over the full width of the component through rigid steel sections.

4 Apparatus

a) a device for applying the load continuously and without shock, with an accuracy of 3 %;

b) devices for distributing the vertical load and, if required, the vertical support reaction uniformly over the width of the component through pivot arrangements consisting of a steel rod, resting in v-shaped notches of flat steel bars or held otherwise in lateral direction, and two sufficiently stiff load-distribution plates, all these parts extending over the full width of the component (see figure 1);

c) a device for measuring the horizontal midspan deflection to an accuracy of 0,01 mm;

d) (optional) a device for measuring the vertical compression (compressive strain) at midheight near the vertical edges of both faces of the component over a gauge length of at least 150 mm to an accuracy of 0,01 mm;

e) a device for measuring the camber (deflection at midspan in unloaded state before testing), if any, to an accuracy of 1 mm;

f) a device for determining the weight of the component to an accuracy of 3 %, if required.

5 Test specimens

5.1 Sample

The test specimen is a prefabricated reinforced component (whole unit).

It shall be selected in such a manner that it is representative of the product to be investigated.

5.2 Measurement of component

Before the load test, the dimensions of the component shall be measured according to EN 991 and, if required, its weight shall be determined to an accuracy of 3 %.

The camber at midspan in unloaded state before testing (e.g. due to non-uniform shrinkage) shall be measured to an accuracy of 1 mm while the component is resting without restraint on one of its edges in vertical position.

5.3 Conditioning of component

The component shall not be frozen during the load test, and large temperature and moisture gradients within the component shall be avoided.

6 Load test

6.1 Temperature conditions

The test may be carried out at any temperature of the test premises between +5 °C and +40 °C. If the temperature differs by more than ± 5 °C from + 20 °C, this shall be indicated in the test report.

6.2 Support conditions

The supports for the longitudinal load shall be horizontal and extend across the full width of the component.

The load and the reaction forces shall be uniformly distributed over the width of the component. If the end faces of the component are not sufficiently plane, equalizing layers, e.g. consisting of a gypsum or mortar bed or a layer of soft fibre board, shall be provided between the end faces of the component and the load-distribution plates according to 4b).

If an additional transverse load is applied, the component shall be simply supported at both ends in a horizontal direction, and at least one of the supports (that at the end where the vertical load is applied) shall be moveable in vertical direction.

The actual support conditions (including any equalizing layers) shall be described in the test report.

6.3 Loading arrangement

The longitudinal load shall be applied as a line load acting parallel to the plane of the component and being uniformly distributed over the width, with the required eccentricity *e*, if any, perpendicular to the plane of the component (see note). Attention shall be paid that any curvature or camber acts in the same sense as the required eccentricity. The eccentricity in the plane of the component (in the direction of the width) shall be zero.

The eccentricity of the load and of the support reaction shall be adjusted to an accuracy of ± 2 mm.

A typical loading arrangement is shown in figure 1. If required, additional horizontal loads shall be applied in the outer quarter points of the span and distributed over the whole width of the component by means of rigid steel profiles.

The actual loading arrangement shall be described and illustrated in the test report.

NOTE: Usually the same eccentricity is chosen at both ends.

6.4 Testing procedure

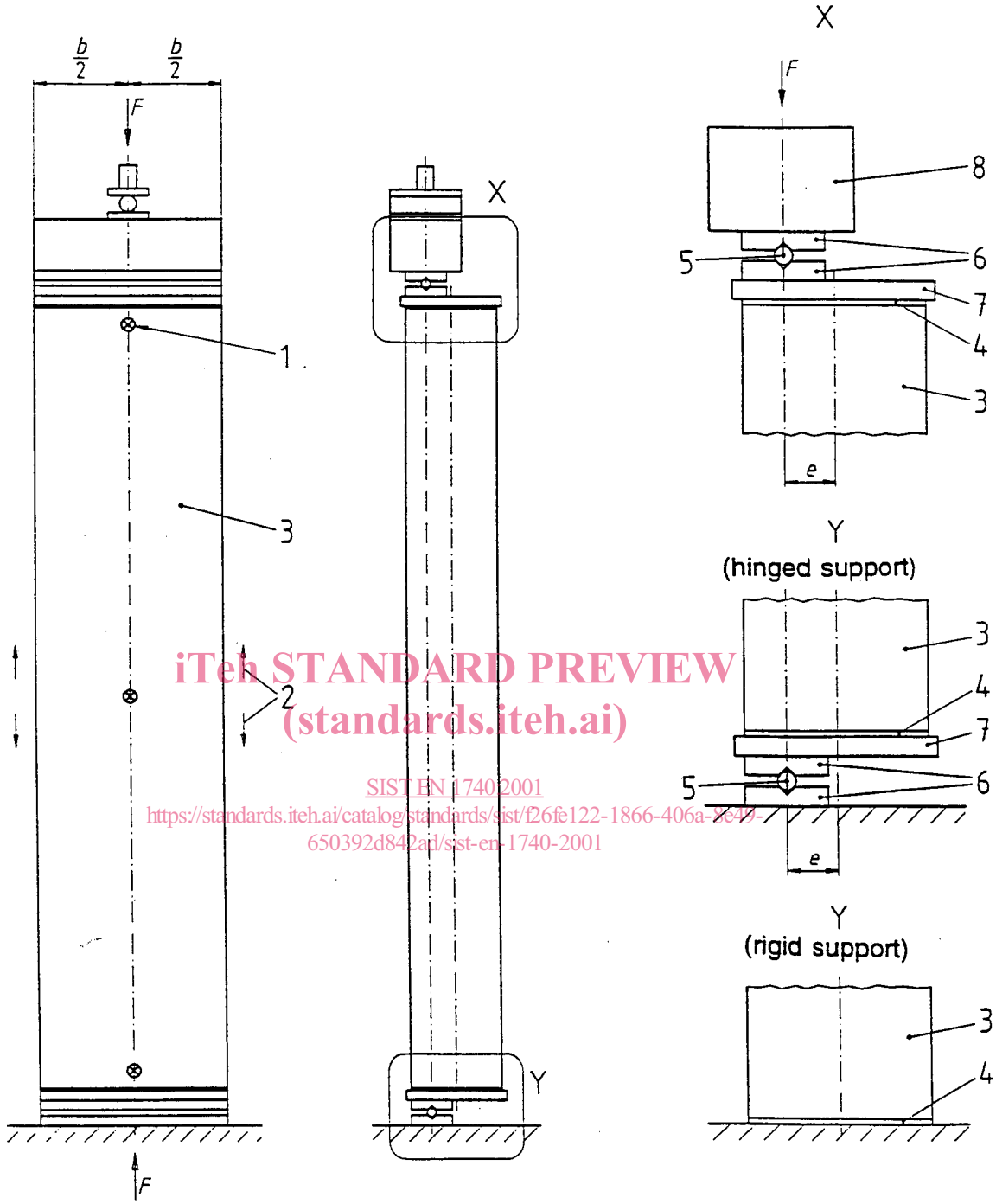
After placing the component in the loading device in a vertical position the required eccentricity of the support and the load shall be adjusted to an accuracy of ± 2 mm. The devices for measuring horizontal deflections and vertical deformation (optional) at midheight shall be arranged according to figure 1. The zero readings shall be made after application of a preload of about (1 to 5) kN.

In the case of combined vertical and horizontal loads, their concurrence shall be specified, and the loading sequence shall be defined.

The load shall be applied in appropriate steps (approximately 1/10 of the expected loadbearing capacity) up to the failure load. The loading rate shall be such that the failure load is reached within (20 to 30) min. The deflection and the vertical deformation (optional) shall be measured for at least four steps below and four steps above the serviceability limit state. Between steps the load shall be increased continuously and without shock. The required level shall be reached within (25 to 35) s and then be maintained constant for 2 min. The deflection and vertical deformation (optional) shall be read after these 2 min.

The test shall be performed in such a manner that the following data can be determined:

- loadbearing capacity (failure load);
- load-deflection and (optional) load-(vertical)deformation diagrams;
- development of cracking and failure.



1 ⊗ Measuring point for determination of horizontal deflection
2 Measuring lines (gauge length ≥ 150 mm) for determination of vertical compression (optional)
3 AAC- or LAC component
4 Equalizing layer, if required
5 Steel bar (e.g. 30 mm diameter) held in v-shaped notches or similar
6 Flat steel plate (e.g. 30 mm x 160 mm)
7 Rigid distribution plate, e.g. steel section, reinforced concrete slab or flat steel plate of at least 25 mm thickness
8 Beam for load distribution
e Eccentricity

Figure 1: Typical loading arrangement