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BRITISH STANDARD

BS EN
13578:2003

Products and systems for the protection and repair of concrete structure — Test method — Compatibility on wet concrete

The European Standard EN 13578:2003 has the status of a British Standard

ICS 91.080.40

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The UK participation in its preparation was entrusted by Technical Committee B/517, Concrete, to Subcommittee B/517/8, Protection and repair of concrete structures, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

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Summary of pages

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13578

December 2003

ICS 91.080.40

English version

Products and systems for the protection and repair of concrete structure - Test Method - Compatibility on wet concrete

Produits et systèmes pour la protection et la réparation des structures en béton - Méthode d'essai - Compatibilité sur béton humide

Produkte und Systeme für den Schutz und die Instandsetzung von Betontragwerken - Prüfverfahren - Verträglichkeit zwischen Beschichtung und wassergesättigtem, oberflächentrockenem Beton

This European Standard was approved by CEN on 1 September 2003.

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Foreword

This document (EN 13578:2003) has been prepared by Technical Committee CEN/TC 104, "Concrete and related products", the Secretariat of which is held by DIN.

This document has been prepared by Sub-Committee 8 “Products and systems for the protection and repair of concrete structures” (Secretariat AFNOR).

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of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

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1 Scope

This European Standard specifies a method for testing adhesion and perceptible changes in the coating during reverse side water action. The test covers situations such as:

- coating of young, water saturated, surface dry concrete (e.g. coating after 7 days);
- coating of old but water saturated, surface dry concrete;
- coated concrete with moisture from behind (without additional hydrostatic pressure), causing an alkaline attack to the coating.

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

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

EN ISO 1513, *Paints and varnishes – Examination and preparation of samples for testing (ISO 1513:1992).*

EN ISO 15528, *Paints, varnishes and raw materials for paints and varnishes – Sampling (ISO 15528:2000).*

ISO 4628-1, *Paints and varnishes – Evaluation of degradation of coatings –Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 1: General introduction and designation system.*

ISO 4628-2, *Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 2: Assessment of degree of blistering.*

ISO 4628-5, *Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 5: Assessment of degree of flaking.*

3 Principle

Water saturated, surface dry concrete slabs which have been treated with a coating on one face have the uncoated faces exposed to water. A pull-off test and examination for peeling, blistering and discolouration are used to determine changes in the performance of the coating in comparison to a coating on dry concrete.

4 Apparatus

4.1 Laboratory

Maintained at the required temperature within 2 °C and the required relative humidity within 10 %.

4.2 Usual accessories

To apply the coating material to the concrete substrate.

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4.3 **Four concrete slabs** 300 mm x 300 mm x 60 mm

Using a concrete MC (0,40) according to EN 1766 as substrate for the coating.

4.4 Diamond core drill equipment acc. to EN 1542

With a diamond tool, internal nominal diameter 50 mm.

4.5 Pull-off Equipment

For measuring the pull-off strength according to EN 1542.

4.6 Water bath

Within supports on the bottom, see Figure 1.

5 Sampling

Take a representative sample of the product to be tested (or of each product in the case of a multi-coat system), as described in EN ISO 15528.

Examine and prepare each sample for testing as described in EN ISO 1513.

6 Test temperature

The test shall be carried out at the minimum permitted application temperature (MAT) specified by the manufacturer of the coating.

NOTE The MAT is normally between 5 °C and 8 °C.

7 Procedure

7.1 Test pieces

The test pieces shall be concrete slabs (4.3) measuring 300 mm x 300 mm x 60 mm. Four concrete slabs shall be fabricated, cured and stored in accordance with EN 1766 using a concrete MC (0,40) with an aggregate size of 8 mm. The cast face to be used as the surface for the coating shall be prepared according to EN 1766 by grit-blasting.

7.2 Storage of the test pieces

After storage according to EN 1766 all test pieces shall be preconditioned at least for 14 days at a temperature of (21 2) °C/(60 10) % R. H. Two test pieces shall be stored for 7 days under water at the MAT. Two reference test pieces shall be stored for 5 days in a climate (21 2) °C/(60 10) % R. H. and 2 days at the MAT and relative humidity of (75 10) %.

NOTE A relative humidity of (75 10) % is achieved at 5 °C – 8 °C in the climate chamber automatically.

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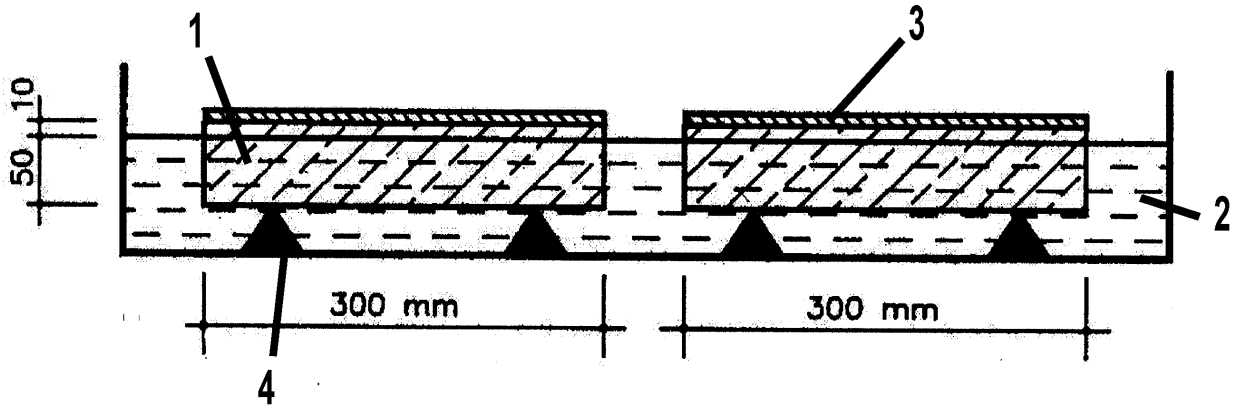
7.3 Coating

a) Coating of the test pieces to be stored under water

The test pieces are removed from the water bath (4.6) and the surfaces to be coated are dabbed with an absorbent paper towel. The specimens are then stored in a horizontal position for 2,5 hours at the MAT and a relative humidity of (75 10) %. The coating materials shall be preconditioned at the MAT and a relative humidity of (75 10) % for 48 h prior to the start of the application process. Mixing and application shall be carried out at the MAT and a relative humidity of (75 10) % in accordance with the manufacturer's instructions. During periods between the application of coats the test pieces are stored in a water bath (4.6) resting on supports which maintain the surface to be coated at a height of 10 mm above the surface of the water (see Figure 1).



Key
1 Concrete slab
2 Water bath, max height 10 mm under coating level
3 Coating
4 Wooden triangular distance strip

Figure 1 — Storage of the test pieces

b) Coating of the reference test pieces

The coating materials shall be preconditioned at MAT for 48 h prior to the start of the application process. Mixing and application shall be carried out at the MAT in accordance with the manufacturer's instructions. During periods between the application of coats the reference test pieces are stored at the MAT and a relative humidity of (75 10) %.

7.4 Storage and testing

After coating the test pieces shall be stored for 56 days flat on the supports in the water bath (4.6) at the MAT in such a way that the water level is 10 mm below the coated surface, see Figure 1. During the 56 days period of storage in the water, the coated surfaces shall be inspected visually at regular intervals (3 to 7 days). Perceptible changes in the coating (peeling, blistering, discolouration) shall be recorded in comparison to the reference test pieces according ISO 4628-1, -2 and -5. The reference test pieces shall be stored for the same time at MAT and (75 10) % relative humidity.

At the end of 56 days storage period the test pieces shall be removed from the bath, any areas with blisters which have been formed are marked with a felt-tip pen and are documented photographically. The test pieces are then stored for 2 days in a climate (21 2) °C/(60 10) % R. H.

The coating shall then be inspected again for blisters and for recession of previous blisters. Immediately afterwards, pull-off testing shall be done according to EN 1542. The pull-off strength and the type of failure shall be recorded.

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The two reference test pieces shall be stored for 2 days in a climate (21 2) °C/(60 10) % R. H. Then the pull-off strength shall be tested according to EN 1542. The pull-off strength and type of failure shall be recorded.

8 Precision

Precision data are currently not available.

9 Test report

The test report shall contain at least the following information:

a) reference to this European Standard;

b) name and address of the test laboratory;

c) identification number and date of the test report;

d) name and address of the manufacturer or supplier of the product(s);

e) name and identification marks or batch number of the product(s);

f) date of supply of the product;

g) date of preparation of the test specimens;

h) date of test and details of the test equipment used;

i) minimum application temperature MAT;

j) preparation of the concrete slabs and their roughness indexes in accordance with EN 1766;

k) number of coats and the method of application of the coating or coating system including waiting times and coverage rates;

l) change in the coating's colour after storage according to ISO 4628-1;

m) degree of blistering after storage according to ISO 4628-2;

n) degree of flaking after storage according to ISO 4628-5;

o) pull-off strength and type of failure of test pieces and reference test pieces according to EN 1542;

p) any deviation from the test method specified;

q) date of test report and signature;

r) any other observations.

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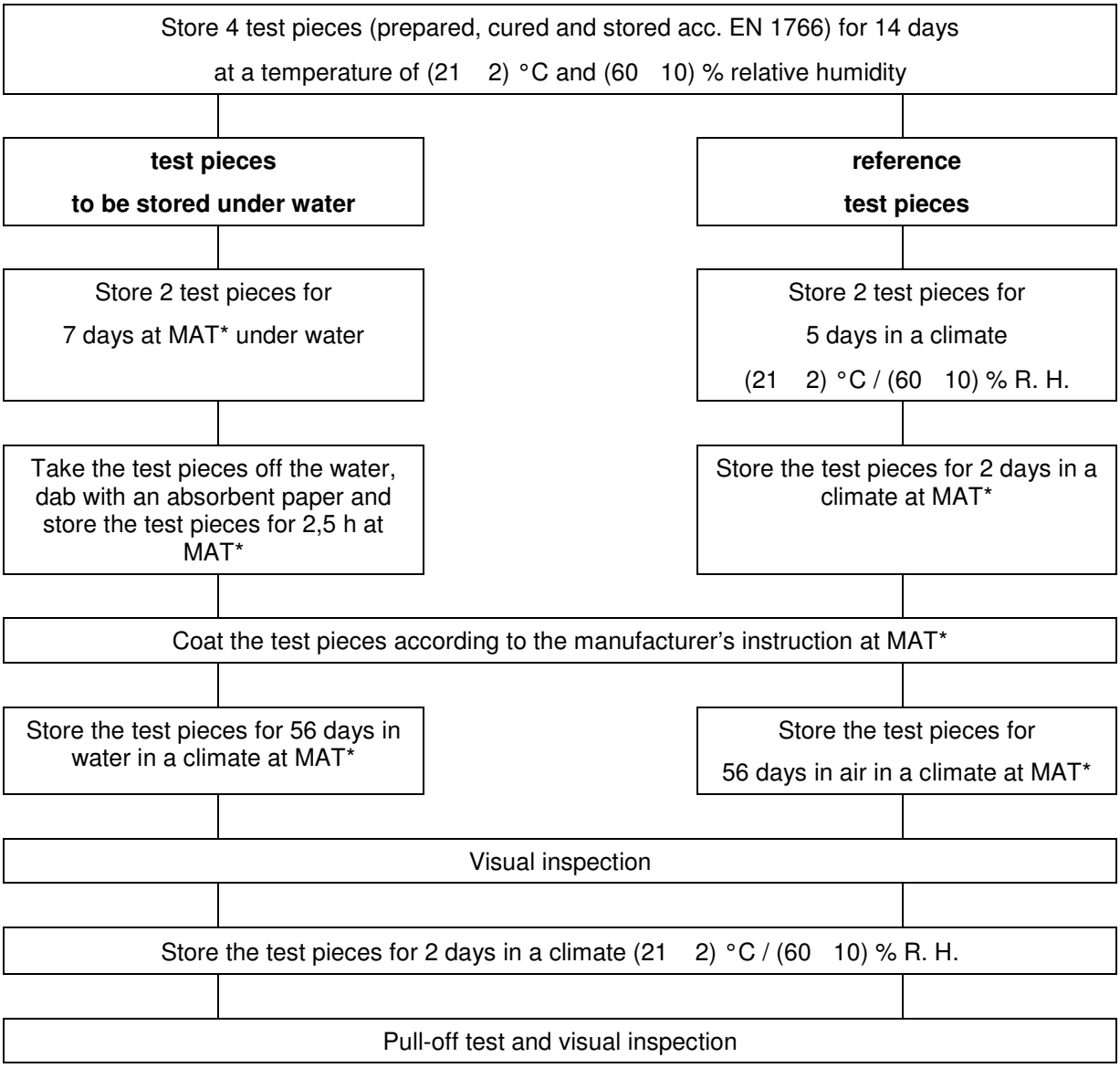

* MAT = Minimum permitted application temperature

Figure 2 — Flow chart of the storage and test procedure

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