Sprayed concrete - Part 1: Definitions, specifications and conformity

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 14487-1:2005 sisaldab Euroopa standardi EN 14487-1:2005 ingliskeelset teksti. Käesolev dokument on jõustatud 28.12.2005 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 14487-1:2005 consists of the English text of the European standard EN 14487-1:2005. This document is endorsed on 28.12.2005 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: This European Standard is applicable to sprayed concrete, to be used for repair and upgrading of structures, for new structures and for strengthening of ground.	**Scope:** This European Standard is applicable to sprayed concrete, to be used for repair and upgrading of structures, for new structures and for strengthening of ground.

ICS 01.040.91, 91.100.30

Võtmesõnad: conformity tests, quality assur, quality assurance programme, quality control, reinforced concrete, sample surveys, self- certification schemes, specification (approval), specifications, sprayed concrete, surveillance (approval), terminology, testing, verification

EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 14487-1

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English Version

Sprayed concrete - Part 1: Definitions, specifications and conformity

Béton projeté - Partie 1: Définitions, spécifications et conformité

Spritzbeton - Teil 1: Begriffe, Festlegungen und Konformität

This European Standard was approved by CEN on 25 May 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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Contents

Foreword

This European Standard (EN 14487-1:2005) 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 May 2006, and conflicting national standards shall be withdrawn at the latest by December 2007.

This European Standard has taken EN 206-1 as a basis. Some clauses which apply to sprayed concrete refer to EN 206-1 because of their importance. Other clauses have been modified to meet the specific requirements of sprayed concrete.

This European Standard is only operable with product standards for constituent materials (i.e. cement, aggregates, additions, admixtures, fibres and mixing water) and related test methods for sprayed concrete which form the package defined below. For this reason, the latest date of withdrawal of national standards (DOW) conflicting with this document is determined by TC 104 to be December 2007.

EN 197-1, *Cement — Part 1: Composition, specifications and conformity criteria for common cements*

EN 450-1, *Fly ash for concrete - Part 1: Definition, specifications and conformity criteria*

EN 12620, *Aggregates for concrete*

EN 1008, *Mixing water for concrete — Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete*

EN 934-2, *Admixtures for concrete, mortar and grout — Part 2: Concrete admixtures — Definitions and requirements*, *conformity, marking and labelling*

EN 934-5, *Admixtures for concrete, mortar and grout — Part 5: Admixtures for sprayed concrete — Definitions, requirements, conformity, marking and labelling*

EN 934-6, *Admixtures for concrete, mortar and grout — Part 6: Sampling, conformity control and evaluation of conformity*

EN 13263-1, *Silica fume for concrete — Part 1: Definitions, requirements and conformity criteria*.

EN 14487-2, *Sprayed concrete — Part 2: Execution*

EN 14488 (all parts), *Testing sprayed 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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This European Standard will be applied in Europe under different climatic and geographical conditions, different levels of protection and under different, well-established, regional traditions and experience. Classes for concrete properties have been introduced to cover this situation. Where such general solutions were not possible, the relevant clauses contain permission for the application of EN 206-1 or other standards valid in place.

This European Standard incorporates rules for the use of constituent materials that are covered by European Standards. Other by-products of industrial processes, recycled materials etc. are in current use based on local experience. Until European specifications for these materials are available, this document will not provide rules for their use, but instead refers to the recommendations given in EN 206-1 to apply national standards or provisions valid in the place of use of the concrete.

This European Standard defines tasks for the specifier, producer and user. For example, the specifier is responsible for the specification of concrete, Clauses 5 and 6 and the producer is responsible for conformity and production control, Clause 7. The user is responsible for placing the concrete in the structure. In practice there may be several different parties specifying requirements at various stages of the design and construction process e.g. the client, the designer, the contractor, the concreting sub-contractor. Each is responsible for passing the specified requirements, together with any additional requirements, to the next party in the chain until they reach the producer. In the terms of this document, this final compilation is known as the "specification".

Further explanations and guidance on the application of this document are given in Annex A.

1 Scope

This European Standard is applicable to sprayed concrete, to be used for repair and upgrading of structures, for new structures and for strengthening of ground.

This European Standard covers:

— classification related to consistence of wet mix;

— environmental exposure classes; young, hardened and fibre reinforced concrete;

— requirements for constituent materials, for concrete composition and for basic mix, for fresh and hardened concrete and all types of fibre reinforced sprayed concrete;

— specification for designed and prescribed mixes;

— conformity.

This European Standard is applicable to wet mix as well as dry mix sprayed concrete.

The substrates to which sprayed concrete can be applied include:

— ground (rock and soil);

— sprayed concrete;

— different types of formwork;

— structural components constituted of concrete, masonry and steel;

— drainage materials;

— insulating materials.

Additional or different requirements may be needed for applications not within this document, for instance-refractory uses.

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 197-1, *Cement — Part 1: Composition, specifications and conformity criteria for common cements*

EN 206-1:2000, *Concrete — Part 1: Specification, performance, production and conformity*

EN 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution — Sieving method*

EN 934-2, *Admixtures for concrete, mortar and grout — Part 2: Concrete admixtures — Definitions, requirements, conformity, marking and labelling*

EN 934-5:2005, *Admixtures for concrete, mortar and grout — Part 5: Admixtures for sprayed concrete — Definitions, requirements, conformity, marking and labelling*

EN 934-6, *Admixtures for concrete, mortar and grout — Part 6: Sampling, conformity control and evaluation of conformity*

EN 1008, *Mixing water for concrete — Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete*

EN 1504-3, *Products and systems for protection and repair of concrete structures — Definitions, requirements, quality control and evaluation of conformity — Part 3: Structural and non structural repair*

EN 1542, *Products and systems for the protection and repair of concrete structures – Test methods – Measurement of bond strength by pull-off*

EN 12350-2, *Testing fresh concrete — Part 2: Slump test*

EN 12350-3, *Testing fresh concrete — Part 3: Vebe test*

EN 12350-5, *Testing fresh concrete — Part 5: Flow table test*

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

EN 12390-5, *Testing hardened concrete — Part 5: Flexural strength of test specimens*

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

EN 12390-8, *Testing hardened concrete — Part 8: Depth of penetration of water under pressure*

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

EN 12504-2, *Testing concrete in structures — Part 2: Non-destructive testing — Determination of rebound number*

EN 12620, *Aggregates for concrete*

EN 13412, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of modulus of elasticity in compression*

prEN 14487-2, *Sprayed concrete — Part 2: Execution*

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

prEN 14488-2, *Testing sprayed concrete — Part 2: Compressive strength of young sprayed concrete*

prEN 14488-3, *Testing sprayed concrete — Part 3: Flexural strengths (first peak, ultimate and residual) of fibre reinforced beam specimens*

EN 14488-4, *Testing sprayed concrete — Part 4: Bond strength of cores by direct tension*

prEN 14488-5, *Testing sprayed concrete — Part 5: Determination of energy absorption capacity of fibre reinforced slab specimens*

prEN 14488-7, *Testing sprayed concrete — Part 7: Fibre content of fibre reinforced concrete*

prEN 14889-1:2004, *Fibres for concrete — Part 1: Steel fibres — Definition, specification and conformity*

prEN 14889-2:2004, *Fibres for concrete — Part 2: Polymer fibres — Definition, specification and conformity*

ISO 758, *Liquid chemical products for industrial use — Determination of density at 20 degrees C*

ISO 6782, *Aggregates for concrete — Determination of bulk density*

ISO 6784, *Concrete — Determination of static modulus of elasticity in compression*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1 Mix component

3.1.1 Admixtures

3.1.1.1
admixtures for basic mix
material added during the mixing process of concrete in a quantity not more than 5 % by mass of the cement content of the concrete, to modify the properties of the mix in the fresh and /or hardened state
[EN 934-2]

3.1.1.2 Admixtures for projection

3.1.1.2.1
sprayed concrete set accelerating admixture
admixture to develop very early setting and very early hardening of the sprayed concrete differing from set accelerating admixtures as defined and specified in EN 934-2
[EN 934-5]

3.1.1.2.2
non-alkaline sprayed concrete set accelerating admixture
sprayed concrete set accelerating admixture according to 3.2.2 of EN 934-5:2005 with an alkali content not exceeding 1 % by mass of the admixture
[EN 934-5]

3.1.2
additions
finely divided material used in concrete in order to improve certain properties or to achieve special properties
[EN 206-1]

3.1.3
cement
a finely ground inorganic material which, when mixed with water, forms a paste that sets and hardens by means of hydration reactions and processes and which, after hardening, retains its strength and stability even under water
[EN 206-1]

3.1.4
aggregate
granular material used in construction. Aggregate may be natural, manufactured or re-cycled
[EN 12620]

3.1.5 Fibres

3.1.5.1
steel fibres
steel fibres are straight or deformed pieces of cold-drawn steel wire, straight or deformed cut sheet fibres, melt extracted fibres, shaved cold drawn wire fibres and fibres milled from steel blocks which are suitable to be homogeneously mixed into concrete or mortar
[prEN 14889-1]