



SLOVENSKI STANDARD

SIST EN 14649:2005

01-junij-2005

Montažni betonski izdelki – Preskusna metoda vzdrževanja napetosti steklenih vlaken v betonu (SIC TEST)

Precast concrete products - Test method for strength retention of glass fibres in cement and concrete (SIC TEST)

Vorgefertigte Betonerzeugnisse - Prüfverfahren zur Bestimmung der Beständigkeit von Glasfasern in Beton (SIC-Prüfung)

Produits préfabriqués en béton - Méthode d'essai de la conservation de la résistance des fibres de verre en contact avec le ciment et le béton (SIC-TEST)

Ta slovenski standard je istoveten z: EN 14649:2005

ICS:

91.100.30	Beton in betonski izdelki	Concrete and concrete products
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EUROPEAN STANDARD

EN 14649

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2005

ICS 91.100.30

English version

Precast concrete products - Test method for strength retention of glass fibres in cement and concrete (SIC TEST)

Produits préfabriqués en béton - Méthode d'essai de la
conservation de la résistance des fibres de verre en contact
avec le ciment et le béton (SIC-TEST)

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Bestimmung der Beständigkeit von Glasfasern in Beton
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This European Standard was approved by CEN on 3 March 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Contents

	Page
Foreword	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Material requirements	6
5 Test methods	9
5.1 Specimen manufacture	9
5.2 Accelerated ageing	10
5.3 Mechanical testing	10
6 Calculation of results	11
Annex A (normative) Sand specification - SIC test	12
Annex B (informative) Strand in cement test results sheet	14
Bibliography	15

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Foreword

This document (EN 14649:2005) 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 October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.

This document includes a Bibliography.

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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Introduction

The Strand in Cement (SIC) test measures the tensile strength of a glass fibre strand in a specified hardened cement or mortar environment. The test enables an assessment to be made of the strength durability of strands of glass fibre after accelerated ageing, under conditions which approximate to those in a cement or concrete precast product.

This test may be used to ensure that an AR glass fibre complies with the specified minimum value of retained strength as defined in the related standard *Precast Concrete products - classification of GRC performances* when tested in standard conditions. The test is a type test, and is appropriate to determine whether the fibre is suitable to use in a standard current matrix, or if necessary using different types of cement or modified cement matrices. The method utilises a strand of glass fibre as used in the commercial glass fibre reinforcement product. In the test the middle section of a length of glass fibre strand is encased within a block of cement paste. The block is cured and aged under defined conditions for a given time and the strength of the encased part of the strand is determined by applying a tensile load at each end of the strand. The test may be performed on strands extracted from a roving or on strands from a cake prior to making up into rovings or chopped strands. Strands of different tex may be assessed.

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1 Scope

This document provides details of equipment, materials and procedure for performing the Strand in Cement test on a sample of glass fibre strand in a hardened cement environment.

Requirements for glass fibres used as reinforcement in cements and concrete are defined in the European Standard *Precast Concrete products - classification of GRC performances*. It applies to continuous filament glass fibre products in the form of rovings, strands, or chopped strands and related products such as nets or chopped strand mats based on these products.

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 1169:1999, *Precast Concrete Products – General rules for factory production control of glass-fibre reinforced cement*.

EN ISO 1889, *Reinforcement yarns – Determination of linear density (ISO 1889:1997)*.

EN ISO 3344, *Reinforcement products – Determination of moisture content (ISO 3344:1997)*.

EN ISO 7500-1, *Metallic materials – Verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Verification and calibration of the force-measuring system (ISO 7500-1:2004)*.

ISO 1887, *Textile glass – Determination of combustible-matter content*.

ISO 1888, *Textile glass – Staple fibres or filaments – Determination of average diameter*.

ISO 3341, *Textile glass – Yarns – Determination of breaking force and breaking elongation*.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1169:1999 and the following apply.

3.1

Alkali Resistant (AR) Glass Fibre

glass fibre product resistant to the alkaline environment of matrices made from hydraulic cement, and manufactured and sold for the reinforcement of cement and concrete products

The resistance is due particularly to a specific composition of the glass.

3.2

filament

single glass fibre as obtained from the manufacturing process

NOTE Adapted from EN ISO 472.

3.3

strand

number of approximately parallel filaments of 10 μm –30 μm individual filament diameter, held together with a size

NOTE Adapted from EN ISO 472 and ISO 1888.

EN 14649:2005 (E)**3.4****cake**

number of strands wound together on a former; an intermediate stage in the manufacturing process, prior to the conversion to "rovings" or "chopped strands"

3.5**roving**

number of parallel strands wound together on a mandrel to form a uniform cylindrical package size

NOTE Adapted from EN ISO 472.

3.6**chopped strands**

number of filaments bonded together with size to form strands in cake form, and then chopped into discrete lengths generally between 3 mm and 50 mm by the glass fibre manufacturer

NOTE Adapted from EN ISO 472.

3.7**size**

coating materials applied to the strand during manufacture to facilitate or improve processing, use and performance of the glass fibres

NOTE Adapted from EN ISO 472.

3.8**tex**

mass in grams per kilometre length of roving or strand, in units of TEX

NOTE Adapted from EN ISO 1889.

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3.9

glass fibre reinforced cement (or concrete) GRC

composite material consisting of a matrix of hydraulic binder reinforced with glass fibres, these materials being compatible

3.10**matrix**

part of glass-fibre reinforced cement including the mixture of sand, cement, water and if necessary additives and admixtures

It is made up of the mixture of sand, cement, water and any additives and admixtures.

3.11**category**

A: strength retention by strand (SIC) test ≥ 250 MPa

B: strength retention by strand (SIC) test ≥ 350 MPa

4 Material requirements

The material shall include:

- a frame to hold the strands and to form ten moulds 30 mm x 10 mm x 10 mm into which cement is cast (Figure 1);
- a scale capable of weighing to 0,1 g;
- a scale capable of weighing to 0,1 mg;

- a curing chamber capable of maintaining the frame assembly at (20 ± 2) °C and at 100 % Relative Humidity;
- a water bath or container, with a ratio: volume 1 dm³ per 10 specimens, capable of maintaining moulded specimens at the required temperature ± 1 °C;
- a testing machine of accuracy meeting the class 2 requirements specified in EN ISO 7500-1 with a load cell of 200 Newton full-scale deflection and a cross head speed of 1 mm/min;
- an oven capable of maintaining a temperature of $(30 - 100)$ °C ± 1 °C;
- storage containers and mixing vessels, spatula etc.

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