

Testing sprayed concrete - Part 4: Bond strength of cores by direct tension

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 14488-4:2005 sisaldab Euroopa standardi EN 14488-4:2005 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 15.07.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 14488-4:2005 consists of the English text of the European standard EN 14488-4:2005.</p> <p>This document is endorsed on 15.07.2005 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: This European Standard describes a means of determining the tensile bond between sprayed concrete and substrate of concrete or rock tested in a laboratory as a direct tension test. Bond strength is defined as the capacity to transfer tension between two layers.</p>	<p>Scope: This European Standard describes a means of determining the tensile bond between sprayed concrete and substrate of concrete or rock tested in a laboratory as a direct tension test. Bond strength is defined as the capacity to transfer tension between two layers.</p>
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ICS 91.100.30

Võtmesõnad: bond strength, concretes, construction, construction materials, laboratory testing, methods, sprayed concrete, strength of materials, tensile force, test equipment, test reports, testing, testing conditions

ICS 91.100.30

English version

Testing sprayed concrete - Part 4: Bond strength of cores by direct tension

Essais pour béton projeté - Partie 4 : Adhérence en traction directe sur carottes

Prüfung von Spritzbeton - Teil 4: Verbundfestigkeit von Bohrkernen bei reinem Zug

This European Standard was approved by CEN on 17 April 2005.

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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.

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Foreword

This document (EN 14488-4:2005) 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 December 2005, 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

This part does not supersede any other European Standard.

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.

1 Scope

This European Standard describes a means of determining the tensile bond between sprayed concrete and substrate of concrete or rock tested in a laboratory as a direct tension test. Bond strength is defined as the capacity to transfer tension between two layers. Bond strength is calculated as the ultimate tensile force divided by the stressed cross-sectional area of a core, drilled out of a sprayed concrete layer together with a portion of the substrate concrete or rock.

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 10002-1, *Metallic materials — Tensile testing – Part 1: Method of test at ambient temperature*

EN 12390-1, *Testing hardened concrete — Part 1: Shape, dimensions and other requirements for specimens and moulds*

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

3 Principle

A core with a diameter (d) of 50 mm–100 mm and a length of more than $2d$ is drilled through the sprayed concrete layer and the concrete or rock substrate. The core is cross-cut so that the bonding zone is near to the middle of the test specimen and the length is $2d$, after which steel dollies are glued onto the ground end surfaces of the core and the test specimen is subjected to increasing stress until it fractures. The values obtained are assessed with regard to the nature of the fracture, and classified as belonging to one of two types:

- a) Fracture in the bonding zone which gives the actual bond strength. This also includes the special case in which no bonding between the layers is obtained.
- b) Fracture where the fracture surface is not entirely in the bonding zone, which means that the bond strength is greater than the value of ultimate stress obtained in this case.

4 Apparatus

4.1 Tensile testing machine of class 2 or better, in accordance with EN 10002-1 which makes it possible to measure the stress within $\pm 2\%$ accuracy, and to regulate the increase in stress within the range of $(0,05 \pm 0,01)$ MPa/s.

4.2 Stone saw and surface grinder

4.3 Steel dollies (two for each test specimen), with diameters equal to the core diameter (± 1 mm) and a thickness of at least 0,4 times the dolly diameter. The surface to be glued shall be flat to within $\pm 0,05$ mm. The other surface is to be fitted with a device which permits application of an axial load at right angles to the surface of the dolly. Alternatively, one steel dolly may be used provided that it is attached to the testing machine by a universal joint.