BRITISH STANDARD

BS EN
438-7:2005

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

The European Standard EN 438-7:2005 has the status of a British Standard

ICS 83.140.20

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 438-7:2005. BS EN 438-7:2005 together with BS EN 438 Parts 1 to 6 supersedes BS EN 438-1:1991 and BS EN 438-2:1991 which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/76, Laminated sheet for decorative purposes, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Note After the text was ratified by CEN, BSI identified that Figure B.4 is a copy of Figure B.5. Figure B.4 should show an insulation material between the backing board and the vertical frame member wood based.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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This British Standard, was published under the authority of the Standards Policy and Strategy Committee on 26 July 2005

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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

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

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

This European Standard was approved by CEN on 12 August 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Foreword

This document (EN 438-7:2005) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by IBN.

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 July 2005, and conflicting national standards shall be withdrawn at the latest by July 2005.

This document supersedes EN 438-1:1991 and EN 438-2:1991.

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 438:1991 and consists of seven 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.*

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

1 Scope

This document specifies the health, safety and energy saving requirements for:

- Compact laminate panels/sidings for interior wall and ceiling finishes (including suspended ceilings);
- HPL composite panels/sidings for interior wall and ceiling finishes (including suspended ceilings);
- Compact laminate panels/sidings for exterior wall and ceiling finishes (including suspended ceilings);
- HPL composite panels/sidings for exterior wall and ceiling finishes (including suspended ceilings).

It also specifies methods for the evaluation of conformity of the product to the requirements, and includes requirements for marking. It covers only the HPL panels for non-structural applications, and does not cover fixing systems.

The products are intended for use as wall and ceiling finishes for internal and external applications according to the manufacturer's specifications.

The scope of this document does not cover:

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

b) HPL-surfaced wood-based panels intended for use as structural components. These products are covered by EN 13986 (wood-based panels for use in construction).

This document covers only characteristics related to health, safety and energy-saving. All other characteristics are covered in separate European Standards for HPL products (see Annex B).

2 Normative references

The following referenced documents are indispensable for the application 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 438-1:2005, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) — Part 1: Introduction and general information.*

EN 438-2:2005, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) — Part 2: Determination of properties.*

EN 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.*

EN 438-4:2005, *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.*

EN 438-6:2005, *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 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 12524, *Building materials and products — Hygrothermal properties — Tabulated design values.*

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 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services).*

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 140-3, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 3: Laboratory measurements of airborne sound insulation of building elements (ISO 140-3:1995).*

EN ISO 178, *Plastics — Determination of flexural properties (ISO 178:2001).*

EN ISO 354, *Acoustics — Measurement of sound absorption in a reverberation room (ISO 354:2003).*

EN ISO 717-1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation (ISO 717-1:1996).*

EN ISO 1183-1:2004, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pyknometer method and titration method (ISO 1183-1:2004).*

EN ISO 11654, *Acoustics — Sound absorbers for use in buildings — Rating of sound absorption (ISO 11654:1997).*

EN ISO 12572, *Hygrothermal performance of building materials and products — Determination of water vapour transmission properties (ISO 12572:2001).*

ISO 13894-1:2000, *High-pressure decorative laminates — Composite elements — Part 1: Test methods.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 438-1:2005 and the following apply

3.1
Compact laminate panel
panels of high-pressure laminate supplied in thicknesses of 2 mm and greater.

Panels may be supplied in the form of large sheets (i.e. the full manufactured size), or smaller cut-to-size panels or sidings

3.2
HPL composite panel
composite panel produced by adhesively bonding high-pressure decorative laminate sheet material to one or both sides of a substrate.

Panels may be supplied in the form of large sheets (i.e. the full manufactured size), or smaller cut-to-size panels or sidings

3.3
substrate of the composite panel
board to which the high-pressure decorative laminate is bonded.

The substrate can be a wood based product (e.g. particleboard or fibreboard), a mineral board (e.g. calcium silicate), an expanded honeycomb, a metal sheet or plastic material, or organic or inorganic foams

4 Performance characteristics

4.1 Conditioning of specimens

Unless otherwise stated, all specimens shall be conditioned for at least 72 h at (23 ± 2) °C and relative humidity (50 ± 5) % prior to testing.

4.2 Reaction to fire

4.2.1 General

Reaction to fire applies only for panels/sidings intended for end uses on walls/ceilings subject to reaction to fire regulations.

For reaction to fire testing of Compact and composite panels, the classification of the thinnest product tested is valid for all thicker panels of the same type. However, testing of thicker panels may be used to prove a better classification.

4.2.2 Specimen preparation

Preparation of the test specimens shall be in accordance with the specified test method.

For the SBI test according to EN 13823, the specimens shall be mounted as defined in Annex B.

4.2.3 Requirement

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

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 according to EN 13501-1 and the resulting class and sub-class shall be declared.

Table 1 — Reaction to fire classes for high-pressure decorative laminate panels Classified Without Further Testing (CWFT)

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 [c]	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 Commission Decision 2000/147/EC Annex Table 1.

[c] Complying with this standard.

4.3 Fire resistance

4.3.1 General

Fire resistance applies only for panels intended for end-uses subject to resistance to fire regulations, and where the panel is intended to contribute to fire resistance.

4.3.2 Specimen preparation

The product tested shall be mounted in a manner representative of the end-use conditions.

4.3.3 Requirement

The product shall be tested and classified according to EN 13501-2, and the resulting class or classes with the corresponding end use(s) shall be declared.

4.4 Water vapour permeability

4.4.1 General

Water vapour permeability applies only for 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.

4.4.2 Requirement

The water vapour permeability shall either be determined as water vapour resistance factor according to EN ISO 12572, or taken from Table 2.

Table 2 — Water vapour permeability values

Panel	Density	Water vapour resistance factor [a]	
		Wet cup μ	Dry cup μ
Compact HPL	1 350 kg/m^3	110	250
HPL particleboard composite panel	Substrate density 300 kg/m^3	10	50
	Substrate density 600 kg/m^3	15	50
	Substrate density 900 kg/m^3	20	50
HPL fibreboard composite panel	Substrate density 400 kg/m^3	5	10
	Substrate density 600 kg/m^3	12	20
	Substrate density 800 kg/m^3	20	30

[a] Linear interpolation for intermediate density values is permitted.

4.5 Resistance to fixings

Resistance to fixings shall be determined as resistance to axial withdrawal of wood screws from the panel face (face screw-holding) according to ISO 13894-1:2000, test method 15, or in the case of Compact panels taken from Table 3. When testing Compact panels a pilot hole, with a diameter 0,5 mm less than the nominal screw size, shall be pre-drilled before inserting the screw.

Table 3 — Resistance to fixings – values for Compact panels

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

4.6 Direct airborne sound insulation

4.6.1 General

Direct airborne sound insulation applies for panels intended for uses in walls/ceilings subject to acoustic insulation regulations, and where the panel is intended to contribute to sound insulation.

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

4.6.2 Requirement

If the building element including Compact or composite panels is to be tested for airborne sound insulation, then it shall be tested in accordance with EN ISO 140-3 and rated in accordance with EN ISO 717-1.

4.7 Bonding strength

4.7.1 General

Bonding strength applies only for wood-based HPL composite panels/sidings.

4.7.2 Requirement

The bonding strength of wood-based HPL composite panels/sidings shall be determined as surface bond strength according to ISO 13894-1:2000, test method 9, and the result shall be declared.

4.8 Flexural tensile strength

4.8.1 General

Flexural tensile strength is applicable only to panels intended for use in suspended ceilings.

4.8.2 Requirement

The flexural tensile strength of HPL composite panels for suspended ceilings shall be determined as surface bond strength according to ISO 13894-1:2000, test method 9. The result(s) shall be declared.

For Compact panels it 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 2 mm/min. The results shall comply with the corresponding requirements of EN 438-4:2005, Table 2 for interior use, and EN 438-6:2005, Table 2 for exterior use, and shall be declared as pass results.

4.9 Thermal resistance/conductivity

4.9.1 General

Thermal resistance/conductivity applies only for panels intended for end uses on walls/ceilings subject to thermal insulation regulations, and where the panel is intended to contribute to the thermal insulation.

4.9.2 Requirement

The thermal conductivity shall be determined in accordance with EN 12664 and the result shall be declared, or it shall be calculated from data taken from EN 12524, where the conductivity of the HPL part of the product shall be taken to be 0,3 W/(m K).

4.10 Release of dangerous substances

4.10.1 Content of pentachlorophenol

4.10.1.1 General

Content of pentachlorophenol applies only for wood-based HPL composite panels/sidings.

4.10.1.2 Requirement

HPL does not contain PCP. Wood-based substrates normally contain less than 5 ppm of pentachlorophenol. If the substrate contains more than 5×10^{-6} (ppm) then it shall be declared by the manufacturer of the composite panel.

4.11 Additional characteristics for internal use

4.11.1 Release of formaldehyde

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 the release of formaldehyde shall be determined according to EN 717-1 and the result 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 EN 717-2, applying the appropriate values from Table 4.

Table 4 — Release of formaldehyde limit values

	EN 717-1 requirement	EN 717-2 requirement
Class E1	≤ 0,13 mg/m^3 air	≤ 3,5 mg/m^2 h
Class E2	> 0,13 mg/m^3 air	> 3,5 to ≤ 8,0 mg/m^2 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 or EN 717-2, either from factory production control or from external inspection.		

4.11.2 Sound absorption

4.11.2.1 General

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

Compact panels/sidings and composite panels/sidings 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.

4.11.2.2 Requirement

If the building element including Compact or 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.

4.12 Additional characteristics for external use

The thermal shock resistance shall be determined as resistance to climatic shock according to EN 438-2:2005, Test method 19. Compact laminate panels shall comply with the requirement specified for a ‘Pass’ result specified in EN 438-6.

4.13 Durability

4.13.1 Compact laminate panels/sidings for internal use

The durability of Compact laminate panels/sidings for internal use shall be demonstrated by testing the following properties: immersion in boiling water in accordance with EN 438-2:2005, Test method 12, and density in accordance with EN ISO 1183-1:2004, Test method A.

Compact laminate panels shall comply with the requirements for a 'Pass' result specified in EN 438-4.

4.13.2 Compact laminate panels/sidings for external use

The durability of Compact laminate panels/sidings for external use shall be demonstrated by testing the following properties: resistance to wet conditions in accordance with EN 438-2:2005, Test method 15, and density in accordance with EN ISO 1183-1:2004, Test method A.

Compact laminate panels shall comply with the requirements for a 'Pass' result specified in EN 438-6.

4.13.3 HPL composite panels/sidings for internal use

The durability of HPL composite panels/sidings for internal use shall be demonstrated by testing the following properties and declaring the results: glue-line quality in accordance with ISO 13894-1:2000, test method 8, resistance to elevated temperature in accordance with ISO 13894-1:2000, test method 12, and water resistance in accordance with ISO 13894-1:2000, test method 19.

4.13.4 HPL composite panels/sidings for external use

The durability of HPL composite panels/sidings for external use shall be demonstrated by testing the following properties and declaring the results: glue-line quality in accordance with ISO 13894-1:2000, test method 8, resistance to elevated temperature in accordance with ISO 13894-1:2000, test method 12, and resistance to wet conditions in accordance with EN 438-2:2005, Test method 15.

5 Evaluation of conformity

5.1 General

The compliance of a wall or ceiling panel/siding with the requirements of this standard and with the stated values or classes shall be demonstrated by:

- initial type testing;
- factory production control by the manufacturer, including product assessment.

Products may be grouped into families where it is considered that a characteristic (or characteristics) is (are) common to all products within the family.

5.2 Type testing

5.2.1 Initial type testing

Initial type testing shall be performed, to demonstrate conformity with this document, for each product type and for every significant change to a product type that may affect the performance of the product in relation to the requirements of this document. Test results or a declaration of conformity from a material (e.g. particleboard) supplier may be used to show compliance without additional testing.

Changes in colour, pattern, surface texture and panel size are not considered to be significant changes.

Tests previously performed in accordance with the provisions of this document (same product, characteristic(s), test method, sampling procedure, system of attestation of conformity, etc.) may be taken into account.

All characteristics in Clause 4 which are applicable to the product and the end use shall be subject to initial type testing.

Whenever a change occurs in the raw material or the production process which would change significantly one or more of the characteristics, the type tests shall be repeated for the appropriate characteristic(s).

5.2.2 Sampling

One or more panels (as required by the specified test methods) taken at random from normal production shall be used for initial type testing.

In the case of Compact panels (for all characteristics except reaction to fire), testing of the thinnest and thickest laminates of the same type is sufficient to cover all intermediate thicknesses. For each characteristic, the lower performance achieved would apply.

In the case of HPL composite panels (for all characteristics except reaction to fire), testing of the thinnest and thickest panels of the same composite construction (i.e. the same laminate type, adhesive type and substrate type) is sufficient to cover all intermediate thicknesses. For each characteristic, the lower performance achieved would apply.

For reaction to fire see 4.2.1.

The results of all type tests shall be recorded and held by the manufacturer for at least five years.

5.3 Factory production control (FPC)

5.3.1 General

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market conform with the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments, and the use of the results to control incoming materials or components, equipment, the production process and the product.

An FPC system conforming with the requirements of EN ISO 9001, and made specific to the requirements of this standard, is considered to satisfy the above requirements.

The results of inspections, tests or assessments requiring action shall be recorded, as shall any action taken. The action to be taken when control values or criteria are not met shall be recorded.

5.3.2 Equipment

All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

5.3.3 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their conformity.

5.3.4 Product testing and evaluation

The manufacturer shall establish procedures to ensure that the stated values of all the characteristics are maintained. The characteristics, and the means of control, are:

a) all relevant durability tests (as specified in 4.13) shall be carried out once in every 12 month period in which the product has been manufactured;

b) where applicable, tests for resistance to fixings, bonding strength, and release of formaldehyde (as specified in 4.5, 4.7, and 4.11.1 respectively) shall be carried out once in every 12 month period in which the product has been manufactured;

c) all other relevant characteristics shown in Clause 4 shall be subject to test once every 5 years.

5.3.5 Inspection and testing status

The inspection and testing status of the products shall be identified by means which clearly indicate the conformity or non-conformity of the product with regard to the inspections and tests performed.

All results of inspection and testing shall be recorded together with:

- a description of the product;
- the date of testing;
- the test method;
- the test result;
- identification of the person responsible for carrying out the test.

When products do not conform to the requirements of this standard, a note shall be made of the actions taken. Such records shall be kept for a minimum of five years.

5.3.6 Traceability

It is the responsibility of the manufacturer, or the manufacturer's agent, to keep full records of individual products or product batches at the time they leave the factory, including the performance characteristics required by this standard.

6 Marking and labelling

Products which conform to the requirements of this document shall be clearly and indelibly marked by the manufacturer or the manufacturer's agent, either directly on the panel or on an affixed adhesive label, with the following information:

- the reference of this document, i.e. EN 438-7;
- the manufacturer's or supplier's identification;
- the product name and batch number;
- the year of manufacture, unless identified within the batch number.

Where ZA.3 covers the same information as this clause, the requirements of this clause are met.

Annex A
(informative)

Other European Standards for HPL products

EN 438-1:2005, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) — Part 1: Introduction and general information*.

EN 438-2:2005, *High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (Usually called Laminates) — Part 2: Determination of properties*.

EN 438-3:2005, *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*.

EN 438-4:2005, *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*.

EN 438-5:2005, *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*.

EN 438-6:2005, *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*.

Annex B
(normative)

Specimen mounting details for SBI fire testing

B.1 Standard frame

Frame as shown in Figures B.1 and B.2, made from non-fire-treated timber or wood-based board (e.g. commercially available pine or MDF), 30 mm x 40 mm for vertical members, and 30 mm x 25 mm for horizontal members. The members shall be mechanically fixed together by appropriate means (e.g. screws, nails, clamps).

Wood-based battens represent all other sub-constructions (e.g. aluminium or steel frames).

Where other fixing systems are used in tests (as applicable to the end-installation), details shall be given in the test report.

B.2 Standard insulation material

50 mm thick mineral wool, with a density of 30 kg/m^3 to 70 kg/m^3, organic binder $\leq$ 5 %, and melting point $>$ 1 000 °C.

The SBI test performance is not enhanced by the use of greater thickness of mineral wool.

B.3 Mounting instructions

Cut the panels to size as shown in Figure B.3 and pre-drill the holes (3 mm oversize) in the positions shown.

Fix the product (Compact laminate panel or HPL-composite panel) to the frame by screws (approximately 5 mm diameter).

Unless the manufacturer seeks information for a more specific end-use application, panels for internal use shall be tested without insulation and without horizontal open joints, and panels for external use shall be tested with insulation and open horizontal joints. Details of joints and the use, or otherwise, of insulation shall be stated in the test report.

Results from fire tests with horizontal joints are valid for the same products used in applications without horizontal joints (see EN 13501-1).

When testing without insulation material, press the long and short wings of the frame (with the test panels fixed in place) directly against the backing board (see Figure B.4).

When testing with the standard insulation material specified in B.2, press the long and short wings of the frame (with the test panels fixed in place) against the backing board, imprisoning the insulation material between frame and backing board (see Figure B.5).

The long wing shall overlap the short wing (see Figures B.4 and B.5). The corner joint shall be unprotected. All joints in the test panels shall be positioned in accordance with Figure B.3.

The frame shall stand on the floor of the test apparatus.

The assembly provides an air-gap ‘open at the top’. In the presence of open horizontal joints the air-gap is classified as ‘open air-gap’.

All products shall be tested with a vertical joint ((8 ± 2) mm gap) in the long wing at (200 ± 10) mm from the corner-line as visible from the front after having fixed the panels (see Figure B.3).

The position of the frame shall remain constant in relation to the corner-line of the test specimen regardless of thickness of product and presence or otherwise of insulation (see function of 'd' in Figures B.4 and B.5).

The outermost part of the panel at the long wing may be unsupported by the wood-based battens. This has no influence on the result of the test, as there is no lateral flame-spread this far.

B.4 Field of application of test results

The test result (classification) from a Compact laminate panel or HPL-composite panel of a given thickness shall be valid, without test, for all greater thicknesses of the same type of panel.

The result of a test using the standard frame of wood-based battens shall be valid, without test, for all other types of frame (e.g. aluminium, steel frames).

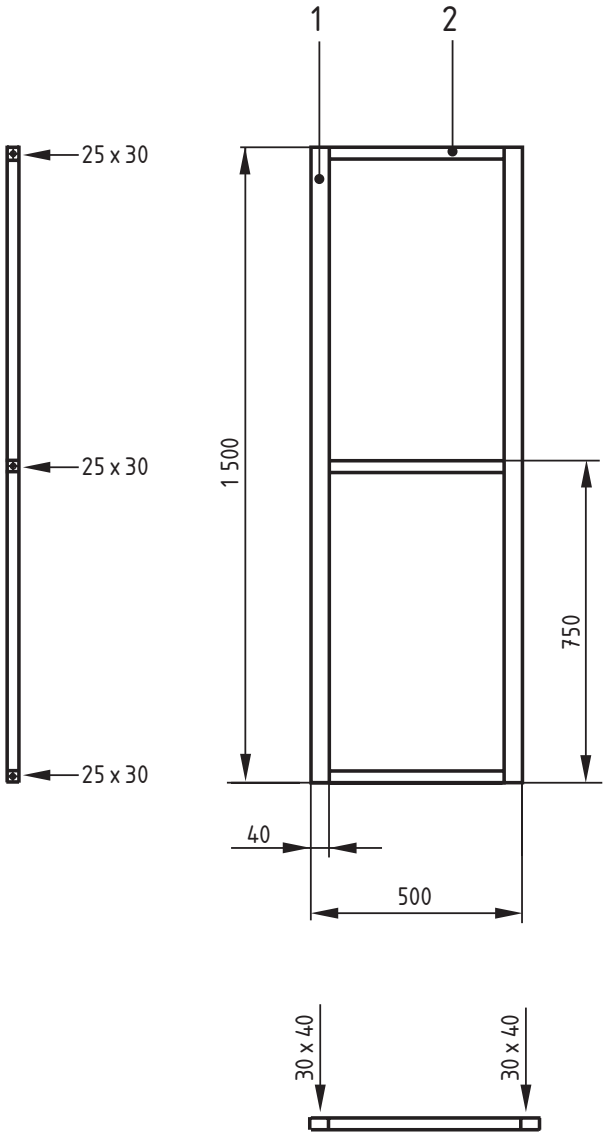
The result of a test with the standard insulation specified in B.2 shall be valid, without test, for the same type of panel used without insulation.

The result from a test with a horizontal joint shall be valid, without test, for the same type of panel used in applications without horizontal joints.

The result from a test with an open horizontal joint shall be valid, without test, for the same type of panel used in applications with any type of closed horizontal joint (e.g. using profiles or tongues).

Screw fixing is representative of all types of mechanical fixing at the same or closer fixing centres. Fixing distances of 400 mm to 600 mm make the test result also valid for fixing distances of up to 800 mm in practical end-use.

Dimensions in millimetres



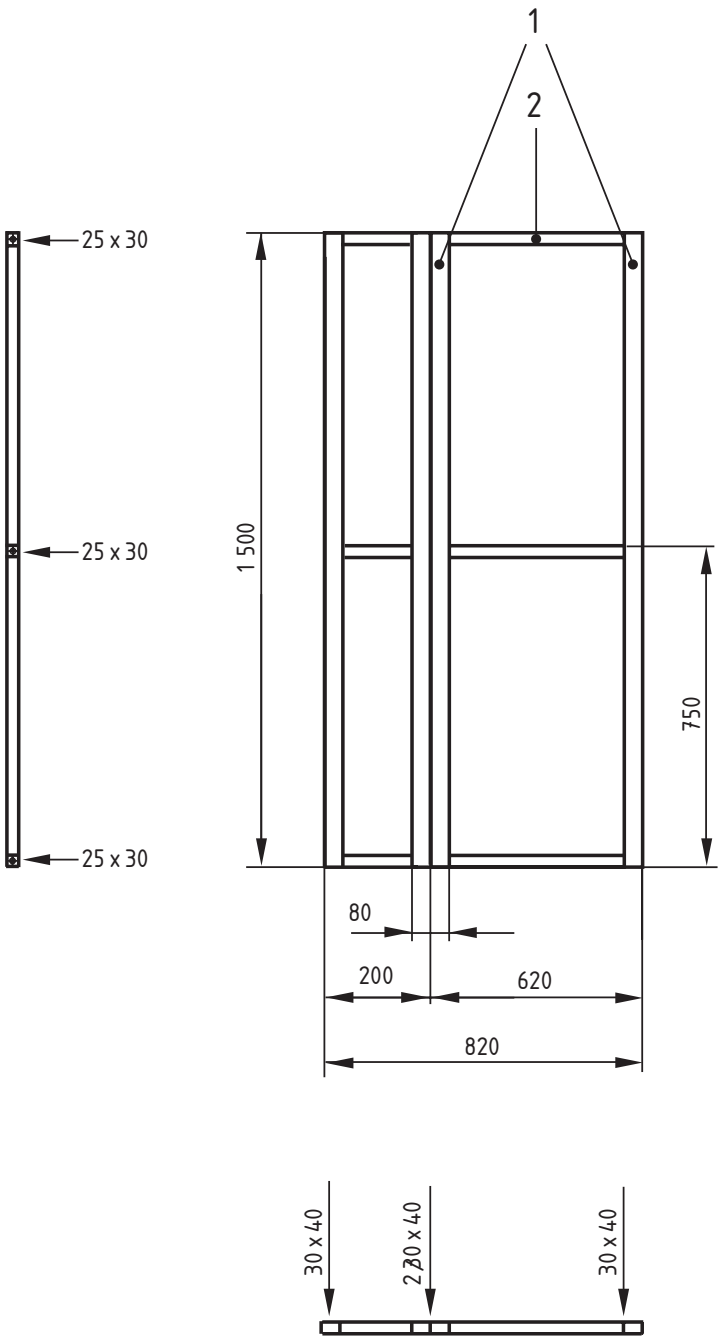
Key

1 Vertical frame member 40 mm x 30 mm

2 Horizontal frame member 25 mm x 30 mm

Figure B.1 — Wood-based frame for HPL panels, short wing

Dimensions in millimetres



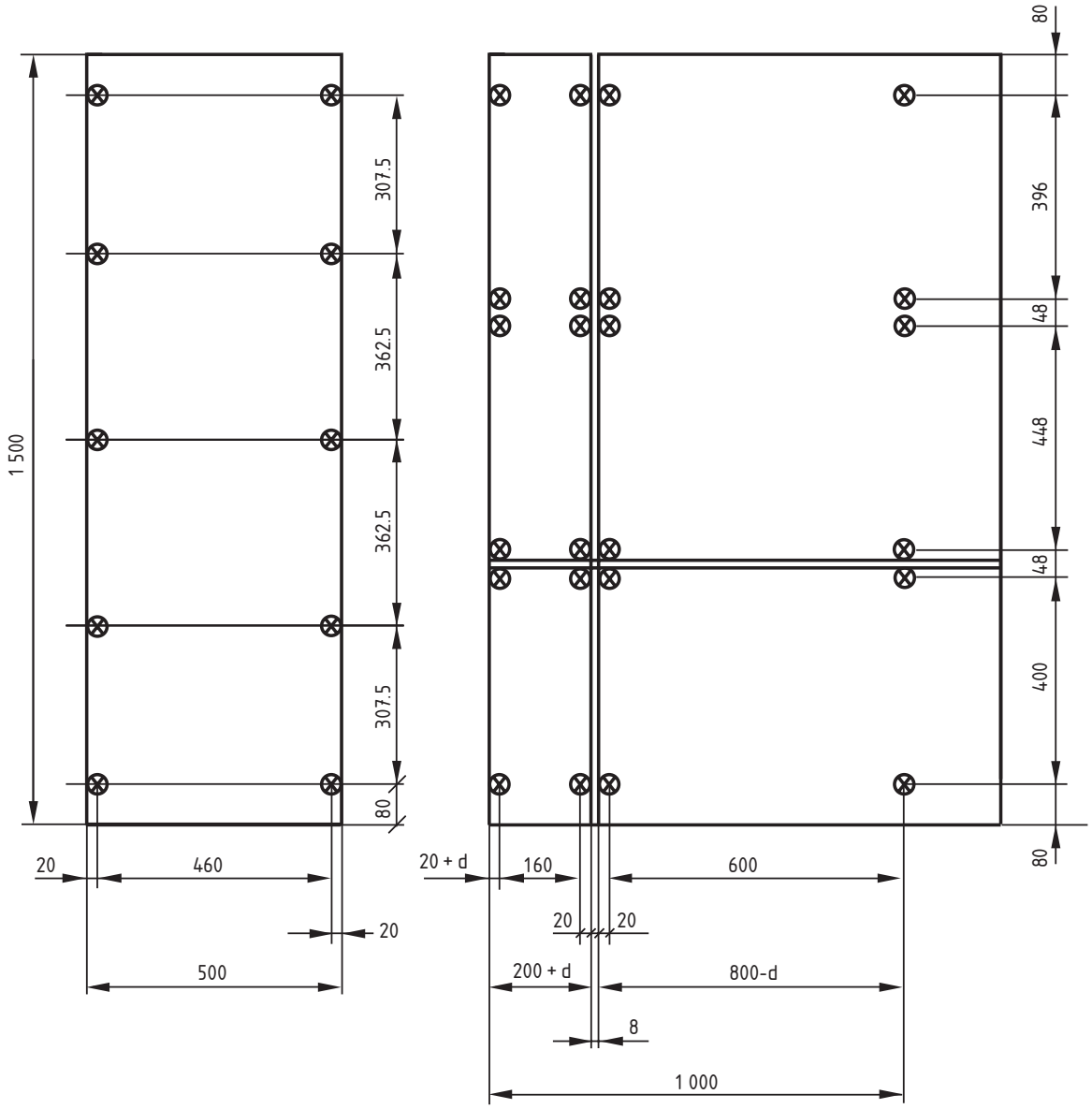
Key

1 Vertical frame member 40 mm x 30 mm

2 Horizontal frame member 25 mm x 30 mm

Figure B.2 — Wood-based frame for HPL panels, long wing

Dimensions in millimetres



Key

Panel size A) 996 mm x (196 + d) mm

B) 996 mm x (796 - d) mm

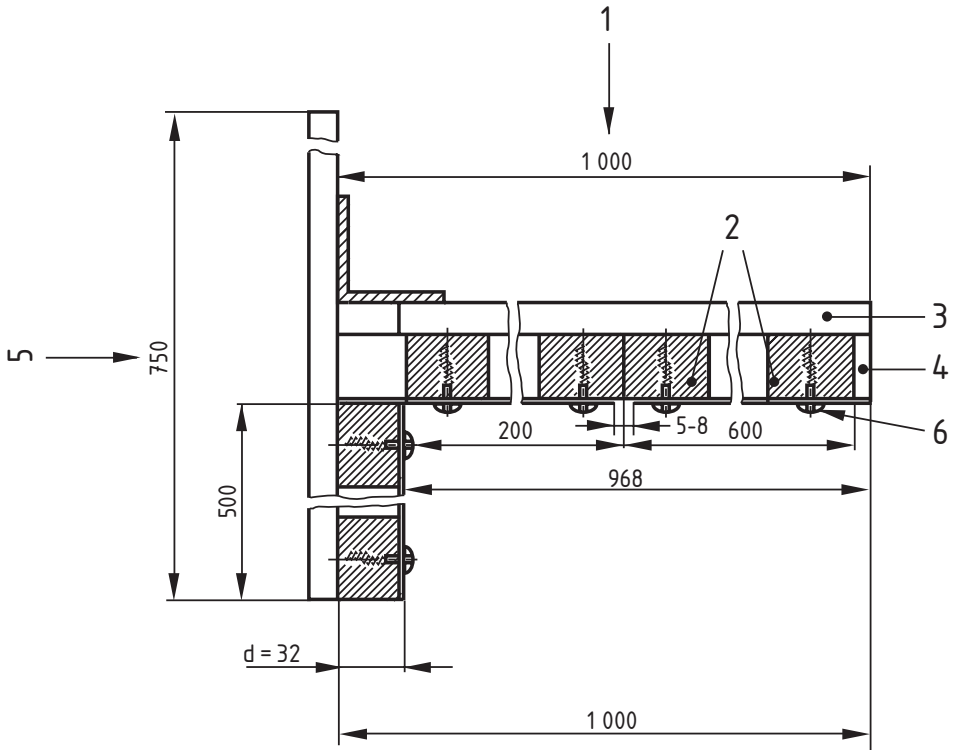
C) 496 mm x (196 + d) mm

D) 496 mm x (796 - d) mm

d) Thickness of panel + distance from backing board (see Figures B.4 and B.5)

Figure B.3 — Details of panel sizes and positions of fixing points

Dimensions in millimetres



Key

1 Backing board

2 Standard insulation material (50 mm)

3 Air-gap (30 mm)

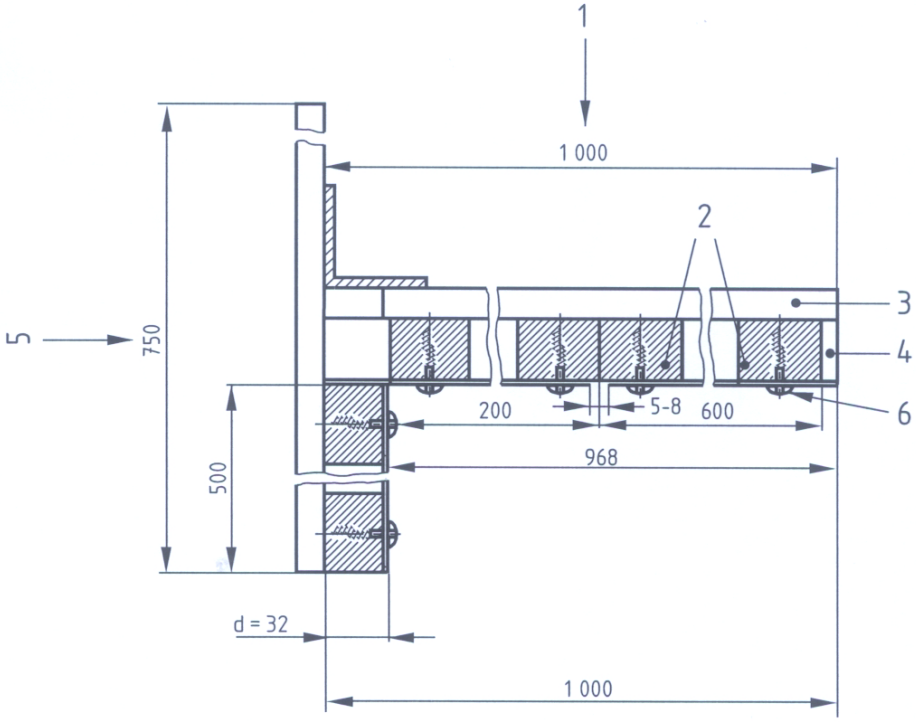
4 Product (HPL or HPL composite panel)

5 Vertical gap

d Dimension (d) compensates for different thickness of product

Figure B.4 — Mounting and fixing rules for products with insulation

Dimensions in millimetres



Key

1 Long wing

2 Vertical frame member (wood-based)

3 Backing board

4 Air-gap (30 mm)

5 Short wing backing board

6 Product (HPL or HPL composite panel)

d Dimension (d) compensates for different thickness of product

Figure B.5 — Mounting and fixing rules for products without insulation

Annex ZA
(informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives.

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under mandates M/121 “Internal and external wall and ceiling finishes” and M/113 “Wood-based panels” given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard shown in this annex meet the requirements of the mandate given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the construction products covered by this annex for the intended uses indicated herein.

This annex has the same scope as Clause 1 of this standard.

> **WARNING:** Other requirements and other EU Directives, not affecting the fitness for intended uses, may be applicable to the construction products falling within the scope of this European Standard.

NOTE 1 In addition to any specific clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

NOTE 2 An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (accessed through http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm).

Table ZA.1 — Relevant clauses for Compact laminate and HPL composite panels/sidings intended for internal and external wall and ceiling finishes (including suspended ceilings)

Essential Characteristics	Requirement clauses in this European Standard	Levels and/or classes	Notes
Reaction to fire (only for panels/sidings intended for end uses on walls/ceilings subject to reaction to fire regulations)	4.2.2	B to F	
Fire resistance (only for panels intended for end-uses subject to resistance to fire regulations, and where the panel is intended to contribute to fire resistance).	4.3.2	See EN 13501-2	
Water vapour permeability (only for 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)	4.4	-	

Table ZA.1 *(concluded)*

Resistance to fixings	4.5	-	
Direct airborne sound insulation (only for panels intended for uses in walls/ceilings subject to acoustic insulation regulations, and where the panel is intended to contribute to sound insulation)	4.6	-	
Bonding strength	4.7	-	Applicable only to HPL composite panels/sidings
Flexural tensile strength (applicable only to panels intended for use in suspended ceilings)	4.8	-	
Thermal resistance/Conductivity (only for panels intended for end uses on walls/ceilings subject to thermal insulation regulations, and where the panel is intended to contribute to the thermal insulation)	4.9	-	
Content of pentachlorophenol	4.10.1	-	Applicable only to HPL composite panels/sidings
Release of formaldehyde	4.11.1	E1 or E2	Applicable only to panels/sidings intended for internal use
Sound absorption (only for panels intended to be used for acoustical absorbent purposes, and where the panel is intended to contribute to sound absorption)	4.11.2	-	Applicable only to panels/sidings intended for internal use
Thermal shock resistance	4.12.1	-	Applicable only to panels/sidings intended for external use
Durability	4.13.3	-	

The requirement on a certain characteristic is not applicable in those Member States (MSs) where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these MSs are not obliged to determine nor declare the performance of their products with regard to this characteristic and the option “No performance determined” (NPD) in the information accompanying the CE marking (see ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level.

ZA.2 Procedures for the attestation of conformity of Compact laminate and HPL composite panels for internal and external wall and ceiling finishes

ZA.2.1 Systems of attestation of conformity

The systems of attestation of conformity of Compact laminates and HPL composite panels indicated in Table ZA.1, as indicated in Annex III of the mandate for "Internal and external wall and ceiling finishes", are shown in Table ZA.2 for the indicated intended uses and relevant classes.

Table ZA.2 — Systems of attestation of conformity

Products	Intended uses	Levels or classes	Attestation of conformity systems
Compact laminate and HPL composite panels for internal and external wall and ceiling finishes	As internal or external finishes, as complete elements, used for fire protection of walls or ceilings	See EN 13501-2	3
	As internal or external finishes in walls or ceilings, subject to reaction to fire regulations	B* and C*	1
		B**, C**, D and E	3
		D*** and F	4
	As internal or external finishes in walls or ceilings, as relevant, subject to regulations on dangerous substances	-	3
	As internal or external finishes in walls or ceilings for all uses other than those described above	-	4
* Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material). ** Products/materials not covered by footnote (*). *** Products/materials that do not require to be tested for reaction to fire *(i.e. CWFT products)*.			
System 1: See Directive 89/106/EEC (CPD) Annex III.2.(i), without audit testing of samples. System 3: See Directive 89/106/EEC (CPD) Annex III.2.(ii), Second possibility. System 4: See Directive 89/106/EEC (CPD) Annex III.2.(ii), Third possibility. NOTE All flame-retardant grade HPL products for which reaction to fire is relevant fall within attestation system 1.			

The attestation of conformity of the Compact laminate and HPL composite panels for internal and external wall and ceiling finishes in Table ZA.1 shall be according to the evaluation of conformity procedures indicated in Tables ZA.3a to ZA.3c resulting from the application of the clauses of this European Standard indicated therein.

Table ZA.3a — Assignment of evaluation of conformity tasks for system 1

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks under the responsibility of the manufacturer	Factory production control (F.P.C)	Parameters related to all characteristics of Table ZA.1 relevant for the intended use	5.3
	Further testing of samples taken at factory†	All characteristics of Table ZA.1 relevant for the intended use	5.3.4
	Initial type testing by a notified test lab†	All characteristics of Table ZA.1 relevant for the intended use, i.e. resistance to fire, release of dangerous substances, flexural tensile strength, except those tested by the manufacturer and reaction to fire in the classes below	5.2
	Initial type testing by the manufacturer†	All remaining characteristics of Table ZA.1 relevant for the intended use, i.e. water vapour permeability, resistance to fixings, sound insulation/absorption, bonding strength, thermal resistance, thermal shock resistance, durability	5.2
Tasks for the notified certification body	Initial type testing†	Reaction to fire (Classes B*, C*)	5.2
	Initial inspection of factory and of F.P.C	Parameters related to all characteristics of Table ZA.1 relevant for the intended use, in particular reaction to fire	5.3
	Continuous surveillance, assessment and approval of F.P.C.	Parameters related to all characteristics of Table ZA.1 relevant for the intended use, in particular reaction to fire	5.3

† Although responsibility for testing rests with the manufacturer of the panel(s) as supplied to the works, tests need not be repeated if the manufacturer of the Compact laminate or HPL composite board from which the panel(s) has been cut has already complied with the test requirements, and can provide documentary evidence to that effect.

* See footnote to Table ZA.2.

Table ZA.3b — Assignment of evaluation of conformity tasks for system 3

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks under the responsibility of the manufacturer	Factory production control (F.P.C)	Parameters related to all characteristics of Table ZA.1 relevant for the intended use	5.3
	Initial type testing by the manufacturer†	All characteristics of Table ZA.1 relevant for the intended use, i.e. water vapour permeability, resistance to fixings, sound insulation/absorption, bonding strength, thermal resistance, thermal shock resistance, durability, other than those shown below	5.2
	Initial type testing by a notified test lab†	Reaction to fire (Classes B**, C**, D, E), resistance to fire, release of dangerous substances, flexural tensile strength	5.2
† Although responsibility for testing rests with the manufacturer of the panel(s) as supplied to the works, tests need not be repeated if the manufacturer of the Compact laminate or HPL composite board from which the panel(s) has been cut has already complied with the test requirements, and can provide documentary evidence to that effect. ** See footnote to Table ZA.2.			

Table ZA.3c — Assignment of evaluation of conformity tasks for system 4

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all characteristics of Table ZA.1 relevant for the intended use	5.3
	Initial type testing†	All characteristics of Table ZA.1 relevant for the intended use, i.e. water vapour permeability, resistance to fixings, sound insulation/absorption, bonding strength, thermal resistance, thermal shock resistance, durability	5.2
† Although responsibility for testing rests with the manufacturer of the panel(s) as supplied to the works, tests need not be repeated if the manufacturer of the Compact laminate or HPL composite board from which the panel(s) has been cut has already complied with the test requirements, and can provide documentary evidence to that effect.			

ZA.2.2 EC Certificate and Declaration of conformity

(For products under system 1) When compliance with the conditions of this annex is achieved, the certification body shall draw up a certificate of conformity (EC Certificate of conformity) which shall be held by the manufacturer, and which entitles the manufacturer to affix the CE marking. The certificate shall include:

- name, address and identification number of the certification body;

- name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;

- description of the product (type, identification, use, ...);

- provisions to which the product conforms (i.e. Annex ZA of this EN),

- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);

- the number of the certificate;

- conditions and period of validity of the certificate, where applicable;

- name of, and position held by, the person empowered to sign the certificate.

In addition, the manufacturer shall draw up a declaration of conformity (EC Declaration of conformity) including the following:

- name and address of the manufacturer, or his authorised representative established in the EEA;

- name and address of the certification body;

- description of the product (type, identification, use, ...), and a copy of the information accompanying the CE marking;

- provisions to which the product conforms (i.e. Annex ZA of this EN);

- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions, etc.);

- number of the accompanying EC Certificate of conformity;

- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

(For products under system 3): When compliance with the conditions of this annex is achieved, the manufacturer or his agent established in the EEA shall prepare and retain a declaration of conformity (EC Declaration of conformity), which authorises the affixing of the CE marking. This declaration shall include:

- name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;

- description of the product (type, identification, use, ...), and a copy of the information accompanying the CE marking;

- provisions to which the product conforms (i.e. Annex ZA of this EN);

- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);

- name and address of the notified laboratory(ies);

- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or his authorised representative.

(For products under system 4): When compliance with this annex is achieved, the manufacturer or his agent established in the EEA shall prepare and retain a declaration of conformity (EC Declaration of conformity), which authorises the affixing of the CE marking. This declaration shall include:

- name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;

- description of the product (type, identification, use, ...), and a copy of the information accompanying the CE marking;

- provisions to which the product conforms (i.e. Annex ZA of this EN);

- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);

- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

The above mentioned declaration and certificate shall be presented in the official language or languages of the Member State in which the product is to be used.

ZA.3 CE marking and labelling

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol to affix shall be in accordance with Directive 93/68/EC. The symbol shall be shown on the panel (either directly on the panel or on an affixed adhesive label); and the symbol together with the following information shall be shown on the packaging or on the accompanying commercial documents:

- identification number of the certification body (only for products under system 1);

- name or identifying mark and registered address of the producer;

- the last two digits of the year in which the marking is affixed;

- number of the EC Certificate of conformity (if relevant);

- reference to this European Standard;

- description of the product: generic name, material, dimensions, … and intended use;

- information on the relevant essential characteristics in Table ZA.1;

- values and, where relevant, level or class to declare for each essential characteristic as indicated in "Notes" in Table ZA.1.

For Interior grade Compact laminate panels/sidings values for the following characteristics shall be declared where applicable:

Reaction to fire
Fire resistance
Water vapour permeability
Resistance to fixings
Direct airborne sound insulation
Flexural tensile strength
Thermal resistance/conductivity
Release of formaldehyde
Sound absorption
Durability

For Interior grade HPL composite panels/sidings values for the following characteristics shall be declared where applicable:

Reaction to fire
Fire resistance
Water vapour permeability
Resistance to fixings
Direct airborne sound insulation

Bonding strength
Flexural tensile strength
Thermal resistance/conductivity
Content of pentachlorophenol
Release of formaldehyde
Sound absorption
Durability

For exterior grade Compact laminate panels/sidings values for the following characteristics shall be declared where applicable:

Reaction to fire
Fire resistance
Water vapour permeability
Resistance to fixings
Direct airborne sound insulation
Flexural tensile strength
Thermal resistance/conductivity
Thermal shock resistance
Durability

For exterior grade HPL composite panels/sidings values for the following characteristics shall be declared where applicable:

Reaction to fire
Fire resistance
Water vapour permeability
Resistance to fixings
Direct airborne sound insulation
Bonding strength
Flexural tensile strength
Thermal resistance/conductivity
Content of pentachlorophenol
Thermal shock resistance
Durability

The “No performance determined” (NPD) option may not be used where the characteristic is subject to a threshold level. Otherwise, the NPD option may be used when and where the characteristic, for a given intended use, is not subject to regulatory requirements.

Figures ZA.1 and ZA.2 give examples of the information to be given on the packaging and/or commercial documents.

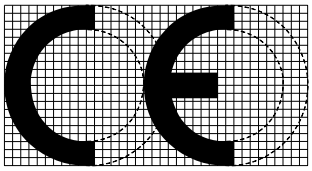
	CE conformity marking, consisting of the "CE" symbol given in Directive 93/68/EEC
Any Co Ltd, PO Box 21, B-1050 **04**	Name or identifying mark and registered address of the producer Last two digits of the year in which the marking was affixed
EN 438-7 **HPL composite panels for use on internal walls and ceilings** **Reaction to fire: Euroclass D-s2,d0** **Fire resistance: NPD** **Water vapour permeability: NPD** **Face screw-holding: 1800 N** **Direct airborne sound insulation: NPD** **Bonding strength: 1,6 MPa** **Thermal resistance: NPD** **Pentachlorophenol content: <5 ppm** **Release of formaldehyde: Class E1** **Sound absorption: NPD** **Durability: Glue-line quality - rating 5; Resistance to elevated temperature - No effect; Water resistance - 9%**	No. of this European Standard Description of product and information on regulated characteristics

Figure ZA.1 — Example of CE marking information for a CWFT product used on internal walls and ceilings

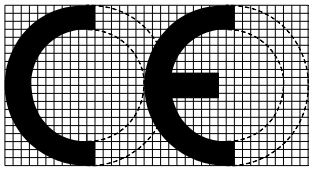
 01234	CE conformity marking, consisting of the "CE" symbol given in Directive 93/68/EEC Identification number of the certification body
Any Co Ltd, PO Box 21, B-1050 **04** 01234-CPD-00234	Name or identifying mark and registered address of the producer Last two digits of the year in which the marking was affixed Certificate number
EN 438-7 **Compact laminate panels for use on external walls and ceilings** **Reaction to fire: Euroclass B-s2,d0** **Fire resistance: NPD** **Water vapour permeability: NPD** **Face screw-holding: 2200 N** **Direct airborne sound insulation: NPD** **Flexural strength: 120 MPa** **Flexural modulus: 11000 MPa** **Thermal resistance: NPD** **Thermal shock resistance: Pass** **Durability: Resistance to wet conditions - Pass; Density – 1400 kg/m^3**	No. of this European Standard Description of product and information on regulated characteristics

Figure ZA.2 — Example of CE marking information for a product used on external walls and ceilings subject to attestation of conformity system 1

In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation.

NOTE European legislation without national derogations need not be mentioned.

Bibliography

[1] EN 120, *Wood-based panels — Determination of formaldehyde content — Extraction method called the perforator method.*

[2] EN ISO 9001, *Quality management systems — Requirements (ISO 9001:2000).*

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