

Betoonkonstruktsioonide kaitsmiseks ja parandamiseks kasutatavad tooted. Määratlused, nõuded, kvaliteedikontroll ja vastavuse hindamine. Osa 5: Betoonelementide injekteerimine

Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - Part 5: Concrete injection

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - Part 5: Concrete injection

Produits et systèmes pour la protection et la réparation des structures en béton - Définitions, exigences, maîtrise de la qualité et évaluation de la conformité - Partie 5 : Produits et systèmes d'injection du béton

Produkte und Systeme für den Schutz und die Instandsetzung von Betontragwerken - Definitionen, Anforderungen, Qualitätsüberwachung und Beurteilung der Konformität - Teil 5: Injektion von Betonbauteilen

This European Standard was approved by CEN on 20 January 2013.

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Foreword

This document (EN 1504-5:2013) 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of an identical text or by endorsement, at the latest by October 2013, and conflicting national standards shall be withdrawn at the latest by October 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1504-5:2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

Compared with the previous version, the following changes have been made:

- a) changes in Table 1, Table 2, Table 4, Table 6, Table 7 and Table 8;
- b) modification of Annexes A, B, C and ZA;
- c) revision of normative references;
- d) renumbering of the tables.

EN 1504 consists of the following parts, under the general title *Products and systems for the protection and repair of concrete structures — Definitions, requirements, quality control and evaluation of conformity*:

- *Part 1: Definitions*;
- *Part 2: Surface protection systems for concrete*;
- *Part 3: Structural and non-structural repair*;
- *Part 4: Structural bonding*;
- *Part 5: Concrete injection*;
- *Part 6: Anchoring of reinforcing steel bar*;
- *Part 7: Reinforcement corrosion protection*;
- *Part 8: Quality control and evaluation of conformity*;
- *Part 9: General principles for the use of products and systems*;
- *Part 10: Site application of products and systems and quality control of the works*.

Part 5 of EN 1504 includes a normative Annex A dealing with classification, an informative Annex B dealing with special applications and an informative Annex C dealing with Factory Production Control on products.

It has been developed by Subcommittee 8 “Products and systems for the protection and repair of concrete structures”, the secretariat of which is held by AFNOR.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

Concrete injection is used as a method for the following principles defined in EN 1504-9:

- principle 1 [IP]: Protection against ingress and waterproofing;
- Filling cracks (method 1.5);
- principle 4 [SS]: Structural strengthening;
- Injecting cracks, voids or interstices (method 4.5);
- Filling cracks, voids or interstices (pressureless) (method 4.6).

Injection is used to avoid the harmful consequences of voids and cracks in concrete:

- to achieve impermeability and hence watertightness;
- to avoid penetration of agents that might induce corrosion of steel reinforcement;
- to strengthen the structure by strengthening the concrete.

1 Scope

This European Standard specifies requirements and conformity criteria for the identification, performance (including durability aspects) and safety of injection products for the repair and protection of concrete structures, used for:

- force transmitting filling of cracks, voids and interstices in concrete (category F, see 3.1);
- ductile filling of cracks, voids and interstices in concrete (category D, see 3.1);
- swelling fitted filling of cracks, voids and interstices in concrete (category S, see 3.1).

The performance requirements in this part of this document may not be applicable to highly specialised applications in extreme environmental conditions, e.g. cryogenic use, nor do they cover specialised circumstances such as accidental impact, e.g. due to traffic or ice, or earthquake loading, where specific performance requirements will apply.

This European Standard does not cover:

- the treatment of cracks by widening them and sealing them with an elastomeric sealing compound;
- external filling of cavities, that is, the placement of product outside the structure (generally within the surrounding foundation soils, or at the interface between the structure and the soil); this is covered by EN 12715 [2], under contact grouting;
- preliminary injection works, if necessary, to temporarily stop water passage during waterproofing injection.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 196-3, *Methods of testing cement — Part 3: Determination of setting times and soundness*

EN 196-2, *Methods of testing cement — Part 2: Chemical analysis of cement*

EN 445, *Grout for prestressing tendons — Test methods*

EN 1240, *Adhesives — Determination of hydroxyl value and/or hydroxyl content*

EN 1242, *Adhesives — Determination of isocyanate content*

EN 1504-1:2005, *Products and systems for the protection and repair of concrete structures — Definitions, requirements, quality control and evaluation of conformity — Part 1: Definitions*

EN 1504-8:2004, *Products and systems for the protection and repair of concrete structures — Definitions, requirements, quality control and evaluation of conformity — Part 8: Quality control and evaluation of conformity*

EN 1504-9:2008, *Products and systems for the protection and repair of concrete structures — Definitions, requirements, quality control and evaluation of conformity — Part 9: General principles for the use of products and systems*

EN 1543, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of tensile strength development for polymers*

EN 1767, *Products and systems for the protection and repair of concrete structures — Test methods — Infrared analysis*

EN 1771, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of injectability and splitting test*

EN 1877-1, *Products and systems for the protection and repair of concrete structures — Test methods — Reactive functions related to epoxy resins — Part 1: Determination of epoxy equivalent*

EN 1877-2, *Products and systems for the protection and repair of concrete structures — Test methods — Reactive functions related to epoxy resins — Part 2: Determination of amine functions using the total basicity number*

EN 12190, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of compressive strength of repair mortar*

EN 12614, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of glass transition temperatures of polymers*

EN 12618-1, *Products and systems for the protection and repair of concrete structures — Test methods — Part 1: Adhesion and elongation capacity of injection products with limited ductility*

EN 12618-2:2004, *Products and systems for the protection and repair of concrete structures — Test methods — Part 2: Determination of the adhesion of injection products, with or without thermal cycling — Adhesion by tensile bond strength*

EN 12618-3, *Products and systems for the protection and repair of concrete structures — Test methods — Part 3: Determination of the adhesion of injection products, with or without thermal cycling — Slant shear method*

EN 12637-1, *Products and systems for the protection and repair of concrete structures — Test methods — Compatibility of injection products — Part 1: Compatibility with concrete*

EN 14068, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of watertightness of injected cracks without movement in concrete*

EN 14117, *Products systems for the protection and repair of concrete structures — Test methods — Determination of time of efflux of cementitious injection products*

EN 14497, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of the filtration stability*

EN 14498, *Products and systems for the protection and repair of concrete structures — Test methods — Volume and weight changes of injection products after air drying and water storage cycles*

EN ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles (ISO 527-1)*

EN ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2)*

EN ISO 2811-1, *Paints and varnishes — Determination of density — Part 1: Pyknometer method (ISO 2811-1)*

EN ISO 2811-2, *Paints and varnishes — Determination of density — Part 2: Immersed body (plummet) method (ISO 2811-2)*

EN ISO 3219, *Plastics — Polymers/resins in the liquid state or as emulsions or dispersions — Determination of viscosity using a rotational viscometer with defined shear rate (ISO 3219)*

EN ISO 3251, *Paints, varnishes and plastics — Determination of non-volatile matter content (ISO 3251)*

EN ISO 9514, *Paints and varnishes — Determination of the pot life of multicomponent coating systems — Preparation and conditioning of samples and guidelines for testing (ISO 9514)*

ISO 13320, *Particle size analysis — Laser diffraction methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1504-1:2005, EN 1504-8:2004, EN 1504-9:2008 and the following apply.

3.1
injection products and systems
products and systems which, when injected into a concrete structure, restore the structural integrity and/or durability

[SOURCE: EN 1504-1:2005, 3.2.2]

Note 1 to entry: Injection products can be classified in three categories, according to the intended use.

3.1.1
injection product for force transmitting filling of cracks, voids and interstices in concrete
(F)
product able to bond to the concrete surface and transmit forces across it

Note 1 to entry: Products for injection for force transmitting filling of cracks, voids and interstices can also be used for saturation without receiving a force transmitting bond.

Note 2 to entry: Unless otherwise stated, injection products are intended for filling of cracks, voids and interstices, so that in the following only the wording injection products for filling of cracks is used.

3.1.2
injection product for ductile filling of cracks, voids and interstices in concrete
(D)
flexible product which is able to accommodate subsequent movement

3.1.3
injection product for swelling fitted filling of cracks, voids and interstices in concrete
(S)
product which is able, in the reacted state, to swell repeatedly by water adsorption, where the water molecules are bonded to the molecules of the injection product

Note 1 to entry: This category of products, referred to as gels, are only used for waterproofing purposes for cracks and voids in damp, wet and water - flow conditions.

3.2
injection product formulated with reactive polymer binder
(P)
product where the hardening is related to the curing of a reactive polymer binder; the reactive part of a polymer binder involved in the hardening of the binder is the functional group

3.3
injection product formulated with hydraulic binder
(H)
product where the hardening is related to the hydration reaction of an hydraulic binder

3.4
pot life for injection products
period of time taken by the freshly mixed product to: