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**BS EN 1504-5:2013**



BSI Standards Publication

# **Products and systems for the protection and repair of concrete structures — Definitions, requirements, quality control and evaluation of conformity**

Part 5: Concrete injection

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This British Standard is the UK implementation of EN 1504-5:2013. It supersedes BS EN 1504-5:2004 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/517/8, Protection and repair of concrete structures.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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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.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Management Centre: Avenue Marnix 17, B-1000 Brussels

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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.

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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.

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## 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*