SLOVENSKI STANDARD
kSIST FprEN 1824:2010

01-december-2010

Materiali za označevanje vozišča - Terenski preskusi

Road marking materials - Road trials

Straßenmarkierungsmaterialien - Feldprüfungen

Ta slovenski standard je istoveten z: **FprEN 1824 rev**

ICS:

93.080.20 Materiali za gradnjo cest Road construction materials

kSIST FprEN 1824:2010 **en,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

FINAL DRAFT
FprEN 1824

October 2010

ICS 93.080.20

Will supersede EN 1824:1998

English Version

Road marking materials - Road trials

Produits de marquage routier - Essais routiers

Straßenmarkierungsmaterialien - Feldprüfungen

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. FprEN 1824:2010: E

Contents

Foreword

This document (FprEN 1824:2010) has been prepared by Technical Committee CEN/TC 226 “Road equipment”, the secretariat of which is held by AFNOR.

This document is currently submitted to the Unique Acceptance Procedure.

This document will supersede EN 1824:1998.

The Annexes A to G of this European Standard are normative and Annex H is informative.

This European Standard is one of a package of inter-related European Standards with a common date of withdrawal (dow) fixed on December 2011 *(including the request of an extension for the co-existence period)*:

— FprEN 1790, *Road marking materials — Preformed road markings*,

— FprEN 1824, *Road marking materials — Road trials*,

— FprEN 1871, *Road marking materials — Physical properties*,

— FprEN 12802, *Road marking materials — Laboratory methods for identification*,

— FprEN 13197, *Road marking materials — Turntable wear simulators*,

— FprEN 13212, *Road marking materials — Requirements for factory production control*,

— FprEN 13459, *Road marking materials — Sampling and testing*.

1 Scope

This document specifies the requirements for conducting road trials for road marking materials intended for use in both permanent and temporary road marking. Details 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

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1436, *Road marking materials — Road marking performance for road users*

EN 13036-1, *Road and airfield surface characteristics — Test methods — Part 1: Measurement of pavement surface macrotexture depth using a volumetric patch technique*

3 Terms and definitions

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

3.1
roll-over
number of wheels passing over a point of a road surface within a specified period of time

3.2
useful rate of application
quantity, expressed in g.m-2, of drop-on and/or non-drop materials which have adhered to the road marking substrate, when lines are done

3.3
rate of consumption during application
quantity, expressed in g.m-2, of drop-on or injection materials at the exit of the guns of the application equipment

3.4
percentage of heavy vehicles
ratio between the number of heavy vehicles and the number of all vehicles circulating on the test site

4 Test sites and conditions

4.1 General

Test sites shall be arranged at suitable locations in accordance with 4.2 to 4.5. The test results may depend on test field location, climate, road surface and traffic which shall be described according to 4.2 to 4.6.

4.2 Test sites characteristics and location

The test site shall be located in an area which belongs to one of the climatic classes defined in 4.3.

The test site shall 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 junctions, substantial obstacles to daylight, sources of frequent dirt (quarries, field exits, etc.) or tracked vehicles.

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.

The percentage of heavy vehicles on the test site shall be 10 % to 25 % of all vehicles.

The location of the test site shall be indicated in the test report.

4.3 Climatic conditions and classes

Climatic classes (see Table 1) are defined according to the Köppen classification and the use of winter maintenance.

Köppen classification shall be determined according to Annex A.

Winter maintenance is defined by the number of times that snowplough have operated on the test field during the road trials. Winter maintenance is applicable if this number is equal to or greater than 20 and shall be considered only for the Köppen zone Cfb.

Table 1 – Test Field climatic classes

Climatic Class	Climatic zone according to Köppen
C1	Dfc E
C2	Cfb without Winter maintenance
C3	Cfb with Winter maintenance Dfb Dsb
C4	Csa Bsh Cfa Csb

4.4 Road surface conditions and classes

Road trials shall 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. Highly porous surfaces shall be avoided.

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

NOTE 2 Road trials on highly porous surfaces do not give comparable results due to the draining properties.

At the commencement of a road trial, a road surface report of the road trial shall be available. The test surface report shall include a general description of the road surface and an account of the texture depth (MTD: mean texture depth), determined in accordance with EN 13036-1.

The MTD shall be measured at several locations on the test field. The number of measurements depends on the test field length. Measurements shall be carried out, at least, at three transversal locations and repeated every 30 m on the test field. The transversal measurements locations are in the centre of the carriageway, near the right and left edge line.

The averaged mean texture depth is derived from these measurements. The standard deviation shall be less than 0,15 mm.

NOTE 3 The averaged texture depth may also be directly determined in accordance with EN ISO 13473-1. Depending to the averaged measured texture depth, the test field roughness is described in term of roughness class according to Table 2.

Table 2 – Test field roughness classes

Roughness class	Averaged measured texture depth
RG1	≤ 0,60 mm
RG2	> 0,60 mm and ≤ 0,90 mm
RG3	> 0,90 mm and ≤ 1,20 mm
RG4	> 1,20 mm

NOTE 4 The texture depth has an influence on the result of road trials, at least for materials applied in thin layers.

4.5 Roll-over classes

The volume of traffic shall 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 shall include the roll-over classes according to Table 3, determined on the measurement area(s) in accordance with Annex B.

Table 3 – Roll-over classes

Roll-over class	Number of wheel passages
T0	≤ 50 000
T1	Between 50 000 and 60 000
T2	100 000 ± 20 %
P0	≤ 50 000
P1	Between 50 000 and 60 000
P2	100 000 ± 20 %
P3	200 000 ± 20 %
P4	500 000 ± 20 %
P5	1 000 000 ± 20 %
P5.5	1 500 000 ± 10 %
P6	2 000 000 ± 10 %
NOTE The roll-over classes T0, T1 and T2 are for materials intended for temporary road markings, while the roll-over classes P0 to P6 are for materials intended for permanent road markings.	

The traffic report should further include the percentage of heavy vehicles together with an indication of the counting method used.

A vehicle is considered a heavy vehicle if its maximum gross mass is above 7500 kg.

4.6 Studded tyres classes

For road trial sites where studded tyres are used to a significant degree, this shall be indicated on the test report.

NOTE From general experience, such traffic conditions can be relevant to the erosion of road markings.

5 Organization of road trials

5.1 Duration

A road trial shall include at least one full climatic cycle of one year for materials intended for permanent road marking and up to 6 months for materials intended for temporary road marking.

In some cases, test markings may fall below the performance requirements of the road authority. In these cases, it may be necessary for the markings to be removed.

5.2 Transverse and longitudinal application patterns

5.2.1 General

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

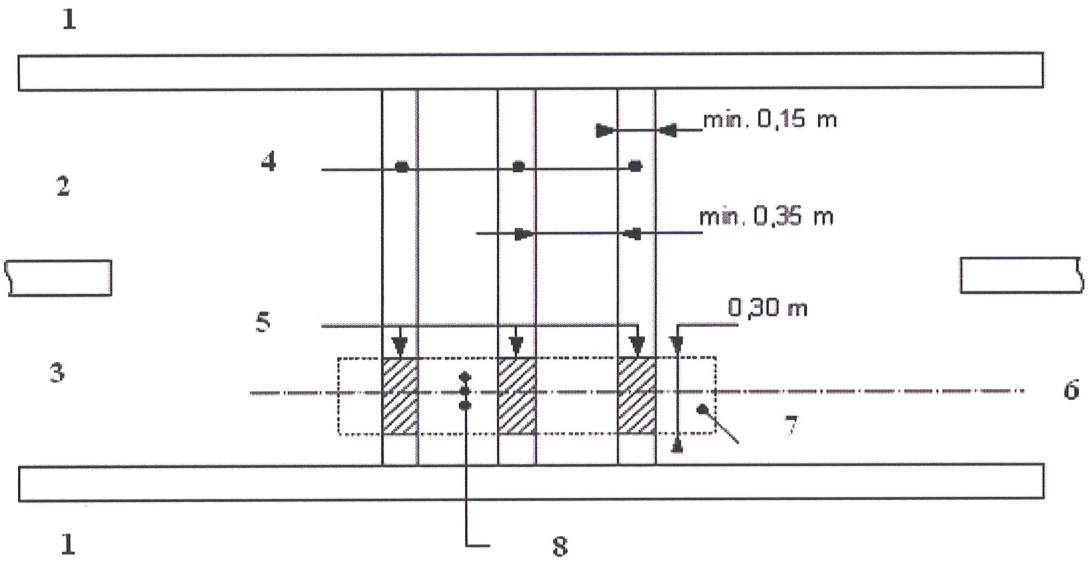
When a long (more than 40 cm) measurement area is necessary, the transverse pattern cannot be used.

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

5.2.2 Transverse pattern

At least three lines shall 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 0,15 m as shown in Figure 1. The application could be done across one or two lanes.

NOTE Lines of the same material need not be adjacent.



Key

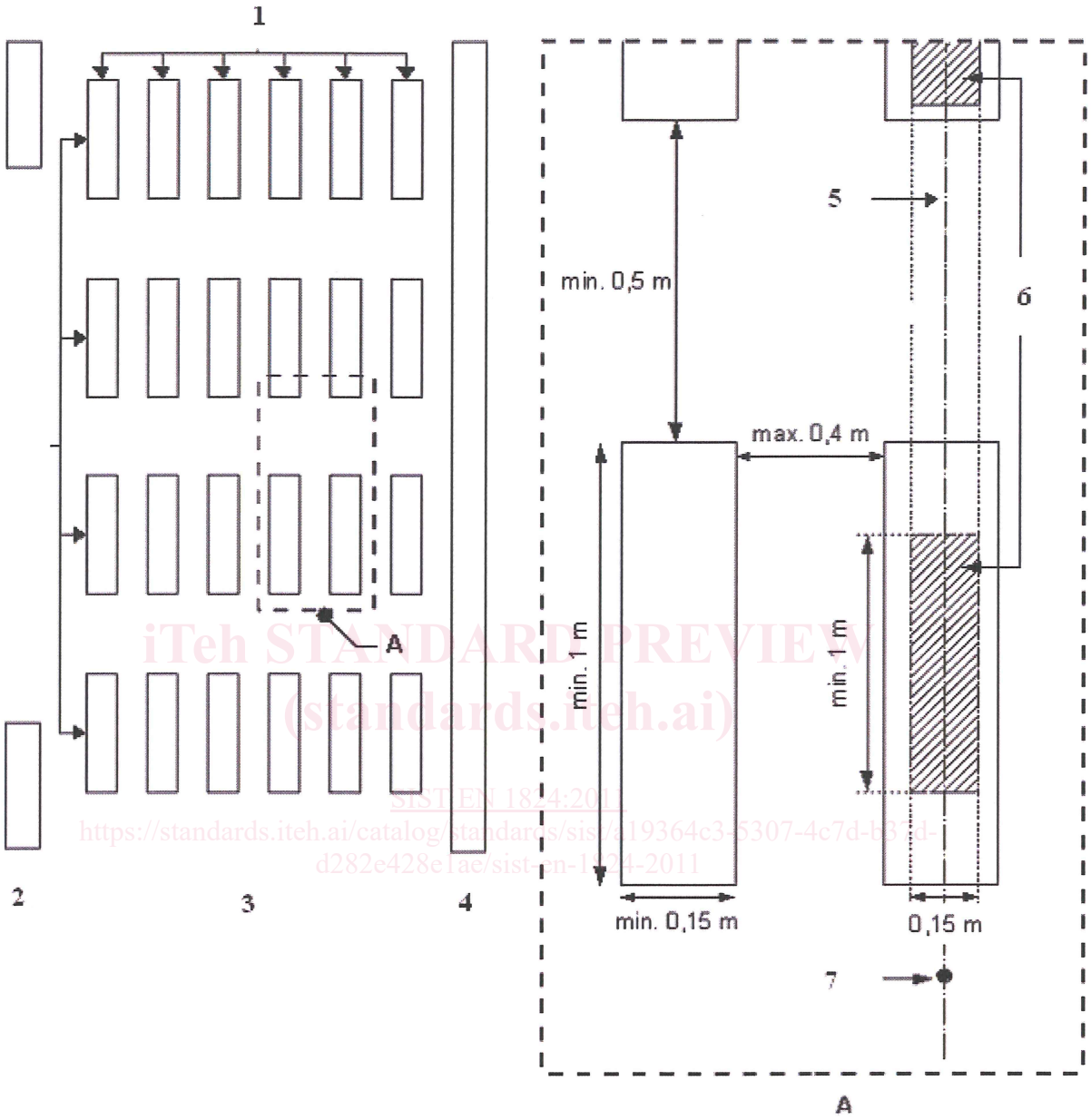
1	edge line	5	measurement areas
2	Lane 2	6	axis of measurement column
3	Lane 1	7	measurement column
4	road marking material in test	8	measurement points for determination of the number of wheel passages

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

5.2.3 Longitudinal pattern

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

The lines should be at least 0,13 m wide and at least 1 m long as shown in Figure 2. Unmarked space between the lines is a minimum of 0,5 m in the longitudinal direction.



Key

1 6 columns
2 centre line
3 Lane 1
4 edge line
5 axis of measurement column
6 Measurement areas
7 Measurement point for the determination of the number of wheel passages

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

6 Application of road marking materials

6.1 General

In case of longitudinal pattern, the application shall be done in the direction of the traffic.

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.

6.2 Periods for application

Road marking materials shall 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 shall be such that the required number of wheel passages is obtained, and the subsequent measurements carried out, prior to or after winter conditions.

6.3 Conditions suitable for application

Conditions shall 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 shall be noted in the individual test report (see Clause 8).

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 $m \cdot s^{-1}$.

6.4 Technical specification for application

Prior to the commencement of the road trials, the applicant shall submit to the test authority the application instructions of the road marking material.

NOTE 1 The application instructions will 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 structure), the rate(s) of application (in grams per square metre), what drop-on materials to add, their rate(s) of application and the method to use.

Whenever possible the road marking material shall be applied using self-propelled road marking equipment, and drop-on materials shall 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 test authority and the applicant 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 shall be adjusted and the rate of application applied verified in accordance with Annex C. A road marking equipment shall be rejected if any of three rates of application applied in three successive test runs deviates more than 20 % from the average rate of application.