



SLOVENSKI STANDARD
SIST EN 1871:2020

01-december-2020

Nadomešča:
SIST EN 1871:2002

**Materiali za označevanje vozišča - Barve, vroče in hladne plastične mase -
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

<https://standards.iteh.ai/catalog/standards/sist/9d034148-4557-4429-ada4-132b976160a9/sist-en-1871-2020>

Ta slovenski standard je istoveten z: EN 1871:2020

ICS:

93.080.20 Materiali za gradnjo cest Road construction materials

SIST EN 1871:2020 **en,fr,de**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1871:2020

<https://standards.iteh.ai/catalog/standards/sist/9d034148-4557-4429-ada4-132b976160a9/sist-en-1871-2020>

EUROPEAN STANDARD

EN 1871

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2020

ICS 93.080.20

Supersedes EN 1871:2000

English Version

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

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

Straßenmarkierungsmaterialien - Markierungsfarben, Kaltplastikmassen und Heißplastikmassen - Physikalische Eigenschaften

This European Standard was approved by CEN on 19 July 2020.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

Contents	Page
European foreword.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions.....	6
4 Requirements.....	7
4.1 General.....	7
4.2 Paint.....	7
4.3 Thermoplastic.....	9
4.4 Cold plastic.....	11
5 Test methods.....	12
5.1 General.....	12
5.2 Paint.....	12
5.3 Thermoplastic.....	13
5.4 Cold plastic.....	13
Annex A (normative) Paint and cold plastic – Test method for determining the luminance factor and chromaticity coordinates.....	15
A.1 Principle and apparatus.....	15
A.2 Materials.....	15
A.3 Procedure.....	15
Annex B (normative) Paint – Test method for determining the hiding power.....	16
B.1 Principle.....	16
B.2 Apparatus.....	16
B.3 Procedure.....	16
B.4 Expression of results.....	17
Annex C (normative) Paint and cold plastic – Test method for determining the storage stability.....	19
C.1 Principle.....	19
C.2 Apparatus.....	19
C.3 Procedure.....	21
C.4 Determination of the degree of suspension and ease of remixing.....	21
C.5 Rating.....	21
Annex D (normative) Paint – Test method for determining the bleed resistance.....	23
D.1 Principle.....	23
D.2 Apparatus and materials.....	23
D.3 Preparation of bitumen coated carrier panel.....	23
D.4 Procedure.....	23

Annex E (normative) Paint, cold plastic and thermoplastic – Test method for determining the alkali resistance of the materials	25
E.1 Principle.....	25
E.2 Apparatus and reagents	25
E.3 Number of tests	26
E.4 Preparation of test panels	26
E.5 Testing.....	27
E.6 Evaluation of the surface conditions	27
E.7 Precision and repetition	27
Annex F (normative) Thermoplastic – Test method for determining the chromaticity coordinates and luminance factor.....	28
F.1 Principle.....	28
F.2 Apparatus	28
F.3 Procedure	28
Annex G (normative) Thermoplastic – Test method for determining the softening point	29
G.1 Principle.....	29
G.2 Apparatus	29
G.3 Samples	29
G.4 Preparation of the ring	29
G.5 Procedure.....	31
G.6 Expression of the result.....	31
Annex H (normative) Thermoplastic – Test method for determining the heat stability.....	32
H.1 Principle.....	32
H.2 Apparatus	32
H.3 Preparation of sample	32
Annex I (normative) Thermoplastic – Test method for determining the cold impact resistance.....	37
I.1 Principle.....	37
I.2 Apparatus and reagents	37
I.3 Procedure	38
Annex J (normative) Thermoplastic – Test method for determining the indentation value	39
J.1 Principle.....	39
J.2 Summary.....	39
J.3 Apparatus	39
J.4 Preparation of the sample	41
J.5 Testing.....	42
J.6 Calculation.....	42

EN 1871:2020 (E)

J.7	Interpretation of the results	42
J.8	Reporting	42
	Bibliography.....	43

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1871:2020

<https://standards.iteh.ai/catalog/standards/sist/9d034148-4557-4429-ada4-132b976160a9/sist-en-1871-2020>

European foreword

This document (EN 1871:2020) 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 April 2021, and conflicting national standards shall be withdrawn at the latest by April 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1871:2000.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 1871:2020

<https://standards.iteh.ai/catalog/standards/sist/9d034148-4557-4429-ada4-132b976160a9/sist-en-1871-2020>

EN 1871:2020 (E)**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.

Not all physical properties listed in this document have to be 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:

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

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 or the process of solvent/water evaporation and a chemical reaction or coalescence process (in the case of water based product)

3.2**thermoplastic**

solvent-free marking product which is supplied in block, granular, powder forms or preformed (e.g. as tape), 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: *paint, thermoplastic and cold plastic*.

4.2 Paint

4.2.1 Luminance factor and chromaticity coordinates

The colour shall be defined by luminance factor β and (x,y) chromaticity coordinates 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	$\geq 0,75$
	LF6	$\geq 0,80$
	LF7	$\geq 0,85$
Yellow	LF1	$\geq 0,40$
	LF2	$\geq 0,50$

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 test measures 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 $\Delta\beta$ is the difference between luminance factor before and 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 $\Delta\beta$ is the difference between luminance factor before and 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 Thermoplastic

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 Luminance factor and chromaticity coordinates

The colour shall be defined by luminance factor β and (x,y) chromaticity coordinates 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 thermoplastic and cold plastic

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

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

4.3.2.2 Softening point

The test measures 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 thermoplastic

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

NOTE Steel ball type (a) and (b) are specified in Annex I.

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: $\Delta\beta$ is the difference between luminance factor before and 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 Luminance factor and chromaticity coordinates

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 is the difference between softening point before and 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

4.4 Cold plastic

4.4.1 Luminance factor and chromaticity coordinates

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

When tested in accordance with 5.4.1, 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.