



SLOVENSKI STANDARD

oSIST prEN 12272-1:2021

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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 - Méthode d'essai - Partie 1: Taux d'épandage et régularité transversale du liant et des gravillons

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93.080.20 Materiali za gradnjo cest Road construction materials

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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prEN 12272-1

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ICS 93.080.20

Will supersede EN 12272-1:2002

English Version

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

Enduits superficiels d'usure - Méthode 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 draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 227.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 12272-1:2021) has been prepared by Technical Committee CEN/TC 227 “Road materials”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12272-1:2002.

This document 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*
- EN 12272-2, *Surface dressing – Test methods – Part 2: Visual assessment of defects*
- EN 12272-3, *Surface dressing – Test methods – Part 3: Determination of binder aggregate adhesivity by the Vialit plate shock test method*

In this document, the Annexes A, B and C are informative.

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prEN 12272-1:2021 (E)**1 Scope**

This document 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.

NOTE This test method can also be used for determining the rate of spread and accuracy of spread of sprayed bituminous emulsions, e.g. when used as bond coats or asphalt preservation systems. The performance categories for binder rate of spread and accuracy of spread in EN 12271 do not apply to bond coats and tack coats.

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 can be used to fulfil the Factory Production Control requirements:

- equipment calibration (EN 12271:2006, Annex B – Table B.2); and
- production inspection (EN 12271:2006, Annex B – Table B.6).

The calibration of binder and chipping spreaders requires strict application of the procedures described in this document.

Using these methods for inspections during production (FPC) allows certain changes to these methods due to the specificity of certain sites and materials used (e.g. combined chipping-binder spreaders). In this case, the changes are documented in the Factory Production Control and identified in the test reports.

Other test methods used to check the rate of spread and accuracy of spread of binder, such as the static spray bar bench test for sprayers, are not covered by this document, although the test methods in this document can be used for this purpose.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

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**chipping**

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

Note 1 to entry: Chippings can have specified values for strength, soundness, shape, polishing resistance, resistance to abrasion, purity, durability and affinity to bituminous binder. Chippings should be washed to achieve the required fines content.

3.3**rate of spread of binder**

average mass of binder in kilograms per square metre (kg/m^2), or average volume of binder in L/m^2 applied to the road surface when measured in accordance with this document

3.4**rate of spread of chippings**

average bulk volume in litres per square metre (L/m^2) or, mass in kilograms per square metre (kg/m^2) applied to the road surface, when measured in accordance with this document

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 document

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 document

Note 1 to entry: 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 document

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Note 1 to entry: 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. The minimum total test area shall be $0,5 \text{ m}^2$ with the collectors where possible spaced evenly across the full width of the road to be sprayed.

4.2 Apparatus**4.2.1 Collectors**

Collectors shall be of material sufficiently robust to resist deformation in use and be capable of retaining 100 % applied binder.

The sprayer shall achieve a consistent operation before the test commences.

4.2.2 Portable balance

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

prEN 12272-1:2021 (E)**4.2.3 Plastic bags**

Plastic bags or similar, if used, shall be lightweight and capable of containing the binder and collector for weighing without any loss by leakage or evaporation.

4.2.4 Tape

Adhesive tape, if used, to hold the collectors to the road and to mask them to the required dimensions. When removed, the adhesive tape shall not damage the masked parts of collectors to ensure there is no loss in mass of the underlying material.

4.3 Procedure**4.3.1 Preparation of the collectors**

Ensure each collector is traceable to its position on the road surface under test. If necessary, mark the collectors with an indelible identification. Weigh the collectors together with a plastic bag (if used), to the nearest 1 g and record these masses as the mass of each collector before spraying.

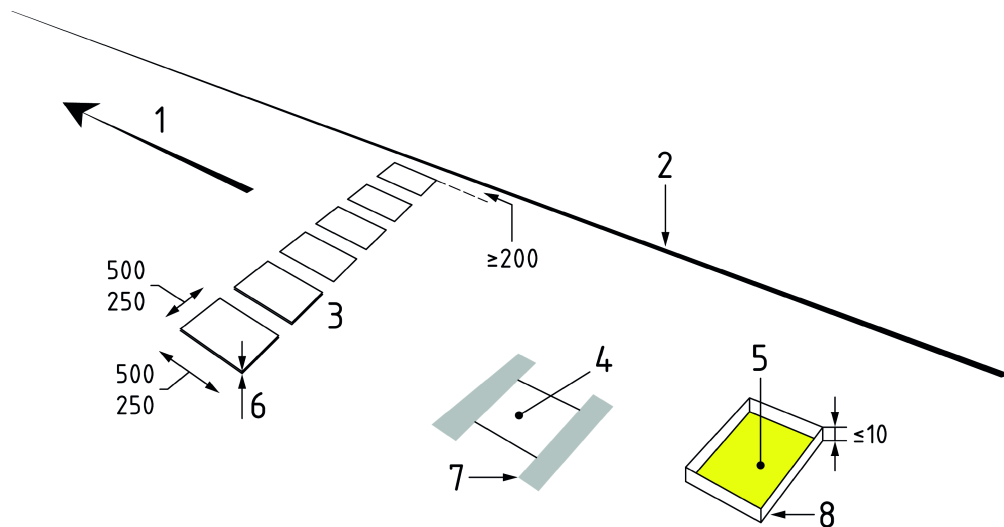
4.3.2 Location and placement of the collectors

Space the collectors 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 collectors 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.

When the rates of transverse distribution are intentionally different in the same transverse profile then the collectors related to the same measurement should be placed in areas where the intended rate of spread is the same.

Care should be taken to ensure that when spray curtains are being used, they are raised to avoid touching the collectors.

Dimensions in millimetres

**Key**

- 1 spraying direction
- 2 edge of spray
- 3 trays, boards or tiles (minimum 3)
- 4 area A_i
- 5 foam sheet or absorbent material insert
- 6 thickness (maximum 25 mm)
- 7 tape
- 8 metal tray

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Figure 1 — Informative Collectors, diagrammatic

4.3.3 Removal and weighing of the collectors

Within 3 min of the binder being sprayed onto the road, but before any chippings are applied, remove the collectors from the road surface. Then insert each collector into its own plastic bag, if used, before weighing it to the nearest 1 g. Care shall be taken not to lose or gain any binder. Weighing shall be carried out within 10 min unless the plastic bags or similar materials minimize the loss of water from emulsions or volatiles so that the results are not affected within the tolerances of the test by the time delay before weighing. Record the mass of each collector and bag, if used, after spraying. The calculation below assumes the binder mass in kg/m^2 is known so when measuring rate of spread in L/m^2 this shall be converted using the density of the binder at spraying temperature.

Methods to test the residual binder, permitting the water and volatiles to evaporate, may be used provided a correlation to the immediate test has been carried out.

prEN 12272-1:2021 (E)**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 collector, expressed in kilograms (kg);

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

M_{1i} is the mass of the collector 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 (kg/m²), for each collector;

M_i is the binder mass retained on the collector, expressed in kilograms (kg);

A_i is the area of collector exposed to the binder spray, expressed in square metres (m²).

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 (kg/m²), reported to the nearest 0,05 kg/m²;

d_i to d_N are the rates of spread of binder on each collector;

N is the number of collector 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 collector;

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

If the proportional range is greater than 0,20 this indicates the binder spreader is not functioning properly.

4.5 Test report

The test report shall contain:

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

5 Determination of the accuracy of spread of binder

5.1 Principle

Binder is collected on a number of collectors which are placed side by side on the road surface, across the full width which is to be sprayed, prior to the spraying of the binder. The mass of binder on each device is then determined from the difference between the masses of the collector before and after spraying the binder and the arithmetic mean of all these binder masses calculated. This test is also known as the "Determination of the transverse distribution of binder".

Some combined machines do not permit testing across the full width and alternative methods have to be employed. These may be accepted as surrogate methods in factory production control documents.

prEN 12272-1:2021 (E)**5.2 Apparatus****5.2.1 Collectors**

Collectors, used for sampling the binder, should be made of suitable material. Each shall be able to collect 0,5 kg/m² to 3 kg/m² or a minimum of 1,5 × the specified binder rate of spread. Each shall be dimensionally stable and retain an adequate collecting capacity even after being run over by the wheels of the spraying vehicle. Each shall also collect the sprayed binder without any loss, overflow or transfer from one collector to the next.

For the determination of the accuracy of spread of binder, the width of each collector shall be 400 mm, 250 mm, 150 mm, 100 mm or 50 mm and the length of each collector shall be at least 50 mm. The minimum sample size shall be 100 mm × 50 mm. These dimensions shall be measured to the nearest 0,2 mm for the 100 mm × 50 mm collectors and 1 mm for the 100 mm × 200 mm or larger collectors.

Two types of device are described in B.1 and B.2 but the latter type is not recommended when spraying low viscosity emulsions.

5.2.2 Portable balance

Portable balance, readable to the nearest 0,1 g for 100 mm × 50 mm samples or 0,3 g for 100 mm × 200 mm or larger samples.

5.3 Procedure**5.3.1 Preparation of the test apparatus**

Clearly number or otherwise identify each collector and determine its mass to the nearest 0,1 g in the case of 100 mm × 50 mm samples or 0,3 g for 100 mm × 200 mm or larger samples. If all the collectors have a similar mass within a limit deviation of ± 0,3 g only one shall be weighed and this value recorded for each of them.

5.3.2 Location and placement of the apparatus

The sprayer shall achieve a consistent operation before the test commences. Place the collectors transversely on the road surface so that the binder is sampled from at least the full width which is to be sprayed.

5.3.3 Removal and weighing of the collectors

After spraying the binder, remove the collectors from the road surface as fast as practically possible in order to minimize any loss of water from emulsion binders or volatile substance. This may be accomplished by using pre-weighed plastic bags or similar to pick up and seal the collectors. Then, within 30 min, determine the mass of each collector with binder to the nearest 0,1 g for samples 100 mm × 50 mm or 0,3 g for samples 100 mm × 200 mm or larger and record the results. This time may be extended if it can be demonstrated that loss of water or volatiles has not occurred to affect the result within the tolerances of the test. Methods to test the residual binder, permitting the water and volatiles to evaporate may be used provided a correlation to the immediate test has been carried out.

Care should be taken to ensure that when spray curtains are being used, they are raised to avoid touching the collectors.

5.4 Expression of results

The collectors at each end of the sprayed width which are empty or only partly filled shall be ignored. Those remaining shall total number N (see Figure 2).