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Proizvodi in sistemi za zaščito 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

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**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**

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 6 : Ancrage
des armatures en acier

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 104.

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Foreword

This document (prEN 1504-6:2004) has been prepared by Technical Committee CEN/TC 104 "Concrete and related products", the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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

This Part 6 of EN 1504 does not supersede any other European standard.

This European Standard 1504 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 standard.

This Part 6 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.*
- prEN 1504-2¹⁾, *Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 2: Surface protection systems.*
- prEN 1504-3¹⁾, *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.*
- prEN 1504-4¹⁾, *Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 4: Structural bonding.*
- prEN 1504-5¹⁾, *Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 5: Concrete injection.*
- prEN 1504-7¹⁾, *Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 7: Reinforcement corrosion protection.*
- prEN 1504-8¹⁾, *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 1504-9²⁾, *Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 9: General principles for use of products and systems.*

1) This document is in preparation.

2) ENV 1504-9 will have to be modified when adopted as EN according to finalisation of this standard.

- *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.*

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1 Scope

This Part of EN 1504 specifies requirements for the identification, performance (including durability) and safety of products 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 4.2 of ENV 1504-9.

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

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 206-1, *Concrete – Part 1: Specification, performance, production and conformity*.

EN 1015-17, *Methods of test for mortars for masonry – Part 17: Determination of chloride ion content*.

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

prEN 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, *Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 9: General principles for 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 load for synthetic resin products (PC) for the anchoring of reinforcing bars*.

prEN 1881, *Products and systems for the protection and repair of concrete structures – Test methods Pull-out test of rebar from concrete*.

EN 1766, *Products and systems for the protection and repair of concrete structures – Test methods – Reference substrates for testing*.

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 function*.

EN 1878, *Products and systems for the protection and repair of concrete structures – Test methods – Thermogravimetric analysis*.

ENV 1992-1-1, *Eurocode 2: Design of concrete structures:- Part 1: General rules and rules for buildings.*

prEN 10080, *Steel for the reinforcement of concrete.*

EN 12190, *Products and systems for the protection and repair of concrete structures – Test methods – Compressive strength.*

EN 12192-1, *Products and systems for the protection and repair of concrete structures – Test methods – 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 temperature 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 repair grout or mortar.*

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

EN ISO 9514, *Determination of pot-life of liquid systems – Preparation and conditioning of samples and guidelines for testing.*

ISO 2736-2, *Concrete test – Test specimens – Part 2: Making and curing of test specimens for strength tests.*

3 Terms and definitions

For the purpose of this standard the following definitions apply in addition to the definitions given in EN 1504-1, prEN 1504-8 and ENV 1504-9.

3.1 anchoring product

hydraulic binders or synthetic resins or a mixture of these, installed at a fluid or paste consistency, to grout 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 Clause 5.2.

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

Property	Repair principles
	Structural strengthening Installing rebar with anchoring product
Pull-out	■
Creep under tensile load ^a	■
Glass transition temperature ^a	■
Chloride ion content	■
^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 12192-1	Confirmed by comparison ^e
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 ^d	EN ISO 9514	± 20 %
^a Data to be supplied by the manufacturer. ^b For all products containing organic polymers. ^c For epoxy resin products only. ^d For synthetic resin products (PC)only. ^e 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°	Property	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 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 prEN 13501-1 and the appropriate reaction to fire class declared.

6 Sampling

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

7 Evaluation of conformity

7.1 General

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

7.2 Initial type testing

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