ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	ICDLI aisbl – International Committee of the Decorative Laminates Industry
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Decorative High-Pressure Thin Laminates (HPL)

International Committee of the Decorative Laminates Industry (ICDLI aisbl)

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ICDLI
International Committee of the Decorative Laminates Industry

General Information

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Declaration number
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This Declaration is based on the Product Category Rules:
Laminates, 07.2014
(PCR tested and approved by the SVR)

Issue date
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Valid to
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Decorative High-Pressure Thin Laminates

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Declared product / Declared unit
Decorative High-Pressure Thin Laminate (HPL) according to /EN 438-3/ produced by ICDLI aisbl members. The EPD applies to 1 m² of HPL without fire-retardant properties with an average density of 1350 kg/m³.

Scope:
The applicability of this document is restricted to Thin HPL produced by member companies of the Laminate Association ICDLI aisbl.
Data has been provided by 12 member HPL producing companies of the ICDLI aisbl for the year 2016. These companies represent 80 % of the ICDLI aisbl members. The production volume of these companies contributes more than 60% to the Thin Decorative High-pressure laminates (Thin HPL) production in Europe.
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Verification

The CEN Norm /EN 15804/ serves as the core PCR
Independent verification of the declaration according to /ISO 14025/
☐ internally ☒ externally

Dr. Stefan Diederichs
(Independent verifier appointed by SVR)

Product

Product description / Product definition
This EPD describes High-pressure decorative laminates (HPL) according to /EN 438-3/ (Thin HPL, thickness < 2 mm) with a density of at least 1350 kg/m³.
High-pressure decorative thin laminates (HPL) are characterised by their aesthetic qualities, strength, durability and functional performance. HPL sheets are available in a wide variety of colours, patterns and surface finishes. They are resistant to wear, impact, scratching, moisture, heat, staining and light and possess good hygienic and -antistatic properties. HPL are easy to clean and maintain.
Thin HPL are not self-supporting and require bonding to a substrate. Typically they are glued to wood-based substrates to from a HPL Composite Panel.

Dimensions:
Length: up to 5600 mm
Width: up to 2200 mm
Thickness 0,5 ≤ t < 2,0 mm (thin HPL, /EN 438-3/)
A large number of HPL manufacturing plants are certified to /ISO 9001/ and/or /ISO 14001/.

Product according to the /CPR/ based on a hEN:
For the placing on the market of HPL Composite Panels in the EU/EFTA (with the exception of Switzerland) Regulation (EU) No. 305/2011 (/CPR/) applies. HPL Composite Panels needs a Declaration of Performance taking into consideration /EN 438-7:2005/ and the CE-marking. For the application and use the respective national provisions apply.

Application
Thin High-pressure decorative laminates can be used for private and -residential housing, hospitals and laboratories, public buildings, -railway stations, airport terminals/infrastructure, transportation, -hotels, education, retail and commercial buildings, sport & recreation centers and industrial buildings.
The performance properties of thin HPL make them suitable for use in a wide variety of interior applications such as: wall cladding, railing infill panels, furniture, tables, desks, column cladding and lab equipment, cubicles, ceilings, window sills, worktops, counter tops, wash basins, etc.

Technical Data
An extract of the technical properties of thin HPL according to EN 438 part 3 is given in the following table. For horizontal grade, thin HPL used in general purpose products without flame retardants, the following properties are given:

Constructional data

Name	Value	Unit
Gross density	≥ 1350	kg/m³
Resistance to abrasion (IP) acc. to /EN 438/	≥ 150	U
Resistance to scratches acc. to /EN 438/	≥ 2	Degree
Light resistance acc. to /EN 438/	≥ 4	-
Dimensional deviation - Thickness tolerance	± 0.1	mm
Dimensional deviation - Length and width	+10/-0	mm

- Performance data of HPL Composite Panels in accordance with the Declaration of Performance (DoP) with respect to its Essential Characteristics according to /EN 438-7:2005 /
- Voluntary data: /EN 438-3:2016/

Base materials / Ancillary materials
More than 60 % of the HPL consists of paper, and the remaining 30 to 40 % consists of cured phenol resin for core layers and melamine resin for the surface layer. HPL is produced in a high-pressure process. Papers are impregnated with thermosetting resins and pressed together under simultaneous application of heat (temperature > 120 °C) and high
specific pressure (≥ 5 MPa). This method produces a homogeneous, nonporous material with a density ≥ 1350 kg/m³.
Thin HPL with thickness < 2,0 mm typically has one decorative surface.
For packaging the materials cardboard, wood/wooden pallets and polyethylene film are used.

Reference service life
Due to the wide range of applications no single reference service lifetime can be established. For information, the service life in standard applications can range from 20 to 50 years (ICDLI aisbl suggestion based on expert judgment).

LCA: Calculation rules

Declared Unit
The declared unit is 1 m² of HPL product with 0.8 mm thickness for Thin HPL with a density of at least 1350 kg/m³.
The declared unit refers to the HPL products manufactured with phenolic impregnated kraft paper core and melamine impregnated decor paper. Special decors, fire retardants or alternative core production technologies are not included.
The declared unit refers to the average HPL products manufactured by ICDLI aisbl members (weighted average).

Declared unit

Name	Value	Unit
Declared unit	1	m²
Grammage	1.08	kg/m²
Conversion factor to 1 kg	0.926	-

System boundary
Type of EPD: Cradle-to-gate with options.

Considered product stages:

- Production of pre-products (e.g. resin ingredients and papers), extraction of energy carriers, raw material transportation, manufacture of product and packaging materials are declared in the modules A1-A3. Modules A1-A3 also include the generation and supply of energy.
- The scenario for the transport of the product to the construction site is declared in module A4.
- The end-of-life scenarios include transportation to the waste processing and disposal (C2), emissions and energy requirements of combustion (C3, in case of scenario 1) and landfilling process (C4, in case of scenario 2). Credits for electricity and thermal energy, which result from energy recovery in modules C3 and C4, are declared in module D.
- The CO_2 incorporation in the product is considered. The C-balance is closed by considering the biotic CO_2 emissions according to the incorporation on input side.

The data collected by the manufacturers is based on yearly production amounts. The production data refers to the yearly consumption in 2016.

Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building

context, respectively the product-specific characteristics of performance, are taken into account.

GaBi ts serves as background database for the calculation /GaBi ts/.

LCA: Scenarios and additional technical information

The following technical information is a basis for the declared modules. This information can also be used for developing specific scenarios in the context of a building assessment for modules that are not declared (MND).

Transport to the building site (A4)

Name	Value	Unit
Transport distance	100	km
Capacity utilisation (including empty runs)	70	%
Gross density of products transported	1350	kg/m^3
Capacity utilisation volume factor	1	-

Packaging material:
8 g polyethylene film, 5 g cardboard, 60 g wood (from pallets) proportional per 1 m² HPL thin product.

End of life (C2-C4)
The transport to waste processing (module C2) is assumed to be 50 km. This scenario is valid for both EoL scenarios.

Name	Value	Unit
Collected separately	1.08	kg
Energy recovery EoL1	1.08	kg
Landfilling EoL2	1.08	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information
Scenario 1: Module D/1 includes the potential benefits in form of energy recovery of the incineration process C3/1 (incineration of HPL thin). A waste incineration plant with R1-value > 0.6 is assumed.
Scenario 2: Landfilling with potential benefits in D/2 by use of landfill gas for electricity generation (C4/2).

LCA: Results

The following tables display the environmental relevant results according to /EN 15804/ for 1 m² HPL thin. The two End-of-Life Scenarios are represented in modules C2 to C4 and D. Scenario 1 reflects the thermal treatment of HPL thin with energy recovery. Scenario 2 shows the environmental results in case of disposal on landfill.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	X	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² HPL thin, thickness 0.8 mm (1.08 kg/m²)

Parameter	Unit	A1-A3	A4	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
GWP	[kg CO_2-Eq.]	3.66E+0	7.31E-3	4.76E-3	1.16E+0	0.00E+0	0.00E+0	9.24E-1	-5.36E-1	-4.08E-2
ODP	[kg CFC11-Eq.]	3.18E-9	2.09E-15	1.36E-15	4.31E-13	0.00E+0	0.00E+0	1.90E-13	-1.07E-11	-1.81E-12
AP	[kg SO_2-Eq.]	5.33E-3	1.58E-5	1.10E-5	6.40E-4	0.00E+0	0.00E+0	2.98E-4	-8.66E-4	-1.17E-4
EP	[kg $(PO_4)^{3-}$-Eq.]	1.23E-3	3.41E-6	2.39E-6	1.59E-4	0.00E+0	0.00E+0	3.66E-4	-9.03E-5	-1.06E-5
POCP	[kg ethene-Eq.]	6.82E-4	-5.28E-6	-3.78E-6	4.14E-5	0.00E+0	0.00E+0	2.31E-4	-8.02E-5	-7.45E-6
ADPE	[kg Sb-Eq.]	1.17E-6	2.26E-10	1.47E-10	1.93E-8	0.00E+0	0.00E+0	1.60E-8	-1.08E-7	-1.63E-8
ADPF	[MJ]	5.40E+1	1.02E-1	6.64E-2	4.75E-1	0.00E+0	0.00E+0	1.11E+0	-7.41E+0	-4.36E-1

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

RESULTS OF THE LCA - RESOURCE USE: 1 m² HPL thin, thickness 0.8 mm (1.08 kg/m²)

Parameter	Unit	A1-A3	A4	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
PERE	[MJ]	26.72	0.00	0.00	11.67	0.00	0.00	0.08	-1.45	-0.24
PERM	[MJ]	12.38	0.00	0.00	-11.60	0.00	0.00	0.00	0.00	0.00
PERT	[MJ]	39.10	0.00	0.00	0.07	0.00	0.00	0.08	-1.45	-0.24
PENRE	[MJ]	47.56	0.10	0.07	9.57	0.00	0.00	1.15	-9.08	-0.72
PENRM	[MJ]	9.34	0.00	0.00	-9.02	0.00	0.00	0.00	0.00	0.00
PENRT	[MJ]	56.90	0.10	0.07	0.55	0.00	0.00	1.15	-9.08	-0.72
SM	[kg]	4.25E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	2.15E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	1.67E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m³]	5.34E-2	5.96E-7	3.88E-7	4.43E-3	0.00E+0	0.00E+0	1.13E-4	-2.07E-3	-3.48E-4

Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² HPL thin, thickness 0.8 mm (1.08 kg/m²)

Parameter	Unit	A1-A3	A4	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
HWD	[kg]	3.70E-7	1.09E-11	7.09E-12	2.65E-10	0.00E+0	0.00E+0	4.46E-9	-2.28E-9	-2.90E-10
NHWD	[kg]	2.96E-2	5.79E-7	3.76E-7	4.12E-3	0.00E+0	0.00E+0	8.68E-1	-3.42E-3	-4.72E-4
RWD	[kg]	1.02E-3	1.19E-7	7.74E-8	2.80E-5	0.00E+0	0.00E+0	1.75E-5	-6.62E-4	-1.11E-4
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	0.00E+0	1.90E+0	0.00E+0	0.00E+0	3.31E-1	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	0.00E+0	4.43E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

The incorporation of CO_2 in packaging materials (paper, cardboard, wood) represents 2.5% of the GWP impact in module A1-A3.

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/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 438-3:2005

/EN 438-7/
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 438-7:2005

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/CPR/
Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

/ISO 9001/
Quality management systems - Requirements

/ISO 14001/
Environmental management systems - Requirements with guidance for use

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