SLOVENSKI STANDARD
oSIST prEN 1871:2019

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Materiali za označevanje vozišča - Barve, vroča in hladna plastična masa - Fizikalne lastnosti

Road marking materials - Paint, thermoplastic and cold plastic materials - Physical properties

Straßenmarkierungsmaterialien - Markierungsfarben, Kaltplastikmassen und Heißplastikmassen - Physikalische Eigenschaften

Produits de marquage routier - Peintures, enduits à froid et à chaud - Propriétés physiques

Ta slovenski standard je istoveten z: **prEN 1871**

ICS:

93.080.20	Materiali za gradnjo cest	Road construction materials

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English Version

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 1871:2018) 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 1871:2000.

1 Scope

This document covers testing of physical properties of road marking materials by laboratory methods.

The products covered and specified by this document are white and yellow paint, thermoplastic and cold plastic materials, with or without premix glass beads, to be used for permanent and/or temporary road markings on highways and other areas used by vehicular traffic. Other products and colours intended for road markings are not covered in this document.

It is not essential that all physical properties listed in this document are specified.

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*

EN 12802, *Road marking materials - Laboratory methods for identification*

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

EN ISO 787-11, *General methods of test for pigments and extenders – Part 11: Determination of tamped volume and apparent density after tamping (ISO 787-11)*

EN ISO 1514, *Paints and varnishes - Standard panels for testing (ISO 1514)*

EN ISO 2812-1, *Paints and varnishes - Determination of resistance to liquids – Part 1: Immersion in liquids other than water (ISO 2812-1)*

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

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 http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
paint
liquid product which contains binders, pigments, fillers, solvents and additives, which can be supplied in single or multi-component systems and which, when applied, produces a cohesive film by the process of solvent/water evaporation and/or a chemical reaction and/or coalescence process (in the case of water base product)

3.2
thermoplastic
solvent-free marking product which is supplied in block, granular or powder forms, which is heated to a molten state prior to application to road surfaces, and which forms a cohesive film by cooling

3.3
cold plastic
viscous products supplied in multi-component forms (at least one main component and a hardener system), the cohesive film being formed after mixing of all components only by a chemical reaction following which the cold plastic becomes a solid

4 Requirements

4.1 General

This clause gives three separate lists of requirements for the product groups: ***Paints, thermoplastics and cold plastics.***

4.2 Paint

4.2.1 Chromaticity coordinates and luminance factor

The colour shall be defined by (x,y) chromaticity coordinates and luminance factor β of the CIE standard system.

When measured according to 5.2.1, the results of the test for the luminance factor shall comply with Table 1.

Table 1 — Classes of luminance factor

Colour	Class	Luminance factor β
White	LF5	≥ 0,75
	LF6	≥ 0,80
	LF7	≥ 0,85
Yellow	LF1	≥ 0,40
	LF2	≥ 0,50

When measured according to 5.2.1, the chromaticity coordinates shall lie within the regions defined by the corner points given in Table 2.

Table 2 — Chromaticity coordinates of white and yellow road marking products

Chromaticity coordinates		Corner point N°			
		1	2	3	4
White	*x*	0,355	0,305	0,285	0,335
	y	0,355	0,305	0,325	0,375
Yellow	*x*	0,494	0,545	0,465	0,427
	y	0,427	0,455	0,535	0,483

4.2.2 Hiding power

The capacity of the paint to reduce the contrast between a black surface and a white surface over which the paint has been applied and dried.

When measured according to 5.2.2, the result, expressed as the contrast ratio, shall comply with Table 3.

Table 3 — Classes of hiding power

Colour	Class	Hiding Power (contrast ratio)
White	HP0	No value requested
	HP2	≥ 90 %
	HP3	≥ 92 %
	HP4	≥ 95 %
Yellow	HP0	No value requested
	HP1	≥ 88 %
	HP2	≥ 90 %

4.2.3 Storage stability

The paint shall be free from skin and settlement that cannot be re-incorporated by stirring. When tested in accordance with 5.2.3, the paint shall have a rating equal to or above 4.

4.2.4 UV ageing

A film of paint is submitted to cycles of UV radiation and condensation and examined for discolouration.

When tested in accordance with 5.2.4, the difference in luminance factor $\Delta\beta$ shall be as in Table 4 (where: $\Delta\beta$ = original luminance factor – luminance factor after test).

Table 4 — Classes of difference in luminance factor after UV ageing

Colour	Class	$\Delta\beta$
White and Yellow	UV0	No value requested
	UV1	≤ 0,05
	UV2	≤ 0,10

For classes UV1, UV2 the chromaticity coordinates shall lie within the regions defined by the corner points given in Table 2.

4.2.5 Bleed resistance

This test is only applicable for paint which is intended to be applied directly to asphaltic surfaces. The film of paint applied to a bituminous surface is examined for discolouration.

When tested in accordance with 5.2.5, the difference in luminance factor $\Delta\beta$ shall be as in Table 5 (where: $\Delta\beta$ = original luminance factor – luminance factor after test).

Table 5 — Classes of difference in luminance factor after bleed resistance test

Colour	Class	$\Delta\beta$
White and Yellow	BR0	No value requested
	BR1	≤ 0,03
	BR2	≤ 0,05

For classes BR1, BR2 the chromaticity coordinates shall lie within the regions defined by the corner points given in Table 2.

4.2.6 Alkali resistance

This test is only applicable for paint which is intended to be applied directly to hydraulic concrete surfaces. The film of paint is submitted to the effect of a solution of sodium hydroxide and examined for surface deterioration.

When tested in accordance with 5.2.6, the paint film shall show no signs of partial or complete film destruction, surface roughening or discolouration.

4.3 Thermoplastics

4.3.1 General

Thermoplastic materials need to be melted before application so that their characteristics should remain stable after supporting a period of heating. This is the reason why the standard includes requirements before and after a heating cycle.

4.3.2 Tests before heat stability

4.3.2.1 Chromaticity coordinates and luminance factor

The colour shall be defined by (x,y) chromaticity coordinates and luminance factor β of the CIE standard system.

When measured according to 5.3.2.1, the results of the test for the luminance factor shall comply with Table 6.

Table 6 — Classes of luminance factor for thermoplastics and cold plastics

Colour	Class	Luminance factor β
White	LF3	≥ 0,65
	LF4	≥ 0,70
	LF5	≥ 0,75
	LF6	≥ 0,80
Yellow	LF1	≥ 0,40
	LF2	≥ 0,50

The chromaticity coordinates shall lie within the regions defined by the corner points given in Table 2.

4.3.2.2 Softening point

It is the temperature at which a given layer of thermoplastic material experiences a given deformation under the action of a steel ball.

When measured in accordance with 5.3.2.2, the softening point of the thermoplastic material shall comply with Table 7.

Table 7 — Classes of softening point for thermoplastics

Class	Softening point in °C
SP0	No value requested
SP1	≥ 65
SP2	≥ 80
SP3	≥ 95
SP4	≥ 110

4.3.2.3 Alkali resistance

This test is only applicable for thermoplastic which is intended to be applied directly to hydraulic concrete surfaces. The thermoplastic is submitted to the effect of a solution of sodium hydroxide and examined for surface deterioration.

When tested in accordance with 5.3.2.3, the thermoplastic film shall show no signs of partial or complete film destruction, surface roughening or discolouration.

4.3.2.4 Cold impact resistance

This test measures the resistance of thermoplastic material, at cold temperature, to the impact of a falling steel ball.

When tested in accordance with 5.3.2.4 the number of specimens passing the test shall comply with Table 8.

Table 8 — Classes for cold impact resistance

Class	Temperature of test in °C	Ball	Number of specimens passing
CI 0	No requirement	–	No value requested
CI 1	0	a	6
CI 2	−10 ± 3	a	6
CI 3	−10 ± 3	b	6

4.3.2.5 UV ageing

A film of thermoplastic is submitted to cycles of UV radiation and condensation and examined for discolouration.

When tested in accordance with 5.3.2.5, the difference in luminance factor $\Delta\beta$ shall be as in Table 4 (where: $\Delta\beta$ = original luminance factor – luminance factor after test).

For Classes UV1, UV2 the chromaticity coordinates shall lie within the regions defined by the corner points given in Table 2.

4.3.3 Tests after heat stability

4.3.3.1 Chromaticity coordinates and luminance factor

When tested in accordance with 5.3.3.2, the difference in luminance factor $\Delta\beta$ shall be no more than 0,10 for both white and yellow. The chromaticity coordinates shall be as given in Table 2.

4.3.3.2 Softening point

When tested in accordance with 5.3.3.3, the difference in softening point ΔSP (where: ΔSP = original softening point – softening point after heating) shall not be more than ± 10 °C.

4.3.3.3 Indentation

It is the time required for a standardized cylinder to sink 10 mm into the thermoplastic at a given temperature.

When tested in accordance with 5.3.3.4, the mean value for the indentation time shall comply with Table 9.

Table 9 — Classes for indentation

Class	Indentation time
IN0	No value requested
IN1	5 s to 45 s
IN2	46 s to 2 min
IN3	2 min 1 s to 5 min
IN4	5 min 1 s to 20 min
IN5	> 20 min

Table 10 — Standardized temperature for test

Temperature (°C)
20
25
30
40

4.3.4 Cold plastics

4.3.4.1 Chromaticity coordinates and luminance factor

The colour shall be defined by (x,y) chromaticity coordinates and luminance factor β of the CIE standard system.

When tested in accordance with 5.3.4.1, for the luminance factor, the results of the test shall comply with Table 6.

The chromaticity coordinates shall lie within the regions defined by the corner points given in Table 2.

4.3.4.2 Storage stability

The products shall be free from skin and settlement that cannot be re-incorporated by stirring.

When tested in accordance with 5.3.4.2, the product shall have a rating equal to or above 3.

NOTE See C.3.2 for components containing peroxides.