BRITISH STANDARD

BS EN
14488-7:2006

Testing sprayed concrete —

Part 7: Fibre content of fibre reinforced concrete

The European Standard EN 14488-7:2006 has the status of a British Standard

ICS 91.100.30

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 14488-7:2006.

The UK participation in its preparation was entrusted by Technical Committee B/517, Concrete, to Subcommittee B/517/10, Sprayed concrete, 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 UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee 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 Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

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.

The BSI copyright notice displayed in this document indicates when the document was last issued.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 April 2006

ISBN 0 580 48235 9

Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 14488-7

April 2006

ICS 91.100.30

English Version

Testing sprayed concrete - Part 7: Fibre content of fibre reinforced concrete

Essais pour béton projeté - Partie 7 : Teneur en fibres du béton renforcé par des fibres

Prüfung von Spritzbeton - Teil 7: Fasergehalt von faserverstärktem Beton

This European Standard was approved by CEN on 27 February 2006.

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, 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 United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 14488-7:2006: E

Contents

Page

Foreword

This European Standard (EN 14488-7:2006) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, 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 October 2006, and conflicting national standards shall be withdrawn at the latest by December 2007.

This European Standard is part of a series concerned with testing sprayed concrete.

This series EN 14488 ‘Testing sprayed concrete’ includes the following parts:

— Part 1: Sampling fresh and hardened concrete

— Part 2: Compressive strength of young sprayed concrete

— Part 3: Flexural strengths (first peak, ultimate and residual) of fibre reinforced beam specimens

— Part 4: Bond strength of cores by direct tension

— Part 5: Determination of energy absorption capacity of fibre reinforced slab specimens

— Part 6: Thickness of concrete on a substrate

— Part 7: Fibre content of fibre reinforced concrete

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 United Kingdom.

1 Scope

This part of European Standard specifies a method for the determination of the fibre content of sprayed concrete from either a fresh or hardened (i.e. before or after set) concrete sample. Only the method using a fresh sample is appropriate with polymer fibres, while both types are applicable with steel fibres.

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 12350-6, *Testing fresh concrete - Part 6: Density*

EN 12390-7, *Testing hardened concrete - Part 7: Density of hardened concrete*

EN 12504-1, *Testing concrete in structures - Part 1: Cored specimens - Testing, examining and testing in compression*

EN 14488-1, *Testing sprayed concrete - Part 1: Sampling fresh and hardened concrete*

3 Principle

Fibres are extracted from a hardened (Method A) or fresh (Method B) concrete sample and the fibre content is determined from their mass and the volume of the concrete sample.

4 Apparatus

4.1 Balance or scale capable of determining the mass of the concrete sample and extracted fibres to the required accuracy.

4.2 Container to support and suspend a sample in water in order to determine its mass.

4.3 Water tank suitable for the immersion of samples in water at (20 ± 2) °C.

4.4 Trowel, or similar cutting device, made from a non-absorbent material not readily attacked by cement paste, suitable for cutting a concrete sample from fresh, in situ sprayed concrete.

5 Test specimens

5.1 General

Fresh samples may be extracted from the basic mix, the in situ material or from a test panel. Hardened samples may be cut from the in situ material or from a test panel. It should be noted that the fibre content at each of these locations may be different, due to the spraying process. The most appropriate sample type and location should be used, which will depend on the purpose of the quality control and on the compliance requirements of the specification.

For hardened samples the test may be conducted in as received, saturated or oven-dried moisture states.

5.2 Hardened sample (Method A)

Three test cores shall be cut from the in situ material or a test panel in accordance with the requirements of EN 14488-1 and EN 12504-1. The core diameter shall be between 50 mm and 100 mm, and the core length shall be between 75 mm and 150 mm (unless the layer thickness is less than 75 mm, in which case the core length should equal the layer thickness).

5.3 Fresh sample (Method B)

Three test samples (coupons) shall be cut from the in situ material or a test panel with a trowel or similar tool. Fibres protruding from the remaining material shall not be extracted and added to the sample. Wherever possible, each coupon should consist of a single piece of sprayed concrete cut from the full depth of the sprayed concrete layer or panel. The latter is to ensure a representative sample is obtained, taking into account any differences in fibre content with depth. Each sample should weigh between 1 kg and 2 kg.

6 Procedures

6.1 General

The volume of the sample (before fibre extraction) is determined by calculation (using actual dimensions) or by water displacement (reference method).

The mass of the fibres is then determined by weighing, following extraction of the fibres from the fresh or hardened sample.

6.2 Volume of hardened specimen (Method A)

The volume (V_d) of each core shall be determined according to the calculation (using actual dimensions) or weighing in water methods given in EN 12390-7. The hardened density may also be determined in accordance with EN 12350-6.

6.3 Volume of fresh specimen (Method B)

The volume (V_d) of each coupon shall be determined by the weighing in water method given in EN 12350-6. Each coupon is weighed in air, then upon immersion in water. The wet density and volume of the sample are then calculated. These measurements shall be made before final set of the concrete if the fibres are to be extracted according to 6.5.

6.4 Mass of fibres from hardened sample (Method A)

The concrete core shall be crushed in a compression testing machine, or other suitable device, so that all the fibres can be separated from the concrete. Magnetic fibres can be easily removed by a magnet.

The fibres shall be cleaned mechanically to remove any cementitious residue that is clearly visible by naked eye, and then weighed (m_f) to 0,1g.

6.5 Mass of fibres from fresh sample (Method B)

Wash out the fibres from the sprayed concrete sample. The sprayed concrete shall be placed in a sieve or filter equipment where the cement and other fine materials can be washed out such that the fibres can be separated from the mass. With synthetic fibres the sample may be soaked with alcohol and stirred until the fibres float on the surface.

The fibres shall be cleaned, dried and then weighed (m_f) to 0,1 g for steel fibres or 0,01 g for polymer fibres.

7 Expression of results

The fibres content shall be calculated from the determined fibres mass and sample volume, using the formula:

$$C_f = \frac{m_f \times 1000}{V_d} \quad (1)$$

where

C_f is the fibres content in kg/m^3

m_f is the mass of fibres extracted from the sample in g

V_d is the volume of the sample in m^3

8 Test report

The report shall include:

a) identification of the test specimen;

b) description of the fibres type;

c) description of the method (A or B);

d) mass of each specimen to nearest 10 g;

e) mass of the fibres in each specimen to nearest 0,1 or 0,01 g as appropriate;

f) calculated fibres content of each specimen to nearest 1 kg/m^3;

g) the average value of fibres content and the standard deviation;

h) any deviation from this standard;

i) declaration from the person technically responsible for the test that the testing was carried out in accordance with this standard, except as detailed in item h).

The report may also include:

j) density (fresh or hardened) of each specimen to nearest 10 kg/m^3.

9 Accuracy

There are currently no accuracy data for this test.

blank

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL