BRITISH STANDARD

BS EN
1170-2 : 1998

# Precast concrete products — Test method for glass fibre reinforced cement

## Part 2. Measuring the fibre content in fresh GRC, 'Wash out test'

The European Standard EN 1170-2 : 1997 has the status of a British Standard

ICS 91.100.30

# National foreword

This British Standard is the English language version of EN 1170-2 : 1997 published by the European Committee for Standardization (CEN).

The UK participation in its preparation was entrusted to Technical Committee B/524, Precast concrete products, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

The UK voted against this standard at the CEN Formal Vote stage but the analysis of voting, in accordance with CEN/CENELEC Internal Regulations Part 2 : *Common rules for standards work* resulted in a positive vote. In consequence, the document was accepted as a European Standard.

This standard, together with BS EN 1170 : Parts 1 and 3 to 7, supersedes BS 6432 : 1984 which is withdrawn.

A list of organizations represented on this committee can be obtained on request to its secretary.

**Cross-references**

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled 'International Standards Correspondence Index', or by using the 'Find' facility of the BSI Standards Electronic Catalogue.

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**Summary of pages**

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 6, an inside back cover and a back cover.

This British Standard, having been prepared under the direction of the Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on 15 May 1998



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EUROPEAN STANDARD
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# EN 1170-2

November 1997

ICS 91.100.30

Descriptors: Concrete products, prefabricated elements, composite materials, cements, glass, verification, conformity tests, measurements, fibres, homogeneity, computation

English version

# Precast concrete products — Test method for glass fibre reinforced cement — Part 2: Measuring the fibre content in fresh GRC, 'Wash out test'

Produits préfabriqués en béton — Méthode d'essai des composites ciment-verre — Partie 2: Mesure de la teneur en fibres du CCV frais, méthode dite 'Séparation par lavage'

Vorgefertigte Betonerzeugnisse — Prüfverfahren für Glasfaserbeton — Teil 2: Bestimmung des Fasergehaltes in frischem GFB, Auswaschverfahren

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

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**CEN**

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

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



Ref. No. EN 1170-2 : 1997 E

## 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.

## Contents

## 1 Scope

This European Standard specifies a test method for verifying the fibre content and the uniformity of distribution in the finished products and for monitoring the consumption of fibres.

## 2 Definition, symbols and abbreviation

### 2.1 Definition

For the purposes of this standard, the following definition applies:

**matrix**

Composition of the glass fibre reinforced cement without the fibres. It is made up of the mixture of sand, cement, water and any admixtures and additives.

### 2.2 Symbols

$G_c$ fibre content, in percentage by mass;

$m$ mass, in grams.

### 2.3 Abbreviation

GRC Glass fibre reinforced cement.

## 3 Apparatus

The apparatus comprises:

– *one scale*, with a measuring range 0 kg to 2 kg, accurate to 0,1 g;

– *one drying oven*, capable of maintaining a temperature of (105 ± 5) °C, or a set of three infrared lamps, or a muffle furnace capable of maintaining (500 ± 20) °C;

– *three wire sieves*, with minimum dimensions of (175 × 100 × 25) mm or minimum diameter of 200 mm, comprising stainless steel wire of approximately 0,3 mm diameter with an aperture size of 3 mm. The sieves can be marked 'T' (top), 'M' (middle) and 'B' (bottom).

Soldered sieves cannot be used at temperatures exceeding (105 ± 5) °C;

– *a test board*, of approximately (800 × 800) mm made of smooth, easy to clean material;

– *a knife*, and, if required, a template of inside dimensions (151 ± 2) mm × (51 ± 2) mm to facilitate cutting out;

– *a rule*, accurate to 0,5 mm.

## 4 Procedure

On the flat board, make a sample panel with no facing layer, i.e. made entirely of solid GRC under the same conditions as actual production (premix or spray).

Wait 15 min to 30 min.

Cut out of the panel, (100 ± 10) mm from the edges, three samples with dimensions of approximately (150 ± 2) mm × (50 ± 2) mm corresponding to the positions represented in figure 1.

Weigh each sieve, i.e. $m_1$ (in grams).

Place each sample in its corresponding sieve and weigh, i.e. $m_2$ (in grams).

Wash the sample under a stream of water until all the matrix has been removed.

Dry the sieves in the oven set to (105 ± 5) °C or under the infrared lamps for about 4 h. If a muffle furnace set to (500 ± 20) °C is used, 10 min is sufficient.

Reweigh the sieves and fibre, i.e. $m_3$ (in grams).

Record the result in the test record sheet (see clause **7**).

## 5 Calculations

The fibre content $G_c$, expressed as a percentage by mass, is given by the following equation:

$$G_c = \frac{m_3 - m_1}{m_2 - m_1} \times 100$$

Round the result to the nearest 0,1 %.

## 6 Interpreting the test

The optimum value is determined by the specification and is a function of the end use.

If the result obtained does not comply with the specified value, carry out a second test to validate the information before making adjustments to the process.

NOTE. The deviation between the measured values may be evaluated for each of the three sieves as shown in annex B.

## 7 Test report sheet

The report sheet shall comprise the following elements:

– the date of test;

– the identification of manufacture;

– the specified composition of the GRC;

– the intermediate results $m_1$, $m_2$, $m_3$;

– the fibre content results.

NOTE. An example of the test report sheet is given in annex A.

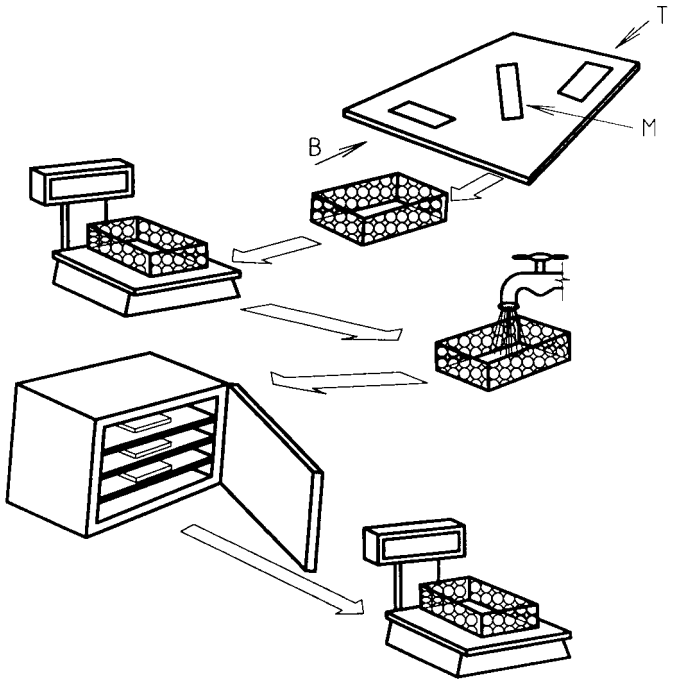


**Figure 1. Procedure**

## Annex A (informative)
## Example of test report sheet

**Production control of:** ..... **By:** .....

| **Order and marking of parts** | **Specified composition**: |
|---|---|
| | Sand: ..... kg Water: ..... l |
| | Cement: ..... kg Plasticizer: ..... kg |
| | Polymer: ..... kg Fibres: ..... kg |
| | Other: ..... kg |
| | Consistency (no. of circle): ..... |
| | Fibre content: ..... % |

**Consistency test** (indicate no. of the circle)

Morning no. | | | | Afternoon no. | | | |

Comments and actions taken if results unacceptable:

**Fibre content of fresh GRC (wash out test)**

| | **Samples** | | **'T' (top)** | **'M' (middle)** | **'B' (bottom)** |
|---|---|---|---|---|---|
| **Masses** g | Sieve | $m_1$ | | | |
| | Sieve and sample | $m_2$ | | | |
| | Sieve and dry fibres | $m_3$ | | | |
| **Fibre content** (%) | $\frac{m_3 - m_1}{m_2 - m_1} \times 100$ | | | | |

Average fibre content (%) =

Comments and actions taken if results unacceptable:

**Spraying test** **Machine:** ..... **Operator:** .....

| **Time** | **Empty bucket** $m_1$ g | **Fibre roll** $m_2$ g | **Bucket + 30 s spray** $m_3$ g | **Fibre roll** $m_4$ g | **Fibre content** $\frac{m_2 - m_4}{m_3 - m_1} \times 100$ (%) | **Setting of air pressure** |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Comments and actions taken if results unacceptable:

Samples taken for: density — bending strength — water absorption(*)

(*) delete term which does not apply

## Annex B (informative)

## Evaluation of the uniformity of fibre distribution

The deviation between the values obtained for each of the three sieves indicates the degree of regularity of fibre distribution. This deviation can be evaluated as indicated in table B.1.

**Table B.1 Evaluation of deviation in fibre distribution**

| Deviation observed for sprayed application | Evaluation of deviation | Deviation observed for premix application |
|---|---|---|
| Less than 1 % | Low to acceptable | Less than 0,5 % |
| Between 1 % and 1,5 % | High | Between 0,5 % and 1 % |
| Greater than 1,5 % | Unacceptable | Greater than 1 % |

*blank*

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