SLOVENSKI STANDARD
SIST EN 438-8:2019

01-januar-2019

Nadomešča:
SIST EN 438-8:2009

Dekorativni visokotlačni laminati (HPL) - Plošče na osnovi duromernih smol (laminati) - 8. del: Razvrstitev in specifikacije laminatov s posebnimi vzorci

High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (usually called laminates) - Part 8: Classification and specifications for design laminates

Dekorative Hochdruck-Schichtpressstoffplatten (HPL) - Platten auf Basis härtbarer Harze (Schichtpressstoffe) - Teil 8: Klassifizierung und Spezifikationen für Design-Schichtpressstoffe

Stratifiés décoratifs haute pression (HPL) - Plaques à base de résines thermodurcissables (communément appelées stratifiés) - Partie 8 : Classification et spécifications relatives aux stratifiés à effets de surface spéciaux

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ICS:

83.140.20	Laminatne plošče	Laminated sheets

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EUROPEAN STANDARD

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English Version

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This European Standard was approved by CEN on 28 September 2018.

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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.

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

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European foreword

This document (EN 438-8:2018) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by May 2019, and conflicting national standards shall be withdrawn at the latest by May 2019.

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 438-8:2009.

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

The test methods referenced have been updated as appropriate; the terms, definitions, symbols and abbreviations are aligned with the other parts of the EN 438 published; the machined crosshead speed for the determination of the flexural characteristics, is the same of the one specified in EN 438-4:2016.

EN 438, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (usually called laminates)*, consists of the following parts:

— *Part 1: Introduction and general information*;

— *Part 2: Determination of properties*;

— *Part 3: Classification and specifications for laminates less than 2 mm thick intended for bonding to supporting substrates*;

— *Part 4: Classification and specifications for compact laminates of thickness 2 mm and greater*;

— *Part 5: Classification and specifications for flooring grade laminates less than 2 mm thick intended for bonding to supporting substrates*;

— *Part 6: Classification and specifications for Exterior-grade compact laminates of thickness 2 mm and greater*;

— *Part 7: Compact laminate and HPL composite panels for internal and external wall and ceiling finishes*;

— *Part 8: Classification and specifications for design laminates*;

— *Part 9: Classification and specifications for alternative core laminates*.

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

1 Scope

This document specifies performance requirements for design laminates intended for interior use with a design effect surface having a phenolic based core and a decorative surface, not covered by EN 438-3 [1], EN 438-4 [2], EN 438-5 [3] and EN 438-6 [4]. Three surface layer types (metal, wood veneer and pearlescent decor) are defined in this part of EN 438.

EN 438-2 specifies the test methods relevant to this part of EN 438.

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 438-2:2016, *High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (usually called laminates) – Part 2: Determination of properties*

EN ISO 178, *Plastics - Determination of flexural properties (ISO 178)*

EN ISO 1183-1, *Plastics - Methods for determining the density of non-cellular plastics – Part 1: Immersion method, liquid pyknometer method and titration method (ISO 1183-1)*

3 Terms, definitions, symbols and abbreviations

3.1 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

3.1.1
high-pressure decorative design laminate
design laminate
HPL
sheet consisting of decorative design surface layer(s) and core layers bonded together by an high pressure process

Note 1 to entry: Typical values for the high pressure process are a temperature of ≥ 120 °C and a pressure of ≥ 5 MPa.

3.1.2
surface layer
upper decorative layer consisting in one or more sheets of fibrous material (usually paper) impregnated with aminoplastic thermosetting resins (usually melamine based resins)

Note 1 to entry: The surface layers appear on one or both side(s) of the laminate(s). They are not necessarily treated with thermosetting resin. In case of one-sided laminates, the back of the sheet(s) can be made suitable for adhesive bonding to a substrate.

3.1.3
Types of high-pressure decorative design laminates

3.1.3.1
pearlescent laminate
design laminate, the surface layer of which consists of a pearlescent effect decorative paper, which is impregnated with aminoplastic thermosetting resins (usually melamine based resins)

Note 1 to entry: To achieve the optimum aesthetic effect from the pearlescent pigment a protective melamine layer is not used.

Note 2 to entry: As a result some surface properties are reduced (e.g. scratch, wear), therefore it is recommended that these products are used for vertical applications.

3.1.3.2
metal laminate
design laminate, the surface layer of which consists of a thin layer of metal

Note 1 to entry: Example: aluminium, steel or copper.

Note 2 to entry: It is often protected by a thin layer of lacquer or in the case of aluminium the surface can be anodized. The surface performance and appearance of these metal laminates is equivalent to that of thin metal sheet.

Note 3 to entry: As some surface properties are lower than that of melamine (e.g. scratch and wear), it is recommended that these products are used for vertical applications.

3.1.3.3
wood veneer laminate

design laminate, the surface layer of which consists of a wood veneer, which is covered by a protective melamine layer

Note 1 to entry: The surface appearance of these wood veneer laminates is similar to wood.

Note 2 to entry: Wood veneer laminates are not normally available in postforming grade.

3.1.4
core layer
fibrous materials (usually paper) impregnated with thermosetting resins (usually phenolic based resins)

3.2 Symbols

For the purposes of this document, the following symbol applies.

t nominal thickness of the design laminate

4 Material types and classification system

High-pressure decorative design laminate is defined using a three letter classification system as shown in Table 1.

Table 1 — High-pressure decorative design laminate classification system

First letter		Second letter		Third letter	
A	(Pearlescent laminate)	C	(Compact)	S	(Standard grade)
M	(Metal laminate)	T	(Thin laminate < 2 mm)	or P	(Postformable grade)
W	(Wood veneer laminate)			or F	(Flameretardant grade)

Type S – Standard grade high-pressure decorative design laminate.

Type P – Postformable high-pressure decorative design laminate, similar to type S but can also be formed at elevated temperature.

Type F – High-pressure decorative design laminate with improved fire retardance similar to type S or P but also complying with special requirements of specified tests which may vary according to the application (e.g. construction, marine, transport) and the country of use (see 5.4.5).

In addition to the abbreviation "HPL" and the number of this European Standard, materials shall be specified by the alphabetical classification system.

EXAMPLE "Pearlescent Standard Grade Thin high-pressure decorative design laminate" is designated as HPL/EN 438-8 ATS.

5 Requirements

5.1 Compliance

High-pressure decorative design laminate classified in Table 1 shall comply with all appropriate requirements specified in 5.2, 5.3 and 5.4. This applies to both full-size sheets and cut-to-size panels.

5.2 Inspection requirements

5.2.1 General

Inspection shall be carried out in accordance with EN 438-2:2016, Clause 4, at a distance between 750 mm and 1 500 mm.

5.2.2 Colour, pattern and surface finish

5.2.2.1 Pearlescent

When inspected in daylight or D65 standard illuminant, as specified in EN ISO 11664-2, and also under tungsten-filament lightning illuminant A as specified in EN ISO 11664-2, a slight difference between the corresponding colour reference sample held by the supplier and the specimen under test is acceptable.

As colour and surface finish are critical, it is recommended that sheets are checked for colour and surface-finish compatibility without protective film before fabrication or installation.

Some of these products are directional in surface finish or colour and they shall be installed in the correct orientation.

5.2.2.2 Metal

When inspected in daylight or D65 standard illuminant, as specified in EN ISO 11664-2, and also under tungsten-filament lightning illuminant A as specified in EN ISO 11664-2, a slight difference between the corresponding colour reference sample held by the supplier and the specimen under test is acceptable.

As colour and surface finish are critical, it is recommended that sheets are checked for colour and surface-finish compatibility without protective film before fabrication or installation.

Some of these products are directional in surface finish or colour and they shall be installed in the correct orientation. Small indentations in the surface are unavoidable.

5.2.2.3 Wood veneer

Due to the fact that wood is a natural product, each veneer may be considered as unique. Slight colour and structure differences are considered as normal. Singularities such as knots and resin inclusions are not considered as defects, but as a part of the decor. There are differences in light fastness performances depending on the wood species and the source of the wood.

5.2.3 Reverse side

The reverse side of single-sided sheets shall be suitable for adhesive bonding (e.g. sanded). In the case of sanded backs, slight chatter marks shall be permitted.

5.2.4 Visual inspection

5.2.4.1 General

The following inspection requirements are intended as a general guide, indicating the minimum acceptable quality for laminates.

Cut-to-size panels and certain applications involving full-size sheets may call for special quality requirements which can be negotiated between supplier and purchaser; in such cases the following requirements may be used as a basis for agreement.

Only a small percentage of sheets in a batch (the level to be agreed with the customer) should contain defects of the minimum acceptable level.

5.2.4.2 Surface quality

The following surface defects are permissible:

a) Dirt, spots, dents and similar surface defects.

The admissible size of such defects is based on a maximum contamination area equivalent to 1,0 mm^2/m^2 of laminate and is proportional to the sheet size under inspection.

The total admissible area of contamination may be concentrated in one spot or dispersed over an unlimited amount of smaller defects.

b) Fibres, hairs and scratches.

The admissible size of defects is based on a maximum contamination length equivalent to 10 mm/m^2 of laminate and is proportional to the sheet size under inspection.

The total admissible length of contamination may be concentrated in one defect or dispersed over an unlimited amount of smaller defects.

5.2.4.3 Edge quality

Visual defects (e.g. moisture marks, lack of gloss, corner damage) can be present on all four edges of the laminate, providing the defect-free length and width are at least the nominal size minus 20 mm.

For compact laminates edge chipping up to 3 mm on each side is permissible.

5.3 Dimensional tolerance requirements

5.3.1 Dimensional tolerance requirements for pearlescent laminates

Dimensional tolerance requirements for pearlescent laminates are specified in Tables 2 and 3.

Table 2 — Dimensional tolerance requirements for thin pearlescent laminates

Property	Test method (EN 438-2:2016, clause nº.)	Requirement
Thickness	5	0,5 mm ≤ t ≤ 1,0 mm: maximum variation ± 0,10 mm 1,0 mm < t < 2,0 mm: maximum variation ± 0,15 mm
Flatness [a]	9	maximum deviation: 60 mm/m
Length and width [b]	6	nominal size $^{+10}_{0}$ mm
Straightness of edges [b]	7	Maximum deviation: 1,5 mm/m
Squareness [b]	8	Maximum deviation: 1,5 mm/m

[a] Provided that the pearlescent laminates are stored in the manner and conditions recommended by the manufacturer they shall comply with the flatness requirements specified in Table 2 when measured in accordance with EN 438-2:2016, Clause 9.

[b] Tolerances for cut-to-size panels shall be agreed between supplier and purchaser.

Table 3 — Dimensional tolerance requirements for compact pearlescent laminates

Property	Test method (EN 438-2:2016, clause nº.)	Requirement
Thickness	5	2,0 mm ≤ *t* < 3,0 mm: maximum variation ± 0,20 mm 3,0 mm ≤ *t* < 5,0 mm: maximum variation ± 0,30 mm 5,0 mm ≤ *t* < 8,0 mm: maximum variation ± 0,40 mm 8,0 mm ≤ *t* < 12,0 mm: maximum variation ± 0,50 mm 12,0 mm ≤ *t* < 16,0 mm: maximum variation ± 0,60 mm 16,0 mm ≤ *t* < 20,0 mm: maximum variation ± 0,70 mm 20,0 mm ≤ *t* < 25,0 mm: maximum variation ± 0,80 mm 25,0 mm ≤ *t*: to be agreed between supplier and customer
Flatness [a]	9	2,0 mm ≤ *t* < 6,0 mm: 8,0 mm/m maximum deviation 6,0 mm ≤ *t* < 10,0 mm: 5,0 mm/m maximum deviation 10,0 mm ≤ *t*: 3,0 mm/m maximum deviation
Length and width [b]	6	nominal size $^{+10}_{0}$ mm
Straightness of edges [b]	7	Maximum deviation: 1,5 mm/m
Squareness [b]	8	Maximum deviation: 1,5 mm/m

[a] Provided that the pearlescent laminates are stored in the manner and conditions recommended by the manufacturer they shall comply with the flatness requirements specified in Table 3 when measured in accordance with EN 438-2:2016, Clause 9. The flatness values specified in Table 3 apply to pearlescent laminates with two decorative faces. Limits for pearlescent laminates with one face sanded shall be agreed between supplier and customer.

[b] Tolerances for cut-to-size panels shall be agreed between supplier and purchaser.

5.3.2 Dimensional tolerances requirements for metal laminates

Dimensional tolerance requirements for metal laminates are specified in Tables 4 and 5