SLOVENSKI STANDARD
SIST EN 1170-4:2001

01-april-2001

Montažni betonski izdelki - Preskusna metoda za steklocementni kompozit - 4. del: Merjenje upogibne trdnosti, "poenostavljeni upogibni preskus"

Precast concrete products - Test method for glass-fibre reinforced cement - Part 4: Measuring bending strength, "Simplified bending test" method

Vorgefertigte Betonerzeugnisse - Prüfverfahren für Glasfaserbeton - Teil 4: Bestimmung der Biegezugfestigkeit, einfache Biegezugprüfung

Produits préfabriqués en béton - Méthode d'essai des composites ciment-verre - Partie 4: Mesure de la résistance en flexion, méthode dite Essai simplifié de flexion

Ta slovenski standard je istoveten z: **EN 1170-4:1997**

ICS:

91.100.30	Beton in betonski izdelki	Concrete and concrete products

SIST EN 1170-4:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1170-4

November 1997

ICS 91.100.30

Descriptors: concrete products, prefabricated elements, composite materials, cements, glass, verification, conformity tests, bend tests, measurements, break strength

English version

Precast concrete products - Test method for glass-fibre reinforced cement - Part 4: Measuring bending strength, "Simplified bending test" method

Produits préfabriqués en béton - Méthode d'essai des composites ciment-verre - Partie 4: Mesure de la résistance en flexion, méthode dite "Essai simplifié de flexion"

Vorgefertigte Betonerzeugnisse - Prüfverfahren für Glasfaserbeton - Teil 4: Bestimmung der Biegezugfestigkeit, einfache Biegezugprüfung

This European Standard was approved by CEN on 29 September 1997.

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 1170-4:1997 E

Contents

Foreword 3

1 Scope 4

2 Normative references 4

3 Symbols and abbreviations 4
3.1 Symbols 4
3.2 Abbreviation 4

4 Apparatus 5

5 Procedure 5
5.1 Test pieces 5
5.2 Test method 7

6 Expression of results 7

7 Interpreting the test 8

8 Test report sheet 8

Annex A (informative) Variability of the production process 9

Annex B (informative) Example of test report sheet 10

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 229 "Precast concrete products", the secretariat of which is held by AFNOR.

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 May 1998, and conflicting national standards shall be withdrawn at the latest by May 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 test method, applicable to glassfibre reinforced cement, for verifying conformity to the bending strength specification, for evaluating the uniformity of the production process and for checking the homogeneity of the compaction.

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.

ISO 7500-1	Metallic materials - Verification of static uniaxial testing machines - Part 1: Tensile testing machines
prEN 1169	Performance criteria for glassfibre reinforced cement - Manufacture control plan

3 Symbols and abbreviations

3.1 Symbols

b : width of test piece, in millimetres ;

d : thickness of test piece (to the nearest 0,1 mm), in millimetres ;

F_{MOR} : failure load, in Newtons ;

l : length of test piece, in millimetres ;

L : span, in millimetres ;

m_w : mass of test piece before drying, “wet mass”, in grammes ;

m_d : mass of test piece after drying, “dry mass”, in grammes ;

W : water content, in percentage by mass ;

σ_{MOR} : stress at failure by bending, in megapascals.

3.2 Abbreviation

GRC : Glassfibre reinforced cement.

4 Apparatus

The apparatus comprises :

- a bending test machine of accuracy meeting the class 3 requirements specified in ISO 7500-1. It is provided with a 4-point bending device, the diameter of the supports being not less than 6 mm and the distance between the supports being fixed (span : 200 mm) or adjustable ;

- a flat board of approximatively (500 x 800) mm made of smooth, easy to be cleaned material. In the case of Premise cement, a frame with the same thickness as the product ;

- a flat-bottomed tank of approximately (500 x 200 x 100) mm filled with water maintained at (20 ± 2) °C ;

- a rule accurate to 0,5 mm ;

- a calliper accurate to 0,1 mm ;

- a ventilated drying oven adjusted to (105 ± 5) °C ;

- a scale with a measuring range 0 kg to 2 kg accurate to 0,1 g.

5 Procedure

5.1 Test pieces

Make a sample panel with no facing layer (i.e. made entirely of GRC),on the flat board, under the same conditions as the actual production it represents : spray or premix.

After 24 h, demould and store the sample panel until the age of 6 days, under the same conditions as for the actual production it represents.

Cut out by sawing at $(50\ ^{+1}_{0})$ mm from the edges, eight test pieces from the positions illustrated in figure 1.

NOTE : The test pieces can also be cut out on the day of demoulding.

Mark the test pieces as shown in figure 1.

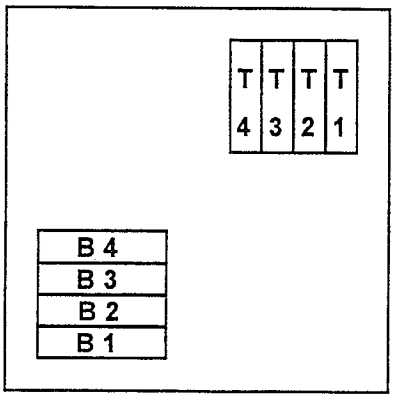

Figure 1 : Position and identification of test pieces

Dimensions of the test pieces :

a) for a testing machine with fixed distance between supports :

- width : (50 ± 2) mm ;
- length : (225 $^{+25}_{0}$) mm ;

b) for a testing machine with adjustable distance between supports ;

- width (50 ± 2) mm ;
- length as a function of the thickness, in accordance with table 1.

Table 1 : Length of test pieces as a function of their thickness

Dimensions in millimetres

Thickness d with a tolerance of ± 0,5 mm	≤ 6,7	6,8 to 10,0	10,1 to 12,5	≥ 12,6
Length l with a tolerance of $^{+25}_{0}$ mm	160	225	275	325

When the eight test pieces have been aged for six days, immerse them in the tank filled with water at (20 ± 2) °C for 24 h so that they have been aged for seven days at the time of the tests.

The test shall be carried out no more than 1/2 h after the test pieces have been removed from the water.

5.2 Test method

Measure the length of each test piece to the nearest millimetre.

Position the test pieces [1] in the testing machine, as shown in figure 2, on the two bottom supports with a span L determined in accordance with table 2.

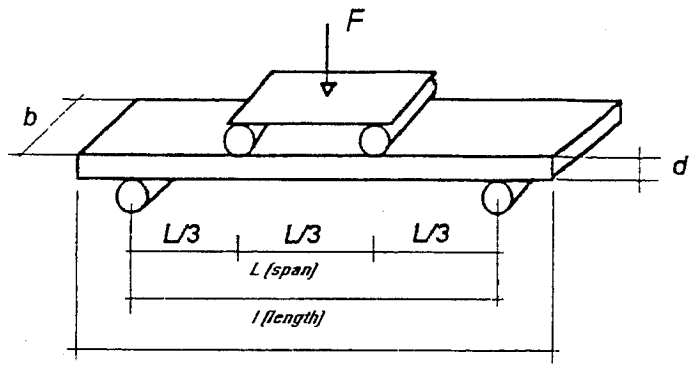

Figure 2 : Position of the test pieces in testing machine

Table 2 : Span of the test pieces as a function of their length

Dimensions in millimeteres

Length l	160	225	275	325
Span L	135	200	250	300

Apply the load smoothly at a rate of (10 ± 1) N/s.

Record the failure load F_{MOR} which is the maximum value read off the machine pressure gauge.

After failure, measure to the nearest 0,1 mm the thickness and width of the test piece at or near the failure location.

Weigh each test piece, i.e. determine m_W (in grammes).

After the failure, place the test pieces in the ventilated drying oven adjusted to (105 ± 5) °C until a constant mass m_d is attained, i.e. until the difference between two weighing results 24 h apart is less than 0,1 %.

6 Expression of results

The stress on failure by bending σ_{MOR} expressed in megapascals is given by the following equation :

$$\sigma_{MOR} = \frac{F_{MOR} \times L}{b \times d^2}$$

---

[1] Test pieces T_1, T_3, B_1 and B_3 are placed "mould" face down on the two bottom supports, test pieces T_2, T_4, B_2 and B_4 are placed with the "mould" face up in contact with the top supports.