



SLOVENSKI STANDARD

SIST EN 1062-7:2004

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Barve in laki - Premazni materiali in premazni sistemi za zunanjo zaščito zidov in betona - 7. del: Določanje lastnosti premoščanja razpok

Paints and varnishes - Coating materials and coating systems for exterior masonry and concrete - Part 7: Determination of crack bridging properties

Beschichtungsstoffe - Beschichtungsstoffe und Beschichtungssysteme für mineralische Substrate und Beton im Außenbereich - Teil 7: Bestimmung der rissüberbrückenden Eigenschaften

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Peintures et vernis - Produits de peinture et systemes de revetement pour maçonnerie et béton extérieurs - Partie 7 : Détermination de la resistance a la fissuration

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87.040 Barve in laki Paints and varnishes

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ICS 87.040

English version

Paints and varnishes - Coating materials and coating systems
for exterior masonry and concrete - Part 7: Determination of
crack bridging properties

Peintures et vernis - Produits de peinture et systèmes de
revêtement pour maçonnerie et béton extérieurs - Partie 7 :
Détermination de la résistance à la fissuration

Beschichtungsstoffe - Beschichtungsstoffe und
Beschichtungssysteme für mineralische Substrate und
Beton im Außenbereich - Teil 7: Bestimmung der
rissüberbrückenden Eigenschaften

This European Standard was approved by CEN on 24 March 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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Foreword

This document (EN 1062-7:2004) has been prepared by Technical Committees CEN/TC 104 "Concrete and related products" and CEN/TC 139 "Paints and varnishes", the secretariats of which are 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 November 2004, and conflicting national standards shall be withdrawn at the latest by November 2004.

EN 1062, *Paints and varnishes – Coating materials and coating systems for exterior masonry and concrete*, consists of the following parts:

- Part 1: Classification
- Part 3: Determination and classification of liquid-water transmission rate (permeability)
- Part 6: Determination of carbon dioxide permeability
- Part 7: Determination of crack bridging properties
- Part 11: Methods of conditioning before testing

Annexes A and B are normative. Annex C is informative.

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

Introduction

This is one of a number of parts of EN 1062 dealing with test methods for coating materials and coating systems for masonry and concrete.

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1 Scope

This European Standard specifies two methods for determining the crack-bridging properties of coating materials, coating systems and related products, intended for exterior masonry and concrete. It should be read in conjunction with EN 1062-1 and prEN 1504-2.

It also gives a classification of coatings on the basis of their crack-bridging properties.

NOTE The method to be used for a particular product or system should be agreed between the interested parties.

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 196-1, *Methods of testing cement — Part 1: Determination of strength*.

EN 971-1:1996, *Paints and varnishes - Terms and definitions for coating materials - Part 1: General terms*.

EN 1062-11, *Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete - Part 11: Methods of conditioning before testing*.

EN 1766:2000, *Products and systems for the protection and repair of concrete structures — Test methods — Reference concretes for testing* standards.iteh.ai/catalog/standards/sist/e27bbd6a-e31c-4232-bac1-dd78f4c42ace/sist-en-1062-7-2004

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)*.

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1

coating system

sum total of the coats of coating materials which are to be applied or which have been applied to a substrate [EN 971-1:1996]

3.2

crack

first visible or measurable failure through the coating, coating system or substrate

3.3

crack bridging

ability of the coating or coating system to take up the elongation resulting from the movement of the crack sides (3.4)

3.4

crack sides

surfaces of the break in the substrate that are generated when the substrate is marking the crack

3.5**crack width**

mean distance of the crack sides (3.4) measured on the surface of the substrate

3.6**nominal crack point**

place in the substrate where the crack will occur

3.7**substrate**

surface to which a coating material is applied or is to be applied [EN 971-1:1996]

4 Principle

After coating the substrate, a defined crack is made in the substrate at a nominal crack point. The applied coating is stretched over this crack. The mechanical stress is applied to the coating using one of the following methods:

Method A: The crack width is continuously enlarged at a defined speed. The measurement is taken when either failure occurs in the coating or coating system or when the required crack width is reached.

Method B: The crack width varies periodically within defined limits. The measurement is taken when either failure occurs in the coating or the coating system or the dynamic cycle is completed.

The crack-bridging properties can be determined at different temperatures.

Annexes A and B, respectively, specify test conditions for methods A and B and lay down classes for the crack-bridging properties on the basis of the respective test conditions. Annex C describes examples of suitable test procedures which meet the further requirements specified for methods A and B.

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5 Apparatus

The test apparatus for changing and controlling the crack width at specified temperatures shall ensure that the movement of the cracks lies between given limits, and that shearing (horizontal and vertical movement) of the crack sides is avoided during the determination.

It shall be provided with a device for maintaining the temperature at which the determination of the crack bridging properties is to be carried out. The tolerance of the test temperature shall be ± 2 K.

Devices for measuring the crack width, e.g. extension measuring strip or inductive path finder, accurate to ± 5 μm , shall be provided. These measuring devices shall be suitable to monitor the change of the crack width during the test (8.3.2 and 8.3.3).

6 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.

7 Test pieces

7.1 Substrate

The substrate shall consist of either:

concrete complying with the requirements of EN 1766, using a test mortar MC (0,45) with an aggregate size 0 mm to 8 mm,

or:

mortar complying with the requirements of EN 196-1, using a test mortar with 0 mm to 2 mm standard sand and CEM I 42,5 R.

Both types of substrate shall be prepared as described in 6.4 and 6.5 of EN 1766:2000.

Store these substrates in accordance with EN 1062-11 for at least 7 days at $(21 \pm 2) ^\circ\text{C}$ and $(60 \pm 10) \%$ relative humidity.

If specified, carry out a surface preparation, either using a metallic brush or by abrasive-blasting in accordance with EN 1766, using grit abrasive.

Other substrates and their preparation can be agreed between the interested parties.

7.2 Number and dimensions

Usually, three test pieces are used. The preparation and dimensions of the test pieces are given in annex C.

NOTE Test pieces of larger dimensions facilitate the application of the coating under practical conditions and a more uniform film thickness will be achieved.

7.3 Coating and conditioning of the substrates

Before coating measure the roughness index in accordance with EN 1766.

For preparation of the test pieces, coat the substrate and cure the test piece in accordance with the manufacturer's instructions.

Condition the test pieces in accordance with EN 1062-11 prior to testing. The conditioning method shall be agreed between the interested parties and stated in the test report.

7.4 Cracking of the test pieces

Make an immediate crack into the coated substrate of the test piece at $23 ^\circ\text{C}$ (see annex C). The crack width shall be $\leq 100 \mu\text{m}$. The nominal crack point shall be in the middle of the length of the test pieces.

8 Procedure

8.1 Preparation of the test apparatus

Mount the devices for measuring the crack width on to the test piece on both sides of the crack. Align the test piece in the test apparatus in such a manner that the relative movement of the test piece and the apparatus is negligible in relation to the crack movement.

NOTE 1 If necessary, the device for measuring the crack width may be mounted to the movable parts of the test apparatus.

NOTE 2 The test piece can be mounted directly in the test apparatus or be fixed in the apparatus, e.g. with steel clips fixed on the surface or with reinforcement bars in the substrate.

8.2 Test temperature

Condition the test pieces at the test temperature specified in annex A or B (see 8.3) prior to testing and start the measurement when the test pieces and the test apparatus have stabilized at the test temperature.

8.3 Measurement of the crack-bridging properties of the coating

8.3.1 Preparation

Apply force to the test piece in the test apparatus, following the procedures described in 8.3.2 or 8.3.3 respectively.

8.3.2 Method A: Continuous opening of the crack

Open the crack continuously at the test temperature until the coating shows failure, using a speed of 0,05 mm/min or 0,5 mm/min (see annex A).

8.3.3 Method B: Cyclic opening of the crack

Change periodically the crack width at the test temperature as defined in annex B. The curve is defined by frequency f , amplitude $w/2$ and mean width of the crack.

The measurement will be finished when a crack in the coating or coating systems occurs or the dynamic cycle is finished.

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9 Expression of results

9.1 Method A: Continuous opening of the crack

Note the crack width in the substrate at which first failure in the coating or coating system in the area of the crack occurs.

9.2 Method B: Periodical change of the crack width

Note whether the coating shows failure or not. Failures are cracks on the surface or cracks from underneath the coating. Describe the type of cracking in the test report.

NOTE Cracks from underneath the coating become visible when the test piece is cut into slices rectangular to the crack.

10 Precision

Precision data are currently not available.

11 Test report

The test report shall contain at least the following information:

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- a) details necessary to identify the product tested;
- b) reference to this European Standard (EN 1062-7);
- c) nature and the dimensions of the substrate;
- d) preparation of the substrate and its roughness index in accordance with EN 1766:2000, clause 7;
- e) number of coats and the method of application of the coating or coating system including waiting times and spreading rates;
- f) method and extent of conditioning before testing;
- g) procedure for inducing the crack;
- h) test method used (method A or method B);
- i) for method A: the test conditions in accordance with annex A;
- j) for method B: the test conditions in accordance with annex B;
- k) test temperature;
- l) film thickness of the coating in the area of the crack in the substrate;
- m) disbonded area in the vicinity of the crack;
- n) type and extent of cracking, as indicated in 9.2;
- o) any deviation from the test methods specified;
- p) date of the test;
- q) classification of the crack-bridging ability of the coating or coating system.

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