



SLOVENSKI STANDARD
SIST EN 1824:1999

01-november-1999

Materiali za označevanje vozišča – Terenski preskusi

Road marking materials - Road trials

Straßenmarkierungsmaterialien - Feldprüfungen

Produits de marquage routier - Essais routiers

Ta slovenski standard je istoveten z: EN 1824:1998

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93.080.20 Materiali za gradnjo cest Road construction materials

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English version

Road marking materials - Road trials

Produits de marquage routier - Essais routiers

Straßenmarkierungsmaterialien - Feldprüfungen

This European Standard was approved by CEN on 16 January 1998.

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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION
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REPUBLIKA SLOVENIJA
AGENCIJA REPUBLIKE SLOVENIJE
ZA VARNOST IN KVALITETO
AMALINUM
Ljubljana, Slovenija



Foreword

This European Standard has been prepared by Technical Committee CEN/TC 226 "Road equipment", the secretariat of which is held by 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of an identical text or by endorsement, at the latest by August 1998, and conflicting national standards shall be withdrawn at the latest by August 1998.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Road markings are carried out by the application of road marking materials to the road surface. Road marking materials include materials to be applied in a liquid form such as solvent-based paints or waterborne, thermoplastic materials in a molten state and cold-hardening materials in a mixture of reacting components. Road marking materials further include preformed materials applied to the road surface by heat, pressure, adhesives or by other means.

Certain materials are used for temporary road marking and other materials for permanent road marking.

Some materials, e.g. paints, are applied in a thin layer, others, e.g. thermoplastics, are applied in thicker layers that more or less cover the road surface texture. Some materials are also applied by methods that result in a lasting pattern on the road marking surface, such as in a profiled road marking. Sometimes one material is used for the base of a profiled road marking and another for the profiles.

Often, drop-on materials are added to the surface of the road marking during the application process for the purpose of improving the performance of the road marking either for an initial period or permanently. There is a range of drop-on materials available, and different methods for applying these are in use.

In road trials, a material is applied to form a few road markings, and for these the performance of the road marking is studied during exposure to local conditions of weather, traffic and road maintenance.

The advantage of road trials is that the testing conditions are realistic, while the disadvantage is that testing conditions are variable. To improve continuity in the testing it is advisable to include road markings materials that have been previously tested in similar conditions. Such a practice, if well conceived (especially in the choice of products), could lead to a better interpretation of the influence of testing conditions (weather, level of traffic and road surface parameters) that are being recorded during road trials. In no case might the results found for products in the course of trials be corrected to match those obtained on the products previously tested in similar conditions.

This European Standard provides guidelines and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

NOTE: The use of the verbal form 'should' in this standard is used to indicate that among several possibilities one is recommended as being particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required.

1 Scope

This European Standard gives guidance for conducting road trials for road marking materials intended for use in both permanent and temporary road marking. Recommendations are given for test sites, for the application of road

marking materials on the test sites, for the parameters to be measured and the frequency of the measurements and for the presentation of the results in the form of a test report.

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.

EN 1436 Road marking materials - Road marking performance for road users

ISO 3310-1 Test sieves - Technical requirements and testing - Part 1: Test sieves of metal wire cloth

3 Definition

For the purpose of this standard, the following definition applies:

roll-over: The number of wheels passing over a point of a road surface within a specified period of time.

4 Test sites and conditions

4.1 General

Test sites should be arranged at suitable locations in accordance with 4.2 to 4.5. The test results will depend on the conditions of weather, traffic and road surface, which should all be described in a general report for the test site.

4.2 Test sites

The test site should consist of a field, where the road marking materials are to be applied, with extra space at both ends. The roads used for test sites should be straight and flat and without singular points, substantial obstacles to daylight, sources of frequent dirt (quarries, field exits, etc.) or tracked vehicles.

The lengthwise and transverse slopes and any special circumstances should be stated in the general report for the test site.

NOTE: It is desirable to have additional areas at the roadsides in order to allow safe working conditions and convenient operation of application with road marking equipment.

4.3 Weather conditions

At the termination of a road trial, a weather report should be produced for the duration of the road trial.

NOTE 1: The weather report can be based on data from the nearest meteorological station and it can include data obtained on the test site itself.

The weather report should include aspects of the weather having influence on the results of the road trial. If the participating parties agree to collect weather information, this should at least include the temperature conditions during the test period.

NOTE 2: The weather report can include a monthly account of minimum and maximum average daily temperatures and cumulated precipitation in millimetres of water. For test sites in hard winter conditions, the number of frost cycles can also be included, and for test sites in hot summer conditions, a monthly account of the number of sun hours and days without precipitation.

4.4 Traffic conditions

The volume of traffic should be such as to ensure that one or more measurement areas with the desired roll-over class can be selected (see 7.2).

At the termination of a road trial, a traffic report for the duration of the road trial should be made available. The traffic report should include the number of wheel passages, determined on the measurement area(s) in accordance with annex A. The traffic report should further include the percentage of heavy vehicles together with an indication of the counting method used. For countries where studded tyres are used to a significant degree, this should be indicated, and the approximate percentage of wheel passages by studded tyres should be given.

NOTE: From general experience, such traffic conditions are known or assumed to be relevant in the erosion of road markings. Further information relating to, for instance, the average driving speed can be added.

4.5 Road surface conditions

Road trials should be carried out on asphaltic road surfaces of an age of 1 year or more, which are in good condition and not in need of repair for the duration of the road trials and are not damaged by the presence of wheel tracks, fissures, cracks or similar.

NOTE 1: Road trials on cement concrete surfaces do not give repeatable results because of on-going chemical reactions.

At the termination of a road trial, a road surface report for the duration of the road trial should be made available. The road surface report should include a general description of the road surface and an account of the texture depth, determined in accordance with annex B, close to the measurement area(s).

NOTE 2: There is evidence that the texture depth (by the sand-patch method) has an influence on the result of road trials, at least for materials applied in thin layers.

If any seasonal maintenance of the road is carried out, such as salting, sanding or snowploughing, the road surface report should include an account of such maintenance.

5 Organization of road trials

5.1 Duration

A road trial should include the full climatic cycles of one year or more for materials intended for permanent road marking and up to 6 months for materials intended for temporary road marking.

The participating parties should agree on the initial duration of a road trial and on subsequent changes such as prolongation or early termination.

5.2 Transverse and longitudinal application patterns

5.2.1 General

Road marking materials may be applied in patterns of lines either transverse or longitudinal to the road.

NOTE: When a long (more than 40 cm) measurement area is necessary, the transverse pattern cannot be used.

When both the transverse and longitudinal patterns are used on the same test site, they should be used on separate parts of that test site.

5.2.2 Transverse pattern

At least three lines should be applied for each road marking material. The distance between two adjacent lines should be at least 0,35 m and the width at least 0,10 m as shown in figure 1.

NOTE: Lines of the same material need not be adjacent.

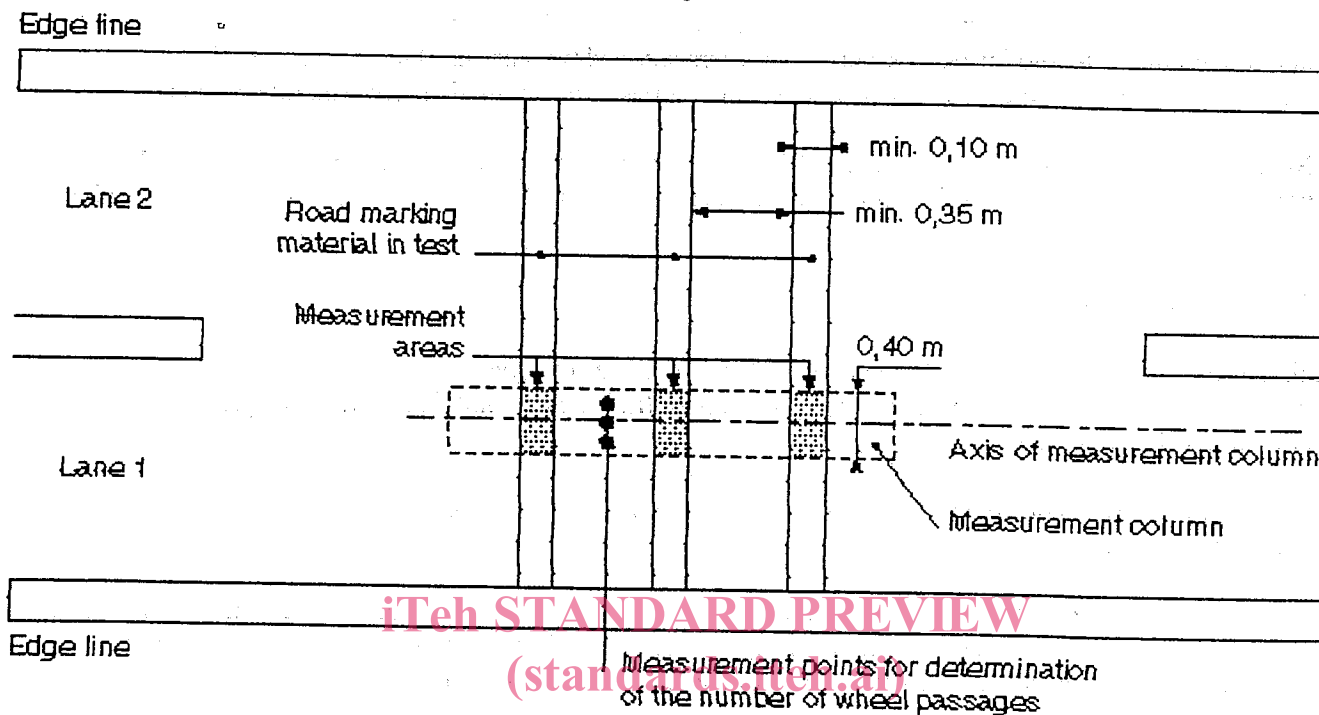


Figure 1: Example of a transverse pattern showing a measurement column

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5.2.3 Longitudinal pattern

Lines are placed in transverse rows and longitudinal columns. For each of the road marking materials there should be one line in each column containing measurement areas (see 7.2.2.3).

The lines should be at least 0,15 m wide and at least 2 m long as shown in figure 2. Unmarked space between the lines is a maximum of 0,4 m in the transverse direction and a minimum of 0,5 m in the longitudinal direction.

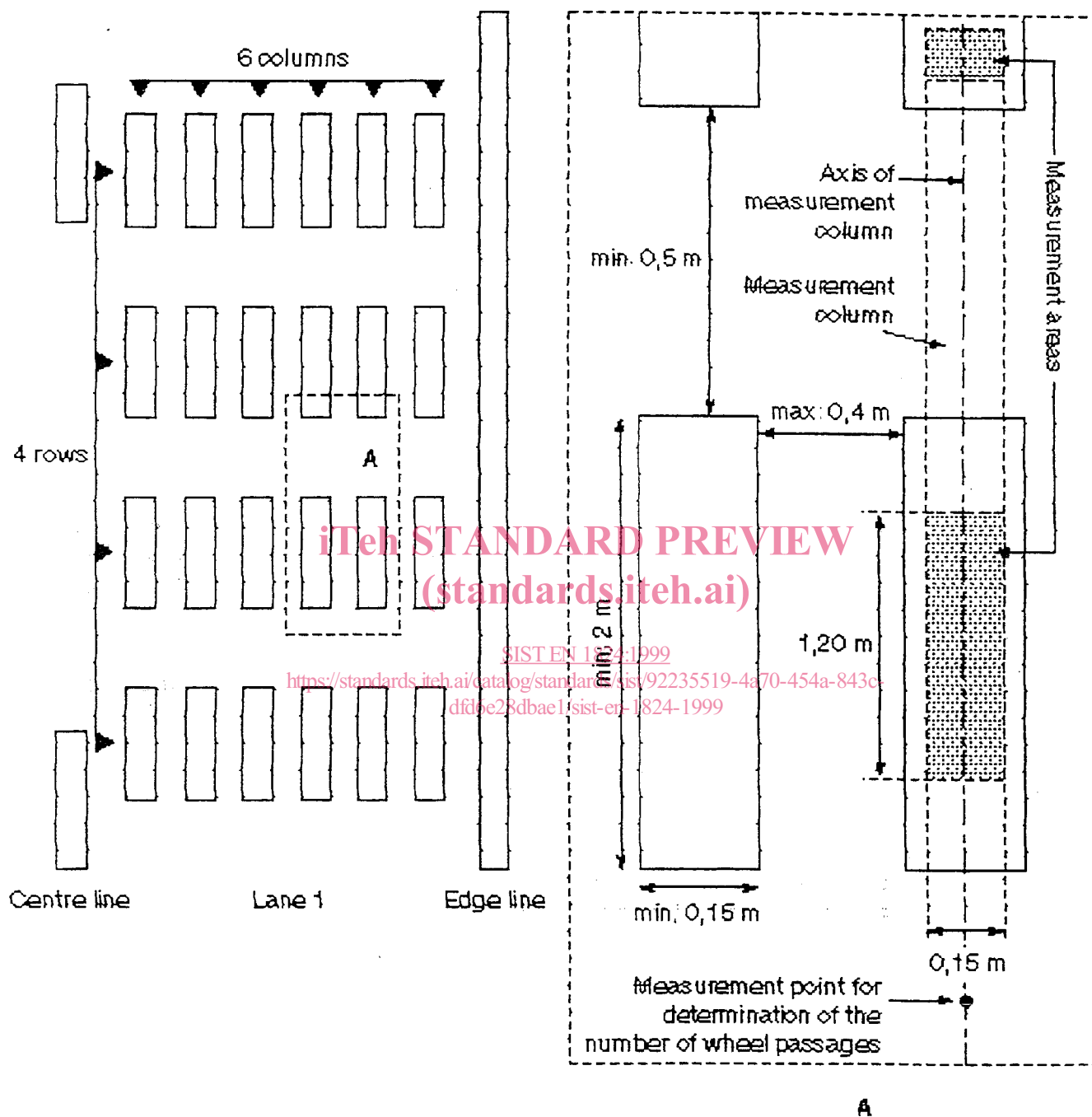


Figure 2: Example of a longitudinal pattern showing a measurement column

6 Application of road marking materials

NOTE: The test results depend on various factors related to the application of the road marking materials, i.e. application method, quantities applied, weather conditions, etc.

6.1 Periods for application

Road marking materials should be applied when the weather conditions are as defined in 6.2.

NOTE: The participating parties can agree to include one or more periods for application. One period can, for instance, be for materials intended for use as temporary road markings and another for materials intended for use as permanent road markings. There are practical advantages to having the period(s) as short as possible.

For temporary road marking materials, the application period should be such that the required number of wheel passages is obtained, and the subsequent measurements carried out, prior to or after commencement of winter conditions.

6.2 Conditions suitable for application

Conditions should be deemed suitable when:

- a) the road surface appears to be dry and dew is not being formed;
- b) the road surface temperature is within limits agreed upon by the participating parties;
- c) the wind speed is less than the maximum agreed upon by the participating parties.

Special road marking materials can be applied in other weather conditions, which should be noted in the individual test report (see clause 8).

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EXAMPLE: The road surface temperature is at least 3 °C above the dew point of the air, the road surface temperature is between 10 °C and 50 °C and the maximum wind speed is less than 10 m·s⁻¹.

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NOTE: The participating parties can agree that the application of a slow drying material may be delayed if the road is opened to traffic within, at most, 2 h.

6.3 Technical specification for application

Prior to commencement of the road trials, the participating parties should agree upon a technical specification for application of the road marking material.

NOTE 1: The technical specification for application can include preparation methods (such as how to melt a thermoplastic material), what type of application to use (e.g. extrusion of a thermoplastic material), any particular road marking equipment required, the pattern of application (e.g. plain or a certain type of profile), the rate of application to be applied (in grams per square metre), what drop-on materials to add, what rate of application and the method to use.

Whenever possible the road marking material should be applied using self-propelled road marking equipment, and drop-on materials should be applied mechanically.

NOTE 2: Most materials, except preformed materials, can be applied using self-propelled road marking equipment; this ensures better repeatability of the application.

NOTE 3: The road marking equipment used can either be those put to general commercial use or special road marking equipment. The road marking equipment can be operated by the usual crews or by staff at the test site.

If the participating parties agree to test road marking equipment prior to the application of a road marking material, the rate of application of marking materials and of drop-on materials should be adjusted and the rate of application applied verified in accordance with annex C. A road marking equipment should be rejected if any of three rates of application applied in three successive test runs deviates more than 10 % from the average rate of application.

6.4 Sampling and measurements

6.4.1 Sampling

When samples are required each road marking material, all the components of a multiple component material, and drop-on materials should be taken into account¹⁾.

NOTE 1: For materials used in more than one application, it is not necessary to sample every application.

NOTE 2: The participating parties can agree to include further specifications for sampling, such as quantities to sample.

6.4.2 Measurement of drying time and weather conditions

When required by the participating parties, the drying time should be measured for paints and cold plastics.

The drying time should be determined in accordance with annex D for every line that contains a measurement area (see 7.2) for further measurements.

The drying time should be reported together with an account of the weather conditions, including the ambient temperature, the road surface temperature, the relative air humidity and the wind speed as measured during application in accordance with annex E.

NOTE 1: The four weather parameters can be used to decide if the weather conditions are suitable for the application of road marking materials (see 6.2). It is therefore useful to record the parameters continuously.

NOTE 2: The drying time depends, among other things, on the weather conditions and the rate of application of material.

6.4.3 Determination of the rate of application

During the application of a road marking material, the rate of application of the material and of any drop-on material should be determined in accordance with annex C for every line that contains a measurement area (see 7.2) for further measurements.

NOTE: The participating parties can agree to include a criterion for the acceptability of the application of a road marking material. For example, the application is rejected if any of the rates of application from the different lines deviates more than 10 % from the average rate of application, or if the average rate of application deviates more than, for example, 15 % or 10 % from the rate of application given in the specification for the material.

¹⁾ In this respect, the following document is in preparation:

“Road marking materials - Quality control - Part 1: Sampling and testing form storage” (WI 00226055).