SLOVENSKI STANDARD
oSIST prEN 1790:2020

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Materiali za označevanje vozišča - Predoblikovane oznake

Road marking materials - Preformed road markings

Straßenmarkierungsmaterialien - Vorgefertigte Markierungen

Produits de marquage routier - Marquages routiers préformés

Ta slovenski standard je istoveten z: **prEN 1790**

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Road marking materials - Preformed road markings

Produits de marquage routier - Marquages routiers préformés

Straßenmarkierungsmaterialien - Vorgefertigte Markierungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 226.

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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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Contents

European foreword

This document (prEN 1790:2019) 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 CEN Enquiry.

This document will supersede EN 1790:2013.

In comparison with the previous edition, the following technical modifications have been made:

- Text and formatting according to provisions for harmonized standards under the Construction Product Regulation.
- Clarification of the definition for preformed road markings and the measurement of the initial performance
- Removed performance classes for the luminance factor β.
- Amendments in line with EN 1436:2018, e.g. addition of nighttime colour, definition of structured road markings
- Removed preformed thermoplastics road markings installed with the addition of drop on material from the scope
- Seperated and updated definition of test frequencies for FPC for the different materials
- Updating of normative references

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

Introduction

A particular category of road marking materials, used for horizontal signalisation, are preformed road markings, manufactured products in the form of sheets or on rolls, ready for use on the road. They can be applied by means of adhesives, pressure or heat, with or without the use of a primer. Preformed road marking materials can be linear, in pieces of a certain length or in rolls. They can also be cut out in the form of symbols or signs or parts of them, making it possible to assemble them on the road to achieve the desired shape.

Preformed road marking materials can be designed for use as permanent or temporary road markings. Temporary road markings, as covered in Annex A, are applied with a view for later removal and therefore the specific property of “removability” can be required.

Preformed road marking products are defined as Tape, preformed Cold Plastic road marking or preformed Thermoplastic road marking.

These type of products are fully finished during manufacturing and do not change significantly their properties during application. They are completely covered by this standard.

Release of dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through: http://ec.europa.eu/growth/tools-databases/cp-ds_en.

1 Scope

This document specifies construction products which are white and yellow, removable or non-removable, preformed road marking materials, under the form of tape, cold plastic, thermoplastics (without addition of drop-on materials during application), to be used for permanent and/or temporary road markings in circulation areas. Other preformed road marking products and colours intended for road markings are not covered in this document.

This document also gives specifications for the evaluation of conformity for white and yellow, removable or non-removable, preformed road materials under the form of tape, cold plastic, thermoplastics to be used for permanent and/or temporary road markings in circulation areas including type testing and factory production control.

This document includes an Annex ZA for permanent tapes, preformed cold plastic road marking and thermoplastic road marking with the clauses addressing the provisions of the EU Construction Product Regulation for permanent road marking.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1436:2018, *Road marking materials - Road marking performance for road users and test methods*

prEN 1824:2018, *Road marking materials — Road trials*

prEN 1871:2018, *Road marking materials — Paint, thermoplastic and cold plastic materials — Physical properties*

EN 13197:2011+A1:2014, *Road marking materials — Wear simulator Turntable*

EN 13459:2011, *Road marking materials - Sampling from storage and testing*

EN ISO 4892-3:2016, *Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps (ISO 4892-3:2016)*

EN ISO 11358-1:2014, *Plastics - Thermogravimetry (TG) of polymers - Part 1: General principles (ISO 11358-1:2014)*

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:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
preformed road marking
factory produced road marking system (or product), in sheet or roll form, capable of being applied to the substrate with adhesive, primer, pressure, heat or a combination of these. These type of products are fully finished during manufacturing and do not change significantly their properties during application

Note 1 to entry: Additional materials to those described in 3.1.1 to 3.1.3 can include, if recommended by the manufacturer, primers which are liquid products which may contain solids and liquid additives suspended in an organic solvent or in water. The solids comprise inorganic and/or organic fillers, pigments and additives. The content of volatile organic solvents is not limited. Primers are used to precoat road surfaces before the road marking system is applied. They improve the adhesion of the road marking and protect against disintegration, discolouring, etc. caused by incompatible compounds in the road surface.

3.1.1
tape
preformed multilayer road marking, capable of adapting itself to the texture of the substrate, which may be precoated with pressure-sensitive adhesive, capable of being stuck to the substrate without heating the material, while the photometric, colorimetric and skid resistance characteristics are not significantly modified during application

3.1.2
preformed cold plastic road marking
preformed road marking made of cold plastic marking material as defined in prEN 1871:2018, applied to the substrate by means of an adhesive, while the photometric, colorimetric and skid resistance characteristics are not significantly modified during application

3.1.3
preformed thermoplastic road marking

"pre-beaded" preformed road marking made of thermoplastic marking material as defined in prEN 1871:2018, applied to the substrate by heating the material until adhesion to the pavement and without the addition of any retroreflective and/or anti-skid drop-on materials during application to the road

3.2
removability
characteristic of a temporary preformed road marking capable of being removed, intact or in large pieces, without leaving permanent marks that could confuse the road user during different weather conditions

3.3
adhesive
substance which is used to bond the preformed road marking to the substrate and the application of which may require heating

3.4
structured road marking
road marking with a structured surface that does not have areas of road marking of regular dimensions and planeness

Note 1 to entry: Structures may be formed by patterns, profiles, random texture or other features.

3.5
type I road marking
road marking that does not necessarily have special properties

3.6
type II road marking
road marking with special properties intended to enhance the retroreflection in wet or rainy conditions

4 Product Characteristics

4.1 General

The performance is meant as characteristic of the material as fully finished product. The performance can be assessed on samples in a laboratory, but also on samples applied on the road or wear simulator. The performance shall be measured after removing any surface coating used to protect the surface of the preformed road marking during roll-up and transport, following the instructions of the manufacturer.

4.2 Essential Characteristics

4.2.1 Day-time Visibility (Reflection in daylight or under road lighting)

Reflection in daylight or under road lighting is measured either by the luminance coefficient under diffuse illumination Qd in the direction of traffic and expressed in mcd·m^{-2}·lx^{-1}; or by the luminance factor β.

a. When luminance coefficient under diffuse illumination Qd is measured, the preformed road marking material is tested in accordance with 5.2.2 a), test results shall be expressed by means of classes Q0 to Q5 of EN 1436:2018, Table 1.

b. When luminance factor β is measured, the preformed road marking material is tested in accordance with 5.2.2 b), test results shall be expressed by means of classes B0 to B5 of EN 1436:2018, Table 2.

4.2.2 Night-time Visibility (Retroreflection under vehicle headlamp illumination)

Retroreflection under vehicle headlamp illumination represents the brightness of a road marking as seen by the vehicle driver under the illumination by the vehicle's own headlamp. The result is expressed by the coefficient of retroreflected luminance R_L in mcd·m^{-2}·lx^{-1}.

The coefficient of retroreflected luminance, measured on dry conditions, changes during wetness or during rain. Retroreflected luminance during wetness or during rain only applies for type II road markings.

a. When preformed road marking material is tested on dry conditions, in accordance with 5.2.3 a), test results shall be expressed by means of classes R0 to R5 of EN 1436:2018, Table 3.

b. When preformed road marking material is tested during wetness in accordance with 5.2.3 b), test results shall be expressed by means of classes RW0 to RW6 of EN 1436:2018, Table 4 (only for type II road marking products).

c. When preformed road marking material is tested during rain in accordance with 5.2.3 c), test results shall be expressed by means of classes RR0 to RR6 of EN 1436:2018, Table 5 (only for type II road marking products).

4.2.3 Day-time Visibility (Chromaticity coordinates)

Chromaticity in daylight shall be defined by means of (*x*,*y*) chromaticity coordinates.

When a white preformed road marking is tested in accordance with 5.2.4, test results shall be expressed by means of colour regions defined by the corner points given in EN 1436:2018, Table 6 for white road markings.

When a yellow preformed road marking is tested in accordance with 5.2.4, test results shall be expressed by means of colour regions defined by the corner points given in EN 1436:2018, Table 6 for yellow road markings.

4.2.4 Night-time Visibility (Chromaticity coordinates)

Chromaticity in nighttime for retroreflected light shall be defined by means of (*x*,*y*) chromaticity coordinates.

When a dry yellow preformed road marking is tested in accordance with 5.2.5, test results shall be expressed by means of colour regions defined by the corner points given in EN 1436:2018, Table 7 for yellow road markings.

4.2.5 Skid resistance SRT value (only for non-structured road marking products)

Skid resistance represents the energy loss caused by the friction of a rubber slider over a specified length of a road marking surface in wet conditions. The result is expressed in SRT (Skid Resistance Tester) units.

Measured according to 5.2.6, test results shall be expressed by means of classes S0 to S5 of EN 1436:2018, Table 8.

This test is valid for flat road markings and road markings with low degree of texture. Road markings with high degree of texture or structured markings may not be suitable for measurement of skid resistance by this method, see definitions in EN 1436:2018, 4.5.

4.3 Durability

4.3.1 General

Durability represents the capability of the preformed road marking material to retain the performance of the essential characteristics declared by the manufacturer after being submitted to road trials and/or wear simulator.

This European Standard considers two possible methods of verification and/or assessment of durability taking into account that some Member States have national regulations based on one of them and considering that state of the art on this matter does not allow to define a single and unified test method.

The information corresponding to the durability method road trials or wear simulator shall include the specific test conditions applicable to the test.

The following performance characteristics of the road marking assemblies are tested by road trial or wear simulator:

— Retroreflection under vehicle headlamp illumination (see 4.2.2):

  — coefficient of retroreflected luminance R_L expressed as class R on dry conditions (only for retroreflective road marking products);

- coefficient of retroreflected luminance R_L expressed as class RW during wetness (only for Type II road marking products) and/or;
- coefficient of retroreflected luminance R_L expressed as class RR during rain (only for Type II road marking products);

— Reflection in daylight or under road lighting (see 4.2.1):

- luminance coefficient under diffuse illumination (Qd) or luminance factor (β)

— Colour – Chromaticity (see 4.2.3 and 4.2.4):

- chromaticity coordinates (x, y);

— Skid Resistance SRT value (only for non-structured road markings) (see 4.2.5).

4.3.2 Durability on road trials

When a preformed road marking material to be used for permanent road marking is tested according to 5.3.2, the road marking product shall be exposed to at least roll-over class P1 of prEN 1824:2018, Table 3. In the case of road trial with studded tyres, class P0 applies and the actual value of wheel passages (to the nearest thousand wheel passages) shall be stated in the test report.

For the requirements of the preformed road marking material specified in 4.2, the results are expressed in terms of the respective class in EN 1436:2018 (with the exception of the colour, for which pass/fail criteria is used) for the corresponding roll-over class (P) and accompanied by studded tyres (Y/N).

4.3.3 Durability on wear simulator - turntable

When a preformed road marking material to be used for permanent road marking is tested according to 5.3.3, the road marking product shall be exposed to at least traffic class P4 of EN 13197:2011+A1:2014, Table 4.

For the requirements of the preformed road marking material specified in 4.2, the results are expressed in terms of the respective class in EN 1436:2018 (with the exception of the colour for which pass/fail criteria is used) for the corresponding roll-over class (P).

4.4 Technical Characteristics - Resistance to UV exposure

UV resistance shall be checked in accordance with 5.4. The chromaticity coordinates of preformed road marking after UV exposure shall comply with the region for white road markings or with region Y1 or Y2 for yellow road markings of Table 6 in EN 1436:2018, respectively for white and yellow preformed road marking.

The preformed road marking materials shall be classified in accordance with Table 1, where Δβ is the difference between the luminance factor before and after UV exposure.

Table 1 — Classes of UV resistance

Colour	**Class**	Δβ
White and yellow	UV0	No value requested
White and yellow	UV2	≤ 0,10