SLOVENSKI STANDARD
oSIST prEN 438-7:2014

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Dekorativni visokotlačni laminati (HPL) - Plošče na osnovi duromernih smol - 7. del: Kompaktni laminati in kompozitni paneli HPL za notranjo in zunanjo oblogo zidov in stropov

High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (Usually called Laminates) - Part 7: Compact laminate and HPL composite panels for internal and external wall and ceiling finishes

Dekorative Hochdruck-Schichtpressstoffplatten (HPL) - Platten auf Basis härtbarer Harze (Schichtpressstoffe) - Teil 7: Kompaktplatten und HPL-Mehrschicht-Verbundplatten für Wand- und Deckenbekleidungen für Innen- und Außenanwendung

Stratifiés décoratifs haute pression (HPL) - Plaques à base de résines thermodurcissables (communément appelées stratifiés) - Partie 7: Panneaux stratifiés compacts et composites HPL pour finitions des murs et plafonds intérieurs et extérieurs

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 249.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN 438-7:2014) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 438-7:2005.

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.

This European Standard is a revision of EN 438 and consists of nine parts:

— prEN 438-1 Plastics — High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 1: Introduction and general information

— prEN 438-2 Plastics — High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 2: Determination of properties

— prEN 438-3 Plastics — High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 3: Classification and specifications for laminates less than 2 mm thick intended for bonding to supporting substrates

— prEN 438-4 Plastics — High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 4: Classification and specifications for Compact laminates of thickness 2 mm and greater

— prEN 438-5 Plastics — High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 5: Classification and specifications for flooring grade laminates less than 2 mm thick intended for bonding to supporting substrates

— prEN 438-6 Plastics — High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 6: Classification and specifications for Exterior-grade Compact laminates of thickness 2 mm and greater

— prEN 438-7 Plastics — High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 7: Compact laminate and HPL composite panels for internal and external wall and ceiling finishes

— EN 438-8 Plastics — High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 8: Classification and specifications for design laminates

— EN 438-9 Plastics — High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 9: Classification and specifications for alternative core laminates

1 Scope

This part of this European Standard specifies requirements for compact laminate produced by using an high pressure process and HPL composite panels for interior and/or external wall and ceiling finishes (non-structural) including suspended ceilings.

It covers full size and cut-to-size panels.

The compact laminate panels and HPL composite panels allow to be mechanically fixed using e. g. screws or rivets.

This part of this European Standard also specifies test methods, provisions for the assessment and verification of constancy of performance (AVCP) of these products and includes requirements for marking.

This part of this European Standard does not cover:

a) HPLs less than 2 mm thick as defined in EN 438 part 3, part 8 and part 9 not glued on a substrate and placed on the market as a separate product;

b) overlaid or veneered wood-based panels, where the overlay/veneer is not an HPL;

c) HPL composite panels intended for use as floor coverings;

d) panels used for fire protection of walls or ceilings.

2 Normative references

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

prEN 438-1, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) — Part 1: Introduction and general information.*

prEN 438-2, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) — Part 2: Determination of properties.*

prEN 438-3, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) — Part 3: Classification and specifications for laminates less than 2 mm thick intended for bonding to supporting substrates.*

prEN 438-4, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) — Part 4: Classification and specifications for Compact laminates of thickness 2 mm and greater.*

prEN 438-5, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) - Part 5: Classification and specifications for flooring grade laminates less than 2 mm thick intended for bonding to supporting substrates*

prEN 438-6, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) — Part 6: Classification and specifications for Exterior-grade Compact laminates of thickness 2 mm and greater.*

EN 438-8, High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) -Part 8: Classification and specifications for design laminates

EN 438-9, High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) -Part 9: Classification and specifications for alternative core laminates

EN 717-1, *Wood-based panels — Determination of formaldehyde release — Part 1: Formaldehyde emission by the chamber method.*

EN 717-2, *Wood-based panels — Determination of formaldehyde release — Part 2: Formaldehyde release by the gas analysis method.*

EN 12664, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Dry and moist products of medium and low thermal resistance.*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests.*

EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item.*

EN 13986, *Wood-based panels for use in construction — Characteristics, evaluation of conformity and marking.*

EN ISO 10140-2, *Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation*

EN ISO 178, *Plastics — Determination of flexural properties.*

EN ISO 354, *Acoustics — Measurement of sound absorption in a reverberation room.*

EN ISO 717-1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation.*

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

EN ISO 10456, *Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values.*

EN ISO 11295, *Classification and information on design of plastics piping systems used for renovation*

EN ISO 11654, *Acoustics — Sound absorbers for use in buildings — Rating of sound absorption*

EN ISO 12572, *Hygrothermal performance of building materials and products — Determination of water vapour transmission properties.*

EN ISO 14025, *Environmental labels and declarations - Type III environmental declarations - Principles and procedures*

ISO 13894-1, *High-pressure decorative laminates — Composite elements — Part 1: Test methods.*

ISO 13894-2, *High-pressure decorative laminates -- Composite elements -- Part 2: Specifications for composite elements with wood-based substrates for interior use.*

3 Terms and definitions

For the purposes of this document, the following term and definition applies.

3.1
high-pressure decorative laminate(s) (HPL)

Sheet(s) consisting of decorative 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

3.2
surface layer

upper decorative layer consisting in one or more sheets of fibrous material (usually paper) impregnated with aminoplastic thermosetting resins (usually melamine) or other curable resins or other decorative design surfaces such as metal foils, wood-veneers and textiles, etc. which are not necessarily treated with thermosetting resin

Note 1 to entry: The surface layers can appear on one or both side(s) of the laminate(s). In case of one-sided laminates, the back of the sheet(s) may be made suitable for adhesive bonding to a substrate.

3.3
core layers

core layers consisting of fibrous materials (usually paper) impregnated with thermosetting resins (usually phenolic based resins) or other curable resins, eventually reinforced by metal layer(s) or metal mesh(es) and others which are not necessarily treated with thermosetting resin

3.4
HPL composite panels

panels produced by adhesively bonding an HPL, fulfilling the requirements of EN 438 parts 3, 4, 6, 8 or 9, to one or both sides of a substrate.
HPL composite panels may be supplied in the form of full size or smaller cut-to-size panels.

3.5
substrate of the HPL composite panels

board to which the HPL is bonded.

Note 1 to entry: the substrate can be a wood based product (e.g. particleboard, plywood or fibreboard), a mineral board (e.g. calcium silicate), an expanded honeycomb, a metal sheet or plastic material, organic or inorganic foams.

3.6
tile

element of regular geometric form with reduced thickness and such dimensions that can be easily held by one person.

3.7
sidings

elements of regular geometric form in which length predominates over the other two dimensions having reduced thickness.

4 Product characteristics

4.1 Reaction to fire

Where required, the reaction to fire shall be assessed and classified in accordance with 5.1.

Interior grade non-flame retardant HPL panels are considered to be Classified Without Further Testing (CWFT) in the classes shown in Table 1[1]

Table 1 — Classes of reaction-to-fire performance of high-pressure decorative laminate panels

High pressure decorative laminate panels [a]	Product detail	Minimum density (kg/m^3)	Minimum overall thickness (mm)	Class [b] (excluding floorings)
Interior grade non-FR Compact HPL panels (3)	Compact HPL meeting EN 438-4, Type CGS	1 350	6	D-s2,d0
Interior grade non-FR HPL composite panels with wood-based substrates [c]	Composite panels comprising non-FR grade HPL meeting the requirements of EN 438-3, adhesively bonded to both sides of non-FR grade wood-based core of minimum thickness 12 mm complying with EN 13986, using PVAc or thermosetting adhesive at an application rate of 60 g/m^2 to 120 g/m^2	Wood-based core minimum density 600 HPL minimum density 1 350	12 mm wood-based core with HPL ≥ 0,5 mm bonded to both sides	D-s2,d0

[a] Either directly fixed (i.e. with no air gap) to a material having a reaction to fire class of A2-s1,d0 or better and a density of at least 600 kg/m^3; or mounted on a timber or metal batten support frame, with a non-ventilated (i.e. void open only at the top) air gap of at least 30 mm, the reverse face of the cavity so formed having a reaction to fire classification of A2-s2,d0 or better.

[b] Classes as provided for in Table 1 of the Annex to Decision 2000/147/EC

[c] Complying with European standard EN 438-7

For products other than those covered by the CWFT Decision, or where the manufacturer seeks a higher class, the product shall be tested and classified in accordance with 5.1 and the resulting class and sub-class shall be declared.

[1] Commission Decision 2003/43/EC of 2003 January 17th (OJEU L 13 of 18.01.2003) as amended by Commission Decision 2003/593/EC of 2003 August 7th (OJEU L 201 of 8.08.2003) establishing the classes of reaction-to-fire of certain construction products.

4.2 Water vapour permeability

Water vapour permeability requirement apply only for compact and HPL composite panels intended for end uses on walls subject to water vapour permeability regulations, and where the panel is intended to contribute to water vapour resistance.

The water vapour permeability shall be declared as the water vapour resistance factor, μ. The value shall be taken from Table 2 in both conditions wet and dry.

Table 2 — Water vapour permeability values

Product	Density	Water vapour resistance factor [a]	
		Wet cup μ	Dry cup μ
Compact laminate panel	1 350 kg/m^3	110	250
HPL composite panel	Particleboard substrate density 300 kg/m^3	10	50
	Particleboard substrate density 600 kg/m^3	15	50
	Particleboard substrate density 900 kg/m^3	20	50
HPL composite panel	Fibreboard substrate density 400 kg/m3	5	10
	Fibreboard substrate density 600 kg/m3	12	20
	Fibreboard substrate density 800 kg/m3	20	30
[a] Linear interpolation for intermediate density values is possible.			

When a better performance is thought for declaration, the water vapour permeability of the material used shall be determined in accordance with 5.2.

4.3 Resistance to fixings

Resistance to fixings is relevant only for compact laminates and for HPL composite panels with associated fixing intended for uses subject to requirements against accidental fall of objects on transit areas.

Resistance to fixings shall be determined in case of HPL composite panels as resistance to axial withdrawn force of wood screws from the face (face screw-holding) in accordance with 5.3.

Screw holding values of Compact panels shall be declared as screw holding values from Table 3.

Table 3 — Resistance to fixings – values for Compact laminate panels

Compact laminate panels thickness (mm)	Screw holding value (Newtons)
2	250
4	1 000
6	2 000
8	3 000
≥ 10	4 000

4.4 Bonding strength

Bonding strength requirements only apply to HPL composite tiles and sidings intended for uses subject to requirements against accidental fall of objects on transit areas.

The bonding strength shall be determined in accordance with 5.5 and the value shall be declared as perpendicular tensile strength.

The results shall comply with the corresponding requirements of ISO 13894-2 in accordance with 5.3.

4.5 Direct airborne sound insulation

Direct airborne sound insulation requirements apply only to compact laminate panel and HPL composite panels intended for uses in walls/ceilings subject to acoustic regulations, and where the manufacturer wishes to declare the performance.

The performance shall be measured in accordance with 5.5 and expressed in accordance with EN ISO 717-1.

4.6 Flexural tensile strength

Flexural tensile strength requirement is applicable only to compact laminate panels and HPL composite panels intended for use in suspended ceilings.

The flexural tensile strength of HPL composite panels shall be determined as perpendicular tensile strength in accordance with 5.6. The result(s) shall be declared and expressed in MPa.

The flexural tensile strength of compact laminate panels shall be determined as flexural strength and flexural modulus of elasticity according to subclause 5.6. The results shall comply with the corresponding requirements of EN 438-4 Table 2 for interior use or EN 438-6 Table 2 for exterior use or EN 438-8 tables 8, 9 and 10 for interior use or EN 438-9 tables 6 and 7 for interior use. The result(s) shall be declared and expressed in MPa.

4.7 Thermal resistance/conductivity

Thermal resistance/conductivity requirement applies only to compact laminate panels and HPL composite panels intended for end uses on walls/ceilings subject to thermal insulation regulations, and where the manufacturer wishes to declare the performance.

4.8 Release of dangerous substances

4.8.1 Formaldehyde emission

Formaldehyde emission levels from Compact laminate panels and from HPL wood-based composite panels shall be determined in accordance with 5.8.1.

Formaldehyde emission levels from HPL Compact laminate panels comply with Class E1 requirements without the need for testing.
In the case of HPL wood-based composite panels, if the substrate complies with Class E1 requirements, then the complete panel shall be accepted as meeting Class E1 without the need for testing.

For initial type testing of HPL wood-based composite panels according to EN 717-1 the release of formaldehyde shall be declared in terms of formaldehyde class as defined in Table 4.

For factory production control purposes formaldehyde emission may be determined in accordance with the appropriate values from Table 4 according to EN 717-2.

Table 4 — Release of formaldehyde limit values

	EN 717-1 requirement	EN 717-2 requirement
Class E1	≤ 0,12 mg/m3 air	≤ 3,5 mg/m2 h
Class E2	> 0,12 mg/m3 air	> 3,5 to ≤ 8,0 mg/m2 h
NOTE For established products, initial type testing may also be done on the basis of existing data from tests carried out in accordance with EN 120 [1] or EN 717-2, either from factory production control or from external inspection.		

4.8.2 Release of other dangerous substances

National regulations on dangerous substances may require, verification and declaration on release, and sometimes content, of other dangerous substances, in addition to those dealt with in other clauses, when construction products covered by this standard are placed on those markets.

In the absence of European harmonized test methods note, 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 web site on EUROPA accessed through:

http://ec.europa.eu/enterprise/construction/cpd-ds/

4.9 Sound absorption

Sound absorption applies only for compact laminate panels and HPL composite panels intended to be used for acoustical absorbent purposes, and where the panel is intended to contribute to sound absorption.

Compact laminate panels and HPL composite panels are used most of the time as a component of building element. The acoustic performance is relevant for the building element of which the panel is a part.

If the building element including compact laminate panels or HPL composite panels is to be tested for sound absorption, then it shall be tested in accordance with 5.9 and rated in accordance with EN ISO 11654.

4.10 Additional characteristics for external use (thermal shock)

The thermal shock resistance shall be determined as resistance to climatic shock according to subclause 5.10. Compact laminate panels shall comply with the requirement specified in EN 438-6 table 4, Resistance to climatic shock.

4.11 Durability

4.11.1 Compact laminate panels for internal use

The durability of the characteristics of the Compact laminate panels for internal use shall be demonstrated by testing in accordance with 5.11.1. Compact laminate panels shall comply with the requirements specified in EN 438-4, table 3, Resistance to immersion in boiling water and Density.

4.11.2 Compact laminate panels for external use

The durability of the characteristics of Compact laminate panels for external use shall be demonstrated by testing in accordance with 5.11.2. Compact laminate panels shall comply with the requirements specified in EN 438-6 table 3, Resistance to wet conditions and Density.

4.11.3 HPL composite panels for internal use

The durability of the characteristics of HPL composite panels for internal use shall be demonstrated by testing in accordance with 5.11.3 and declaring the results.

4.11.4 HPL composite panels for external use

The durability of the characteristics of HPL composite panels for external use shall be demonstrated by testing in accordance with 5.11.4 and declaring the results.

4.12 Sustainability

For the assessment of the sustainable use of resources and for the impact assessment of building works on the environment as aspects of sustainability, environmental product declarations in accordance with 5.12.

5 Testing, assessment and sampling methods

5.1 Reaction to fire

For reaction to fire, the classification of the thinnest either compact laminate panels or HPL composite panels of the family tested shall be valid for all thicker products of that family. However, testing of thicker product may be used to prove a better classification.
Panel parameters defining family of panels in relation to reaction to fire performance are reported in Annex B (normative).

Products other than those covered by the CWFT Decision, or where the manufacturer seeks an higher class, shall be tested and classified according to EN 13501-1.

Preparation of the test specimens shall be in accordance with the specified test methods.
For the SBI test according to EN 13823, the specimens shall be mounted as defined in Annex A.

5.2 Water vapour permeability

The water vapour permeability of the material used shall be determined according to EN ISO 12572.

5.3 Resistance to fixings

in case of HPL composite panels the Resistance to fixings shall be determined according to ISO 13894-1, clause 15.

5.4 Bonding strength

The bonding strength shall be determined according to ISO 13894-1 clause 10: Perpendicular tensile strength.

5.5 Direct airborne sound insulation

The Direct airborne sound insulation shall be measured as described in EN ISO 10140-2.

5.6 Flexural tensile strength

The flexural tensile strength of HPL composite panels shall be determined as perpendicular tensile strength according to ISO 13894-1 clause 10. The result(s) shall be declared and expressed in MPa.

The flexural tensile strength of compact laminate panels shall be determined as flexural strength and flexural modulus of elasticity measured in the transverse direction according to EN ISO 178, at a machine crosshead speed of 10 mm/min. The result(s) shall be declared and expressed in MPa.

5.7 Thermal resistance/conductivity

The thermal resistance/conductivity shall be determined in accordance with EN 12664 or can be calculated from data taken from EN ISO 10456.
When calculating the thermal conductivity of the HPL composite panels, the contribution of HPL is to be considered as 0,3 W/(m K).
In case of compact laminate panels, the thermal conductivity value may be declared at the most as 0,3 W/(m K).

5.8 Release of dangerous substances

5.8.1 Formaldehyde emission

For initial type testing of HPL wood-based composite panels the release of formaldehyde shall be determined according to EN 717-1.
For factory production control purposes formaldehyde emission may be determined in accordance with EN 717-2.

5.8.2 Release of other dangerous substances

In the absence of European harmonized test methods note, 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 web site on EUROPA accessed through:
http://ec.europa.eu/enterprise/construction/cpd-ds/

5.9 Sound absorption

If the building element including compact laminate panels or HPL composite panels is to be tested for sound absorption, then it shall be tested in accordance with EN ISO 354 and rated in accordance with EN ISO 11654.

5.10 Additional characteristics for external use (thermal shock)

The thermal shock resistance shall be determined as resistance to climatic shock according to EN 438-2, clause 19.

5.11 Durability

5.11.1 Compact laminate panels for internal use

The durability of the characteristics of the Compact laminate panels for internal use shall be tested as follows: Resistance to immersion in boiling water in accordance with EN 438-2, clause 12, and Density in accordance with EN ISO 1183-1, Test method A.

5.11.2 Compact laminate panels for external use

The durability of Compact laminate panels for external use shall be tested as follows: resistance to wet conditions in accordance with EN 438-2, clause 15, and density in accordance with EN ISO 1183-1, Test method A.

5.11.3 HPL composite panels for internal use

The durability of HPL composite panels for internal use shall be tested as follows: Glue-line quality in accordance with ISO 13894-1, clause 8; Resistance to elevated temperature in accordance with ISO 13894-1, clause 12, and Water resistance in accordance with ISO 13894-1, clause 19.

5.12.4 HPL composite panels for external use

The durability of HPL composite panels for external use shall be demonstrated by testing as follows: Glue-line quality in accordance with ISO 13894-1, clause 8; Resistance to elevated temperature in accordance with ISO 13894-1, clause 12; Resistance to wet conditions in accordance with EN 438-2, clause 15.

5.12 Sustainability

The assessment of the sustainable use of resources and the impact assessment of building works on the environment as aspects of sustainability, environmental product declarations has to be performed in accordance with EN ISO 14025.

6 Assessment and verification of constancy of performance - AVCP

6.1 General

The compliance of compact laminate and HPL composite panels for internal and external wall and ceiling finishes with the requirements of this standard and with the performances declared by the manufacturer in the DoP shall be demonstrated by: