SLOVENSKI STANDARD
SIST EN 1504-6:2006

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Proizvodi in sistemi za zaģļ ito in popravilo betonskih konstrukcij - Definicije, zahteve, kontrola kakovosti in ovrednotenje skladnosti - 6. del: Sidranje armaturne palice

Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - Part 6: Anchoring of reinforcing steel bar

Produkte und Systeme für den Schutz und die Instandsetzung von Betontragwerken - Definitionen, Anforderungen, Qualitätsüberwachung und Beurteilung der Konformität - Teil 6: Verankerung von Bewehrungsstäben

Produits et systemes pour la protection et la réparation des structures en béton - Définitions, exigences, maîtrise de la qualité et évaluation de la conformité - Partie 6 : Ancrage de barres d'acier d'armature

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This European Standard was approved by CEN on 19 July 2006.

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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.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This document (EN 1504-6:2006) 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of an identical text or by endorsement, at the latest by February 2007, and conflicting national standards shall be withdrawn at the latest by December 2008.

It has been developed by sub-committee 8 "Products and systems for the protection and repair of concrete structures" (Secretariat AFNOR).

This Part of EN 1504 does not supersede any other European Standard.

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 Construction Products Directive (89/106/EC).

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

This Part of EN 1504 includes an informative Annex A dealing with factory production control and an informative Annex B dealing with release of dangerous substances.

This Part of this European Standard is one of the Parts of this standard on products and systems for the repair and protection of concrete structures. The other parts are listed below:

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

— *EN 1504-2, Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 2: Surface protection systems for concrete.*

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

— *EN 1504-4, Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 4: Structural bonding.*

— *EN 1504-5, Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 5: Concrete injection.*

— *EN 1504-7, Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 7: Reinforcement corrosion protection.*

— *EN 1504-8, 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.*

— *ENV 1504-9* [1)]*, 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 1504-10, Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity - Part 10: Site application of products and systems and quality control of the works.*

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1) ENV 1504-9 will be modified when adopted as EN according to finalisation of this European Standard

1 Scope

This Part of EN 1504 specifies requirements for the identification, performance (including durability) and safety of products and systems to be used for the anchoring of reinforcing steel (rebar) as used for structural strengthening to ensure the continuity of reinforced concrete structures.

This Part of EN 1504 covers the fields of application in accordance with repair method 4.2 of ENV 1504-9:1997.

NOTE It is assumed that a proper structural assessment of the structural elements to be subjected to repair is carried out by qualified engineers and that the choice of the products and systems to be used as well as the design are based on this assessment.

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 1015-17, *Methods of test for mortar for masonry — Part 17: Determination of water-soluble chloride content of fresh mortars*

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*

ENV 1504-9:1997, *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*

prEN 1544, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of creep under sustained tensile load for synthetic resin products (PC) for the anchoring of reinforcing bars*

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

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*

prEN 1881, *Products and systems for the protection and repair of concrete structures — Test methods — Testing of anchoring products by the pull out method*

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

EN 12192-1, *Products and systems for the protection and repair of concrete structures — Granulometry analysis — Part 1: Test method for dry components of premixed mortar*

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

EN 13294, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of stiffening time*

EN 13395-2, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of workability - Part 2: Test for flow of grout or mortar*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

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 9514:2005)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1504-1:2005, EN 1504-8:2004, ENV 1504-9:1997 and the following apply.

3.1
anchoring product
products based on hydraulic binders or synthetic resins or a mixture of these, installed at a fluid or paste consistency, to grout ribbed reinforcing steel bars (rebars) in hydraulic concrete structures

4 Performance characteristics for intended uses

Table 1 lists the performance characteristics of anchoring products which are required for anchoring of reinforcing steel bars (rebars) according to the “principles” and “methods” defined in ENV 1504-9.

Performance characteristics which are required for “all intended uses” are marked with ■.

Performance requirements are given in 5.2.

Table 1 — Performance characteristics of anchoring products for all intended uses

Performance characteristic	Repair principle
	Structural strengthening Installing rebar with anchoring product
Pull-out	■
Chloride ion content	■
Glass transition temperature [a]	■
Creep under tensile load [a]	■

[a] For polymers only.
■ For all intended uses.

5 Requirements

5.1 Identification requirements

The manufacturer shall undertake selected representative initial identification tests for the product or system as specified in Table 2. These tests may be used to confirm the composition of the product at any time. Acceptable tolerances are given in Table 2. The manufacturer shall hold test records.

Table 2 — Identification requirements

Property	Test method	Tolerance on values supplied by manufacturer [a]
Granulometry of dry components	EN 12192-1	Manufacturers declared value and tolerances
Infra-red analysis [b]	EN 1767	Confirmed by comparison [d]
Compressive strength	EN 12190	Greater than 80 % of manufacturers declared value
Stiffening time	EN 13294	Manufacturers declared value and tolerances
Workability – Grout flow trough	EN 13395-2	Manufacturers declared value and tolerances
Epoxide equivalent [c]	EN 1877-1	± 5 %
Amine function [c]	EN 1877-2	± 6 %
Pot life [b]	EN ISO 9514	± 20 %

[a] Data to be supplied by the manufacturer.

[b] For PCs only.

[c] For epoxy resin products only.

[d] Check for signs of change in composition.

5.2 Performance requirements

The manufacturer shall undertake initial performance tests on anchoring products in accordance with Table 3 and the product shall comply with the requirements.

Table 3 — Performance requirements for anchoring products

Item N°	Performance characteristics	Test method	Requirement
(1)	Pull-out	prEN 1881	Displacement ≤ 0,6 mm at load of 75 KN
(2)	Chloride ion content	EN 1015-17	≤ 0,05 %
(3)	Glass transition temperature[a]	EN 12614	≥ 45 °C or 20 °C above the maximum ambient temperature of the structure in service, whichever is the higher
(4)	Creep under tensile load[a]	prEN 1544	Displacement ≤ 0,6 mm after continuous loading of 50 KN after 3 months
[a] For PC products only.			

5.3 Release of dangerous substances

Hardened anchoring products shall not release substances dangerous to health, hygiene and the environment. See Annex B (informative).

5.4 Reaction to fire

For anchoring products to be used in elements subject to fire requirements the manufacturer shall declare the reaction to fire classification of the anchoring product.

For anchoring products containing equal or less than 1 % by mass or volume (whichever is the most onerous) of homogeneously distributed organic materials the declaration may be fire Class A1 without the need to test.

Hardened anchoring products containing more than 1 % by mass or volume (whichever is the most onerous) of homogeneously distributed organic materials shall be classified in accordance with EN 13501-1 and the appropriate reaction to fire class declared.

6 Sampling

General requirements for sampling are set out in EN 1504-8.

7 Evaluation of conformity

7.1 General

General requirements for procedures for evaluation of conformity are set out in EN 1504-8.

7.2 Initial type testing

General requirements for initial type testing are set out in EN 1504-8.

7.3 Factory production control

The manufacturer shall operate a factory production control (FPC) system to ensure that production continues to meet the identification and performance requirements set out in 5.1 and 5.2 of this part of EN 1504.

For FPC, the manufacturer can select representative identification or performance tests or may select other test methods. Such other FPC test methods shall be correlated to the initial identification and performance test methods to ensure conformity of the product to the requirements of this standard. Such correlation shall be clearly documented in the FPC system.

The FPC shall be undertaken in accordance with EN 1504-8.

Guidance on the frequency of identification and performance tests for FPC is given in Annex A (informative). Frequencies may need to be increased during initial production or following an incident of non-conformity.

Any deviation from this guidance shall be justified by documented evidence which demonstrates equivalence.

7.4 Assessment, surveillance and certification of factory production control (informative)

Where required, provisions for the assessment, surveillance and certification of FPC are given in EN 1504-8:2004, Annex A (informative).

8 Marking and labelling

Requirements for marking and labelling are set out in EN 1504-8.

NOTE For CE marking and labelling ZA.3 applies.