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SIST EN 14721:2005

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 14721**

August 2005

ICS 91.100.30

English version

## Test method for metallic fibre concrete - Measuring the fibre content in fresh and hardened concrete

Méthode d'essai du béton de fibres métalliques - Mesurage de la teneur en fibres du béton frais ou durci

Prüfverfahren für Beton mit metallischen Fasern - Bestimmung des Fasergehalts in Frisch- und Festbeton

This European Standard was approved by CEN on 27 June 2005.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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<b>Contents</b>		Page
Foreword .....		3
1	Scope .....	4
2	Normative references .....	4
3	Principle.....	4
4	Apparatus .....	4
5	Test specimens .....	5
6	Testing procedures.....	5
7	Expression of results.....	7
8	Test report .....	7
9	Precision.....	7

**iTeh STANDARD PREVIEW**  
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[SIST EN 14721:2005](#)

<https://standards.iteh.ai/catalog/standards/sist/f0c70f08-7917-40fa-936a-7dd0501e1758/sist-en-14721-2005>

## Foreword

This European Standard (EN 14721:2005) 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of an identical text or by endorsement, at the latest by February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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**EN 14721:2005 (E)****1 Scope**

This European Standard specifies two methods of measuring the fibre content of metallic fibre concrete. Method A measures the fibre content of a hardened concrete specimen. Method B measures the fibre content of a fresh concrete specimen.

**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*

**3 Principle**

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

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**4 Apparatus****4.1 Method A**

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4.1.1 Core drill equipment, capable of extracting test cores from the hardened concrete to the volume set out in 5.1.

4.1.2 Callipers and/or rules, capable of measuring the dimensions of test cores to an accuracy of 0,5 mm.

4.1.3 Balance, equipped with a stirrup for weighing the test core in both air and water to an accuracy of 10 g.

4.1.4 Water tank, fitted with a device to maintain water at a constant level and of sufficient size to allow the test core on the stirrup to be fully immersed to a constant depth.

4.1.5 Balance or scales, capable of determining the mass of the extracted metallic fibres to an accuracy of 0,5 g.

**4.2 Method B**

4.2.1 Container, watertight, of sufficient rigidity to retain its shape, made of metal not readily attacked by cement paste, having a smooth internal face, with the rim machined to a plane surface. The rim and base shall be parallel. The smallest dimension of the container shall be at least four times the maximum nominal size of the coarse aggregate in the concrete, but shall be not less than 150 mm. The volume of the container shall be not less than 3 ℓ.

4.2.2 Scoop, or similar sampling device, made from non-absorbent material not readily attacked by cement paste, suitable for taking increments of concrete.

**4.2.3** Means of compacting the concrete, which may be one of the following:

- internal (poker) vibrator with a minimum frequency of approximately 120 Hz, the diameter of the internal vibrator not exceeding approximately one-quarter of the smallest dimension of the container;
- vibrating table with a minimum frequency of approximately 40 Hz.

**4.2.4** Steel trowel or float.

**4.2.5** Balance or scales, capable of determining the mass of the extracted metallic fibres to an accuracy of 0,5 g.

**4.2.6** Sieve or filter equipment, suitable for washing out cement and other fine materials from fresh concrete.

## 5 Test specimens

### 5.1 Method A - Hardened specimen

The hardened test specimen shall consist of 3 or more test cores obtained in accordance with 6.1.1. The volume of a test core shall be 1 ℓ or more. The volume of the test specimen shall be 5 ℓ or more.

### 5.2 Method B - Fresh specimen

The fresh test specimen shall consist of 3 or more test samples obtained in accordance with 6.1.2. The volume of each test sample shall be 3 ℓ or more.

## 6 Testing procedures

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### 6.1 Sampling

#### 6.1.1 Method A

##### 6.1.1.1 Drilling cores

The cores shall be drilled perpendicular to the product surface. The drill shall be kept positioned rigidly during coring.

#### 6.1.2 Method B

##### 6.1.2.1 Filling the container

Clean all the apparatus to use.

Using the scoop take the required number of increments from the discharging stream of concrete from the mixer, disregarding the very first part and the very last part. When sampling from a falling stream, take the increments in such a way as to represent the whole width and thickness of the stream. Deposit the increments into the container.

##### 6.1.2.2 Compacting the concrete

Immediately after placing in the container, the concrete shall be compacted, if necessary, in a manner comparable to that used in the application.

**EN 14721:2005 (E)****6.2 Volume of sample****6.2.1 Method A - Hardened sample**

The volume of each test core shall be determined by calculation using measured values of actual dimensions or by water displacement in compliance with EN 12390-7.

The volume  $V$  of the test core shall be expressed to the nearest 0,02  $\ell$ .

**6.2.2 Method B - Fresh sample**

The volume of the container shall be obtained by calibration in compliance with EN 12350-6.

The volume of each test sample shall be determined by one of either following methods.

In case the container is completely filled after compaction, the concrete shall be levelled off, using the steel trowel or float. Then the volume of the fresh sample is equal to the volume of the container.

In case the container is not completely filled after compacting the concrete, the container shall be placed on a horizontal surface and the volume of water required to fill the container shall be measured. Then the volume of the fresh sample is equal to the volume of the container less the volume of the water added.

The volume  $V$  of the test sample shall be expressed to the nearest 0,02  $\ell$ .

**6.3 Mass of fibre**

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**6.3.1 Method A - Hardened sample**

Each test 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 may be collected by using a magnet.

The collected fibres shall be thoroughly cleaned and then weighed.

The mass  $m$  of the fibres shall be expressed to the nearest 0,5 g.

**6.3.2 Method B - Fresh sample**

Each test sample shall be placed in a sieve or filter equipment where the cement and other fine materials can be washed out so that the fibres can be separated from the mass. Magnetic fibres may be collected directly or after washing out by using a magnet.

The collected fibres shall be cleaned, dried and then weighed.

The mass  $m$  of the fibres shall be expressed to the nearest 0,5 g.