

# SLOVENSKI STANDARD SIST EN 12272-3:2004

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Surface dressing - Test methods - Part 3: Determination of binder aggregate adhesivity by the Vialit plate shock test method

Oberflächenbehandlung - Prüfverfahren - Teil 3: Bestimmung des Adhäsionsvermögens von Bindemittel und Gesteinskörnuung mit dem Schlagprüfverfahren (standards.iteh.ai)

Enduits superficiels - Méthode d'essai<u>is</u> Partie<u>3</u>; <u>Déte</u>rmination de l'adhésivité liantsgranulats par l'essai<u>na</u><u>la</u><u>plague</u><u>Vialit</u><u>alog</u>/standards/sist/c2ac6bb1-25ba-4036-b460-4f072d1a9299/sist-en-12272-3-2004</u>

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#### SIST EN 12272-3:2004

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# EN 12272-3

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# Surface dressing - Test method - Part 3: Determination of binder aggregate adhesivity by the Vialit plate shock test method

Enduits superficiels - Méthode d'essai - Partie 3: Détermination de l'adhésivité liants-granulats par mesure de la cohésion Vialit Oberflächenbehandlung - Prüfverfahren - Teil 3: Bestimmung des Adhäsionsvermögens von Bindemitteln und Gesteinskörnung mit dem Schlagprüfverfahren

This European Standard was approved by CEN on 21 November 2002.

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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 Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION COMITÉ EUROPÉEN DE NORMALISATION EUROPÄISCHES KOMITEE FÜR NORMUNG

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#### SIST EN 12272-3:2004

## EN 12272-3:2003 (E)

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# Foreword

This document (EN 12272-3:2003) has been prepared by Technical Committee CEN/TC 227 "Road materials", 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of an identical text or by endorsement, at the latest by July 2003, and conflicting national standards shall be withdrawn at the latest by April 2005.

This European Standard is one of a series of standards as listed below:

EN 12272-1, Surface dressing — Test method — Part 1: Rate of spread and accuracy of spread of binder and chippings.

prEN 12272-2, Surface dressing — Test method — Part 2: Visual assessment of defects.

EN 12272-3, Surface dressing — Test method — Part 3: Determination of binder aggregate adhesivity by the Vialit plate shock test method.

Annexes A, B, C and D are informative.

**The STANDARD PREVIEW** According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard; Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom, Market Standard, St

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## Introduction

The adhesion between binder and chippings is the basis of successful surface dressing. It is important that this bond can be obtained, initially, at the moment of construction and be ensured in cool conditions when the adhesivity problems become dominant binder with damp or dry and dusty chippings. A knowledge of adhesivity enables the choice of a binder and aggregate type for minimum risk, especially for early and late season work.

#### 1 Scope

This European Standard specifies the measurement of the binder aggregate adhesivity, and the influence of adhesion agents or interfacial dopes an adhesion characteristics as an aid to design binder aggregate systems for surface dressing. It is not intended that this method is used on site for quality control.

This European Standard specifies methods of measurement of:

- the mechanical adhesion of the binder to the surface of the aggregate;
- the active adhesivity of the binder to the chippings;
- the improvement of the mechanical adhesion and active adhesivity by adding an adhesion agent either into the mass of the binder or by spraying the interface between binder and chippings;
- the wetting temperature of the binder to the aggregate;
- \_\_\_\_\_ the variation of adhesivity below the fragility temperature/sist/c2ac6bb1-25ba-4036-b460-

4f072d1a9299/sist-en-12272-3-2004

This test method is suitable for:

- all the hydrocarbon binders used for surface dressings (e.g. conventional or polymer modified binders, fluxed or cut-back binders or, conventional or polymer modified bituminous emulsions);
- all the aggregate types used for surface dressings;
- following aggregate product sizes:
  - set 1: 2/5 mm, 5/8 mm, 8/11 mm and 11/16 mm;
  - set 2: 2/6 mm, 4/6 mm, 6/10 mm and 10/14 mm.
- NOTE Further information concerning the purpose of the test may be found in annex D.

#### 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).

ISO 48, Rubber, vulcanized or thermoplastic — Determination of hardness (Hardness between 10 IRHD and 100 IRHD).

### 3 Terms and definitions

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

#### 3.1

#### active adhesivity

necessary to bond damp chippings in their natural state

#### 3.2

#### mechanical adhesion

necessary to bond the dry chippings with their natural dust or fines making an inhibiting screen

#### 3.3

#### wetting temperature

lowest temperature of the binder on the plate, just prior to applying the chippings, at which the number of all the stained chippings either bonded to the plate or fallen, after the shock test, is at least 90 % of the chippings

#### 3.4

#### fragility temperature

lowest test temperature at which 90 % aggregates remain bonded to the plate

#### 3.5

#### test temperature

temperature at which the plates with the binder and the chippings are conditioned before the shock test

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# 4 Active adhesivity and mechanical adhesioniteh.ai)

#### 4.1 Description

#### <u>SIST EN 12272-3:2004</u>

The required quantity of binder is heated to spraying temperature and spread evenly an a steel plate. The test is performed at  $(5 \pm 1)$  °C.

50 or 100 graded chippings are laid down on the binder and rolled if a hot binder is used.

The prepared plate is turned over and put on 3-pointed supports.

A steel ball is made to fall 500 mm three times onto the plate within a 10 s period.

The adhesivity value is determined as the sum of number of chippings remaining bonded to the plate and the number of fallen chippings which are stained by the binder.

NOTE If the chippings are treated chemically or washed on site or an interfacial adhesion agent (dope) used in construction, then this should be simulated in the test method. If polymer modified binders are used which need special site conditions, e. g. road temperatures > 10 °C or heated chippings, then again the test should reflect these constraints and the report modified accordingly, e. g. increase temperature of chippings to 10 °C.

#### 4.2 Apparatus

#### 4.2.1 Flat steel plates (see Figure 1)

Flat steel plates with a rim of 2 mm to 3 mm height and with following dimensions:

- side  $(200 \pm 1) \text{ mm} \times (200 \pm 1) \text{ mm};$
- thickness  $(2,0 \pm 0,2)$  mm.

The plates should be flat manufactured with a tolerance of 0,2 mm across the total length in any direction. The maximum tolerance after usage shall be 0,5 mm.

Dimensions in millimetres



Figure 1 — Flat steel plate

#### 4.2.2 3-pointed supports

A device composed of a rigid base with 3-pointed supports, a vertical support ending in a lightly angled slide  $(3,0 \pm 0,5)^\circ$  to launch the ball, see Figure 2.



Figure 2 — 3-pointed supports

Key

Level

Ball

1

2

**Dimensions in millimetres** 

#### 4.2.3 Steel ball

Mass  $(510 \pm 10)$  g, diameter  $(50,0 \pm 0,5)$  mm.

#### 4.2.4 Rubber wheel roller (see Figure 3)

Thickness of the hard rubber:  $(15 \pm 2)$  mm;

mass: (25 ± 1) kg;

useful width:  $(260 \pm 10)$  mm (see Figure 3);

hardness of the rubber shall be Shore 40/150 in accordance with ISO 48.



#### Key

- 1 Rubber thickness (15  $\pm$  2) mm
- 2 Roller mass (25 ±1) kg

#### Figure 3 — Rubber wheel roller

#### 4.2.5 Sprayer

For applying adhesion agent (dope) as an interfacial layer between binder and chippings if required.

#### 4.2.6 Hygrometer

Accurate to 5 % at 90 % humidity.

#### 4.2.7 Balance

Accurate to 0,1 g, range at least 1 000 g.

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#### 4.2.8 Climatic chambers

Capable of maintaining temperatures of the samples to cover the range  $(30 \pm 1)$  °C to  $(-25 \pm 1)$  °C and a humidity greater than 90 %.

#### 4.2.9 Oven

Capable of heating chippings or binder e.g.  $(50 \pm 5)$  °C to  $(170 \pm 5)$  °C.

#### 4.2.10 Auxiliary items

- Spatula;
- metallic box which can be hermatically sealed;
- basket made of a metallic gauze;
- timing device of accuracy to ± 1 s.

#### 4.3 Procedure

#### 4.3.1 Preparation of the binder

# 4.3.1.1 Quantity **iTeh STANDARD PREVIEW**

The binder rate of spread used for the test shall be: dards.iteh.ai)

- 0,7 kg/m<sup>2</sup> when the chipping size is 4/6 mm; SIST EN 12272-3:2004
- 1,0 kg/m<sup>2</sup> when the chipping sizes are 5/8/mm, 6/10 mm or 8/71 arm or 8/72 arms
- 41072d1a9299/sist-eh-12272-3-200
- 1,3 kg/m<sup>2</sup> when the chipping sizes are 10/14 mm or 11/16 mm.

When a bitumen emulsion is tested, the above quantities apply to the residual binder after breaking and total evaporation of the water content.

#### 4.3.1.2 Temperature

At least 0,5 kg of binder shall be warmed up to spraying temperature typically used on site to obtain an even spread.

#### 4.3.2 Preparation of the chippings

#### 4.3.2.1 Quantity

- 100 chippings shall be used with the sizes 4/6 mm, 5/8 mm, 6/10 mm or 8/11 mm;
- 50 chippings shall be used with the sizes 10/14 mm or 11/16 mm.

When choosing chippings for the sample, any obviously oversized, undersized or flaky chippings shall be rejected.

#### 4.3.2.2 Treatment for mechanical adhesion test

Put the chippings with their dust and fines in a carton and place it in a ventilated oven at  $(50 \pm 1)$  °C for  $(24 \pm 1)$  h.

Put the carton containing the chippings into a box which is then hermatically sealed and placed in a temperature controlled chamber at  $(5 \pm 1)$  °C for  $(24 \pm 1)$  h.

#### 4.3.2.3 Treatment for active adhesivity test

Put the chippings with their dust and fines in a basket made of a metallic gauze and place it in a climatic chamber at  $(5 \pm 1)$  °C with relative humidity greater than 90 % for  $(24 \pm 1)$  h.

#### 4.3.3 Preparation of the plates

Clean and dry the plates before each test.

Weigh out the required quantity of binder warmed up to the spraying temperature and apply it to the plate uniformly with a spatula after checking with a spirit-level that the support is horizontal.

To obtain a uniform thickness of the binder film, the plate may be heated to a maximum temperature of 50 °C, for a maximum period of 5 min.

Put the plate with the binder in a climatic chamber at  $(5 \pm 1)$  °C, close by the samples, for  $(20 \pm 2)$  min.

#### 4.3.4 Spreading and rolling (binders excluding emulsions)

Take the chippings from the climatic chamber and place them evenly on the binder.

If an interfacial adhesion agent (dope) is used, spray it just prior to the application of the chippings.

Carry out the rolling with the rubber roller by three passes in one direction and three passes in a crosswise iTeh STANDARD PREVIEW

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#### 4.3.5 Spreading (emulsions)

Take the chippings from the climatic chamber and place them gently and uniformly onto the emulsion before any breaking of the emulsion occurs; rolling shall not be carried out.

Put the plate with the emulsion and chippings in a forced draft ventilated climatic chamber at room temperature (between 20 °C and 30 °C) for (24  $\pm$  1) h.

The water content is totally evaporated when constant mass is achieved. Constant mass is deemed to be achieved when the difference between successive weighings at half hourly intervals does not exceed 0,1 % of the mass.

#### 4.3.6 Temperatures setting

Take the plates with the binder or residual binder of the emulsion and the chippings, and put them in a climatic chamber at  $(5 \pm 1)$  °C, close by the samples, for  $(20 \pm 2)$  min.

#### 4.3.7 Implementation

Each test shall be carried out within 1 min under the same conditions and, successively, with three different plates to obtain three measurement values. The apparatus shall be placed on a hard base.

Check, using a spirit-level that the 3-pointed support is level. Adjust, if necessary, by means of the three levelling screws in the base.

Remove the plate from the climatic chamber and place it upside down an the 3-pointed supports so that the chippings are underneath.

Place the metallic ball in the holder, let the ball drop three times within 10 s.

After the third shock, examine the plate and count the chippings as follows:

— number of fallen chippings unstained by the binder *a*';