



**SLOVENSKI STANDARD**  
**SIST EN 12272-1:2002**

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**Površinske prevleke - Preskusne metode - 1. del: Količina pobrizga veziva in posipa drobirja**

Surface dressing - Test methods - Part 1: Rate of spread and accuracy of spread of binder and chippings

Oberflächenbehandlung - Prüfverfahren - Teil 1: Dosierung und Querverteilung von Bindemitteln und Splitt

Enduits superficiels d'usure - Méthodes d'essai - Partie 1: Taux d'épandage et régularité transversale du liant et des gravillons

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 12272-1**

February 2002

ICS 93.080.20

English version

## Surface dressing - Test methods - Part 1: Rate of spread and accuracy of spread of binder and chippings

Enduits superficiels d'usure - Méthodes d'essai - Partie 1:  
Taux d'épandage et régularité transversale du liant et des  
gravillons

Oberflächenbehandlung - Prüfverfahren - Teil 1: Dosierung  
und Querverteilung von Bindemitteln und Splitt

This European Standard was approved by CEN on 9 November 2001.

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 Management Centre 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 Management Centre has the same status as the official versions.

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## Foreword

This document EN 12272-1:2002 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of an identical text or by endorsement, at the latest by August 2002, and conflicting national standards shall be withdrawn at the latest by June 2004.

In this standard the annexes A and C are normative and the annexes B and D informative.

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

EN 12272-1, *Surface dressing – Test methods – Part 1: Rate of spread and accuracy of spread of binder and chippings.*

prEN 12272-2, *Surface dressing – Test methods – Part 2: Visual assessment of defects.*

prEN 12272-3, *Surface dressing – Test methods – Part 3: Determination of binder aggregate adhesivity by the vialit plate shock test method; German version prEN 12272-3:1997.*

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, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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**EN 12272-1:2002 (E)****1 Scope**

This European Standard specifies test methods for determining the rates of spread and accuracy of spread of binder and chippings of a surface dressing on a section of road at a given time. It is also applicable to surface dressings on airfields and other trafficked areas.

The test methods are used on site to check the ability of binder sprayers and chipping spreaders to meet the intended rates of spread and tolerances and coefficients of variation.

The test methods for measuring the rates of spread and accuracy of spread of binders and chippings are not applicable to combined chipping-binder spreaders.

**2 Normative references**

Not applicable.

**3 Terms and definitions**

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

**3.1 surface dressing**

surface treatment consisting of the successive laying of at least one layer of binder and at least one layer of chippings

**3.2 chippings**

coarse aggregate within a narrow grading range, practically free of fines

NOTE Chippings can have specified values for strength, soundness, shape, polishing resistance, resistance to abrasion, purity, durability and affinity to bituminous binder.

**3.3 rate of spread of binder**

average mass of binder in kilograms per square metre ( $\text{kg}/\text{m}^2$ ), applied to the road surface when measured in accordance with this European Standard

**3.4 rate of spread of chippings**

average bulk volume in litres per square metre ( $\text{l}/\text{m}^2$ ) or, mass in kilograms per square metre ( $\text{kg}/\text{m}^2$ ) applied to the road surface, when measured in accordance with this European Standard

**3.5 proportional range**

difference between the maximum and minimum individual values of rates of spread of binder or chippings determined divided by the mean value, using the test methods in this European Standard

**3.6 accuracy of spread of binder**

Coefficient of variation of the mass of binder applied to the road surface when measured in accordance with this European Standard. The value and graph indicate the ability of the sprayer to apply binder evenly across the road

**3.7 accuracy of spread of chippings**

Coefficient of variation of the mass of chippings applied to the road surface when measured in accordance with this European Standard. The value and graph indicate the ability of the chipping spreader to apply the chippings evenly across the road

## 4 Determination of the rate of spread of binder

### 4.1 Principle

Samples of the binder sprayed by the binder sprayer are collected to determine the average rate of spread. At least five trays, boards or tiles are used, each with a minimum area of 0,1 m<sup>2</sup> and having a minimum combined area of 0,5 m<sup>2</sup>, spaced evenly across the full width of the road to be sprayed. Alternatively, a continuous strip of tiles or boards abutting each other is arranged across this entire width.

### 4.2 Apparatus

#### 4.2.1 Trays

Rectangular trays of metal or other material sufficiently robust to resist deformation in use. (Steel plate 2 mm thick is suitable).

NOTE The trays can contain an absorbent material to inhibit binder flow.

The internal dimensions of each tray in millimetres (mm) shall be the following:

- Side length (250 ± 2) mm to (500 ± 2) mm;
- Height (5 ± 2) mm to (10 ± 2) mm.

A set of trays used for a test shall not vary in side dimensions by more than 10 mm from each other.

#### 4.2.2 Tiles or absorbent fibre boards

Rectangular carpet tiles or absorbent fibre boards, sufficiently absorbent to hold at least 1,5 times the specified rate of binder without loss of binder, e.g. flowing off whilst spraying or transferring to bags or penetration through the tile or board.

The dimensions of the tiles or boards (exposed area to collect binder) in millimetres (mm) shall be the following:

- Side length (250 + 2) mm to (500 + 2) mm;
- Thickness maximum 25 mm.

The tiles or boards may be larger than the maximum dimension but shall be masked by tape to give the maximum dimension.

A set of trays used for a test shall not vary in side dimensions by more than 10 mm from each other.

#### 4.2.3 Ruler

Ruler, with a minimum length of 500 mm to measure the dimension of the trays, boards or tiles to the nearest 1 mm.

**EN 12272-1:2002 (E)****4.2.4 Portable balance**

Portable balance, readable to 0,1 g and of sufficient capacity to weigh one tray with 1,5 x the maximum rate of spread of binder.

**4.2.5 Plastic bags**

Plastic bags, lightweight and capable of containing the binder and tray or board or tile for weighing without any loss by leakage or evaporation.

**4.2.6 Tape**

Adhesive tape, used to hold the trays, boards or tiles to the road and to mask them to the required dimensions. When removed, the tape shall not damage the masked parts of absorbent boards or carpet tiles so as to ensure there is no loss in mass of the underlying material.

**4.3 Procedure****4.3.1 Preparation of the trays, carpet tiles or absorbent fibre board**

Mark the trays or carpet tiles or absorbent fibre boards with an indelible identification. Insert an absorbent material as a liner into each tray. Weigh the trays, the carpet tiles or absorbent fibre boards together with a plastic bag, to the nearest 1 g and record these masses as the mass of each sampling device before spraying.

**4.3.2 Location and placement of the tray, carpet tiles or absorbent fibre board**

The test site shall be at least 30 m from the start of the spraying operation.

Space the trays, carpet tiles or absorbent fibre boards across the width of road which is to be sprayed with binder, and at least 200 mm from the edge as shown in Figure 1. If adhesive tape is used to secure the carpet tiles or absorbent fibre board to the road during spraying, measure the length and width of each of the areas exposed to the binder spray to the nearest 5 mm for the calculation of the exposed area.

NOTE 1 When the rates of transverse distribution are intentionally different in the same transverse profile then the trays, boards or carpet tiles related to the same measurement should be placed in areas where the intended rate of spread is the same.

NOTE 2 Care should be taken to ensure that when spray curtains are being used, to avoid touching the trays, boards or tiles.



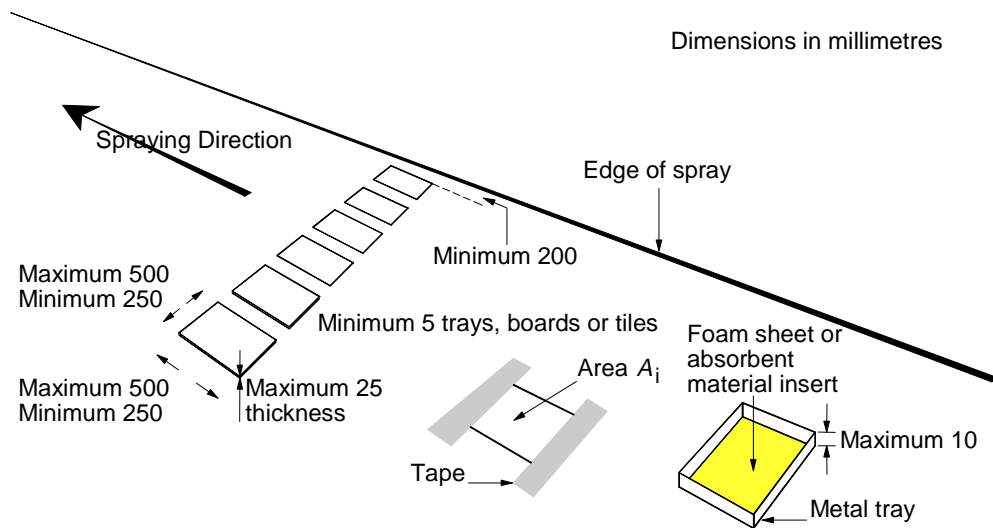


Figure 1 — Trays or carpet tiles or absorbent fibre boards, diagrammatic

#### 4.3.3 Removal and weighing of the trays, carpet tiles or absorbent fibre boards

Within 3 min of the binder being sprayed onto the road, but before any chippings are applied, remove the trays, carpet tiles or absorbent fibre board from the road surface. Care shall be taken not to lose or gain any binder. Then insert each sampling device into its own plastic bag before weighing it to the nearest 1 g. Record the mass of each sampling device after spraying.

#### 4.4 Expression of results

Calculate the binder mass:

$$M_i = M_{2i} - M_{1i} \quad (1)$$

where

$M_i$  is the binder mass retained on the sampling device, expressed in kilograms (kg);

$M_{2i}$  is the mass of the sampling device after spraying, expressed in kilograms (kg);

$M_{1i}$  is the mass of the sampling device before spraying, expressed in kilograms (kg);

Calculate the rate of spread:

$$d_i = \frac{M_i}{A_i} \quad (2)$$

where

$d_i$  is the rate of spread of binder, expressed in kilograms per square metre ( $\text{kg/m}^2$ ), for each sampling device;

$M_i$  is the binder mass retained on the sampling device, expressed in kilograms (kg);

$A_i$  is the area of sampling device exposed to the binder spray, expressed in square metres ( $\text{m}^2$ ).

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Calculate the mean rate of spread of the binder:

$$D = \frac{(d_1 + d_2 + d_3 + d_4 + d_5 + \dots + d_N)}{N} \quad (3)$$

where

$D$  is the mean rate of spread of binder, expressed in kilogram per square metre ( $\text{kg/m}^2$ ), reported to the nearest  $0,05 \text{ kg/m}^2$  ;

$d_1$  to  $d_N$  are the rates of spread of binder on each sampling device;

$N$  is the number of sampling devices used in the test.

Calculate the proportional range:

$$P_R = \frac{(d_{\max} - d_{\min})}{D} \quad (4)$$

where

$P_R$  is the proportional range;

$d_{\max}$  is the highest rate of spread of binder found on an individual sampling device;

$d_{\min}$  is the lowest rate of spread of binder found on an individual sampling device.

Repeat the test if the proportional range is greater than 0,20.

NOTE If this recurs it indicates that a measurement of the transverse distribution can be necessary (see clause 6).

**4.5 Test report**

The test report shall contain:

- a) a statement that the test has been performed in accordance with this European Standard;
- b) identification of sprayer and spraybar used;
- c) spraybar height;
- d) spraybar width used;
- e) location of site test;
- f) date of test;
- g) climatic conditions likely to affect the test result (e.g. windy, etc.);
- h) binder temperature recorded from the tank;
- i) binder type;
- j) specified rate of spread and tolerance;
- k) results as calculated in 4.4;
- l) any remarks;
- m) name and signature of the person responsible for conducting the test.

## 5 Determination of the rate of spread of chippings

### 5.1 Principle

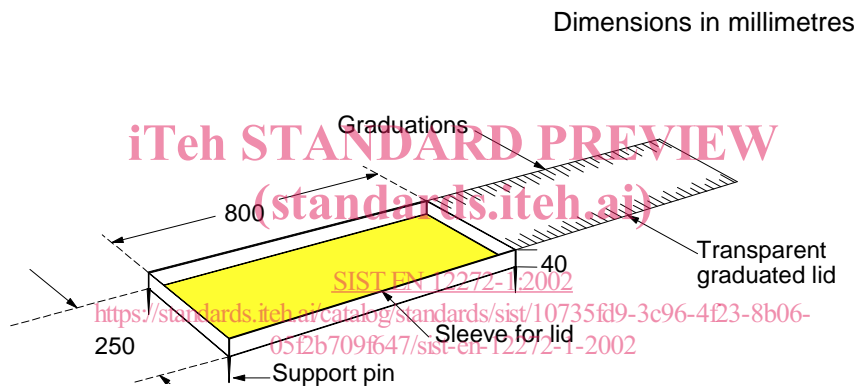
Chippings are collected in three calibrated boxes laid on the road in front of the chipping spreader, in order to determine the rate of spread. When each box is laid flat, with its lid removed, it serves as a tray to collect the chippings from a known area. With its lid replaced, each box is stood on its end and used to directly measure the bulk volume of the collected chippings. Alternatively, each box is used to collect chippings for subsequent weighing.

NOTE A method of determining the shoulder to shoulder rate of spread of chippings is included in annex A.

### 5.2 Apparatus

#### 5.2.1 Box for measuring the rate of spread of chippings

Rectangular box, for measuring the rate of spread of chippings, with a rigid, sliding, transparent graduated lid, as shown in Figure 2.



**Figure 2 — The chipping rate of spread box**  
(Dimensions shown are all internal, with a tolerance of  $\pm 2$  mm)

The lid shall either have 5 mm graduations or be directly graduated in litres per square metre (5 mm is equivalent to  $0,25 \text{ l/m}^2$ ). For ease of reading, graduations shall be marked on both of the longer edges of the top of the lid.

NOTE The box can be fitted with support pins in case it has to be placed on the binder film.

#### 5.2.2 Portable balance

Portable balance, readable to 10 g and of sufficient capacity to weigh both the box and the maximum rate of spread of chippings.

### 5.3 Procedure

With its lid removed, place each open box flat on its base clear of the wheel tracks of the chipping spreader. Place the major axis approximately parallel to the direction of travel of the chipping spreader. Place the three boxes in three different transverse positions, all within a 30 m length of road.

Each open box shall collect those chippings which are spread above it.

**EN 12272-1:2002 (E)****5.4 Determination of the rate of spread of chippings by volume****5.4.1 Principle**

When the chipping spreader has passed over the three calibrated boxes, their lids are replaced and each box is stood on its end and tapped three times on a hard surface so as to ensure that the top surface of the chippings contained in the box is flat and level.

**5.4.2 Expression of results**

Measure the height of the top surface of the chippings to the nearest 5 mm or directly record the reading in litres per square metre ( $l/m^2$ ) from the graduations marked on the lid of each box to the nearest  $0,25 l/m^2$  i.e. the bulk volume of the chippings.

If the scale on the box is graduated in millimetres, calculate the chipping rate of spread using the following equation:

$$R_v = \frac{1}{3} (H_1 + H_2 + H_3) / 20 = (H_1 + H_2 + H_3) / 60 \quad (5)$$

where

$R_v$  is the rate of spread of chippings, expressed in litres per square metre ( $l/m^2$ );

$H_1, H_2$  and  $H_3$  are the heights, expressed in millimetres (mm), to the top surface of the chippings in the three boxes.

If the scale on the box has been graduated in litres per square metre ( $l/m^2$ ), calculate the chipping rate of spread using the following equation:

$$R_v = (V_1 + V_2 + V_3) / 3 \quad (6)$$

where

$R_v$  is the rate of spread of chippings, expressed in litres per square metre ( $l/m^2$ );

$V_1, V_2$  and  $V_3$  are the volumes, expressed in litres per square metre ( $l/m^2$ ).

Repeat the test if the proportional range is greater than 0,20 (see 5.5.3).

NOTE If this recurs, it indicates that a measurement of the accuracy of spread can be necessary, see clause 7.

**5.5 Determination of the rate of spread of chippings by mass****5.5.1 Principle**

The mass of the chippings collected in each box is determined from the difference between the mass of the box containing the chippings, and its mass when empty. The test result is the average of the masses of chippings determined for each of the three boxes.

**5.5.2 Expression of results**

Calculate the chipping rate of spread using the following equation:

$$R_M = \frac{5}{3} (M_1 + M_2 + M_3) \quad (7)$$