

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

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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Declaration number	EPD-ICL-20220238-CBE1-EN
Issue date	18/11/2022
Valid to	17/11/2027

HPL (Dekorative High Pressure Laminates)
**International Committee of the Decorative
Laminates Industry (ICDLI aisbl)**

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General Information

International Committee of the Decorative Laminates Industry aisbl (ICDLI)

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

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This declaration is based on the product category rules:

Laminates, 09.2022
(PCR checked and approved by the SVR)

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Dipl. Ing. Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)



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HPL

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Declared product / declared unit

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 HPL produced by member companies of the Laminate Association ICDLI aisbl. Data has been provided by 10 member HPL-producing companies of the ICDLI aisbl for the year 2021. These companies represent 75 % of the ICDLI aisbl members. The production volume of these companies contributes more than 55 % to the 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.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as EN 15804.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data
according to ISO 14025:2011

☐ internally ☒ externally



Dr. Stefan Diederichs
(Independent verifier)

Product

Product description/Product definition

This EPD describes HPL (High-pressure laminate) according to EN 438-3 (HPL, thickness < 2 mm) with a density of at least 1350 kg/m³.

HPL is characterised by its 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 is easy to clean and maintain. HPL is not self-supporting and requires bonding to a substrate. Typically it is glued to wood-based substrates to form an HPL Composite Panel.

Dimensions:

Length: up to 5600 mm

Width: up to 2200 mm

Thickness $0,5 \leq t < 2,0$ mm (HPL, EN 438-3)

A large number of HPL manufacturing plants are certified to ISO 9001 and/or ISO 14001.

For the placing on the market of HPL Composite Panels in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. HPL Composite Panels needs a Declaration of Performance (DoP) taking into consideration EN 438-

7:2005 and the CE-marking. For the application and use the respective national provisions apply.

Application

HPL 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 centres and industrial buildings. The performance properties of 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, countertops, wash basins, etc.

Technical Data

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

Constructional data

Name	Value	Unit
Density	≥ 1350	kg/m ³
Grammage	1.08	kg/m ²
Resistance to surface wear (IP) acc. to EN 438	≥ 150	revolution s
Resistance to scratches acc. to EN 438	≥ 2	rating
Resistance to impact /small diameter ball) acc. to EN 438 acc. to EN 438	≥ 20	N
Light resistance acc. to EN 438	≥ 4	grey scale rating
Dimensional deviation - Thickness tolerance acc. to EN 438	± 0.1	mm
Dimensional deviation - Length and width acc. to EN 438	+10/-0	mm

Formaldehyde emissions acc. to EN 717-1	< 100	µg/m ³
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- 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.

HPL with thickness < 2,0 mm typically has one decorative surface.

For packaging the materials cardboard, wood/wooden pallets and polyethylene film are used.

This product HPL contains substances listed in *the candidate list* (date: 12.08.2022) exceeding 0.1 percentage by mass: No.

Reference service life

Due to the wide range of applications, no single reference service life 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 the 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	m ²
Grammage	1.08	kg/m ²

The EPD is an average product from factories of several HPL manufacturers. The averaging was done by weighting according to the total production quantities of the declared products of the member companies.

The EPD is representative for(of) the ICDLI association. With regard to the variability compared to the actual production, a slight variability can occur due to different production technologies and locations (different national energy mixes)

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 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 treatment of packaging materials at installation is declared in module A5.
- The end-of-life scenarios include manual dismantling (C1), transportation to waste processing (C2), emissions and energy requirements of combustion (C3). Credits for electricity and thermal energy, which result from energy recovery in modules A5 and C3, are declared in module D.
- The CO₂ incorporation in the product (from the sequestration in the paper material) is considered. The C-balance is closed by considering the biotic CO₂ 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 2021.

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.

The *GaBi ts* software (CUP 2022.1) was used as background datasets.

LCA: Scenarios and additional technical information

Characteristic product properties

Information on biogenic Carbon

Biogenic carbon is present in the product and the packaging materials.

Note: 1 kg biogenic Carbon is equivalent to 44/12 kg of CO₂

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic Carbon Content in product	0.29	kg C
Biogenic Carbon Content in accompanying packaging	0.028	kg C

Energy recovery	1.08	kg
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Reuse, recovery and/or recycling potentials (D)

Module D includes the potential benefits in form of energy recovery of the incineration process C3 (incineration of HPL). A waste incineration plant with R1-value > 0.6 is assumed.

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)	61	%
Gross density of products transported	1350	kg/m ³
Capacity utilisation volume factor	1	-

Installation into the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (packaging materials)	0.075	kg

Packaging material:

polyethylene film : 0,008 kg/m²

cardboard: 0,005 kg/m²

wood (from pallets and fibreboard) : 0,062 kg/m²

End of life (C1-C4)

The deconstruction (module C1) is assumed to be done manually (no environmental impacts).

The transport to waste processing (module C2) is assumed to be 50 km.

Name	Value	Unit
Collected separately	1.08	kg

LCA: Results

The following tables display the environmentally relevant results according to EN 15804 for 1 m² HPL.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

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	X	ND	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² HPL, thickness 0.8 mm (1.08 kg/m²)

Core Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	1.26E+0	8.42E-3	1.23E-1	0.00E+0	4.21E-3	1.10E+0	0.00E+0	-5.29E-1
GWP-fossil	[kg CO ₂ -Eq.]	2.41E+0	8.06E-3	2.13E-2	0.00E+0	4.03E-3	3.64E-2	0.00E+0	-5.26E-1
GWP-biogenic	[kg CO ₂ -Eq.]	-1.14E+0	3.67E-4	1.01E-1	0.00E+0	1.84E-4	1.06E+0	0.00E+0	-2.70E-3
GWP-luluc	[kg CO ₂ -Eq.]	1.30E-3	1.03E-7	4.16E-7	0.00E+0	5.16E-8	4.11E-6	0.00E+0	-5.81E-5
ODP	[kg CFC11-Eq.]	1.18E-11	5.13E-16	1.06E-14	0.00E+0	2.56E-16	1.64E-13	0.00E+0	-3.58E-12
AP	[mol H ⁺ -Eq.]	6.34E-3	2.43E-5	1.58E-5	0.00E+0	1.22E-5	9.31E-4	0.00E+0	-6.95E-4
EP-freshwater	[kg P-Eq.]	1.75E-5	1.69E-9	2.59E-9	0.00E+0	8.43E-10	4.25E-8	0.00E+0	-7.28E-7
EP-marine	[kg N-Eq.]	2.75E-3	1.14E-5	5.03E-6	0.00E+0	5.70E-6	4.41E-4	0.00E+0	-1.88E-4
EP-terrestrial	[mol N-Eq.]	1.92E-2	1.25E-4	7.48E-5	0.00E+0	6.26E-5	5.11E-3	0.00E+0	-2.02E-3
POCP	[kg NMVOC-Eq.]	5.50E-3	2.26E-5	1.38E-5	0.00E+0	1.13E-5	1.14E-3	0.00E+0	-5.27E-4
ADPE	[kg Sb-Eq.]	3.18E-7	3.42E-10	2.59E-10	0.00E+0	1.71E-10	4.32E-9	0.00E+0	-7.98E-8
ADPF	[MJ]	4.98E+1	1.13E-1	2.69E-2	0.00E+0	5.66E-2	5.31E-1	0.00E+0	-8.96E+0
WDP	[m ³ world-Eq deprived]	2.37E-1	1.55E-5	1.17E-2	0.00E+0	7.77E-6	1.88E-1	0.00E+0	-5.64E-2

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; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² HPL, thickness 0.8 mm (1.08 kg/m²)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	1.54E+1	4.27E-4	1.03E+0	0.00E+0	2.14E-4	1.17E+1	0.00E+0	-2.47E+0
PERM	[MJ]	1.26E+1	0.00E+0	-1.03E+0	0.00E+0	0.00E+0	-1.16E+1	0.00E+0	0.00E+0
PERT	[MJ]	2.80E+1	4.27E-4	6.42E-3	0.00E+0	2.14E-4	1.02E-1	0.00E+0	-2.47E+0
PENRE	[MJ]	4.06E+1	1.13E-1	3.95E-1	0.00E+0	5.67E-2	9.55E+0	0.00E+0	-8.96E+0
PENRM	[MJ]	9.39E+0	0.00E+0	-3.68E-1	0.00E+0	0.00E+0	-9.02E+0	0.00E+0	0.00E+0
PENRT	[MJ]	5.00E+1	1.13E-1	2.69E-2	0.00E+0	5.67E-2	5.31E-1	0.00E+0	-8.96E+0
SM	[kg]	2.60E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	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]	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	[m ³]	1.05E-2	6.44E-7	2.75E-4	0.00E+0	3.22E-7	4.43E-3	0.00E+0	-2.38E-3

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 – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² HPL, thickness 0.8 mm (1.08 kg/m²)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	1.71E-7	3.74E-13	2.50E-12	0.00E+0	1.87E-13	6.63E-11	0.00E+0	-1.21E-9
NHWD	[kg]	4.90E-2	1.06E-5	2.47E-3	0.00E+0	5.31E-6	1.36E-2	0.00E+0	-4.54E-3
RWD	[kg]	9.81E-4	1.24E-7	1.46E-6	0.00E+0	6.21E-8	2.48E-5	0.00E+0	-7.09E-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
MFR	[kg]	0.00E+0	0.00E+0	5.00E-3	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
EEE	[MJ]	0.00E+0	0.00E+0	1.73E-1	0.00E+0	0.00E+0	2.21E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	3.10E-1	0.00E+0	0.00E+0	3.92E+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

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² HPL, thickness 0.8 mm (1.08 kg/m²)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	[Disease Incidence]	8.14E-8	1.29E-10	9.59E-11	0.00E+0	6.43E-11	2.77E-9	0.00E+0	-5.76E-9
IRP	[kBq U235-Eq.]	1.47E-1	1.81E-5	2.31E-4	0.00E+0	9.04E-6	4.01E-3	0.00E+0	-1.20E-1
ETP-fw	[CTUe]	1.52E+1	7.88E-2	1.39E-2	0.00E+0	3.94E-2	1.97E-1	0.00E+0	-1.98E+0
HTP-c	[CTUh]	1.14E-9	1.46E-12	8.83E-13	0.00E+0	7.29E-13	1.29E-11	0.00E+0	-9.05E-11
HTP-nc	[CTUh]	2.81E-8	7.13E-11	5.05E-11	0.00E+0	3.57E-11	4.77E-10	0.00E+0	-3.47E-9
SQP	[-]	1.74E+2	3.12E-4	7.67E-3	0.00E+0	1.56E-4	1.25E-1	0.00E+0	-1.61E+0
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index								

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

References

Standards

EN 438-2

High-pressure decorative laminates (HPL) - Sheets based on thermosetting resins (usually called laminates) - Part 2: Determination of properties; EN 438-2:2016+A1:2018

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: 2016

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

EN 717-1

Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method; EN 717-7:2004

EN 15804

EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

ISO 9001

DIN EN ISO 9001:2015-11, Quality management systems - Requirements

ISO 14001

DIN EN ISO 14001:2015-09, Environmental management systems - Requirements with guidance for use

ISO 14025

EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

Further References

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

IBU 2021

Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021
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GaBi

GaBi Software System and Database for Life Cycle Engineering, 1992-2021, Sphera Solutions GmbH, Leinfelden-Echterdingen, with acknowledgement of LBP University of Stuttgart, program version GaBi 10; database version 2022.1

GaBi documentation

GaBi dataset documentation for the software system and databases, LBP, University of Stuttgart and Sphera Solutions GmbH, Leinfelden-Echterdingen, 2021.
(<http://www.gabi-software.com/support/gabi/gabi-database-2021-lci-documentation/>)

PCR Part A

PCR - Part A: Calculation rules for the Life Cycle Assessment and Requirements on the Background Report, version 1.6, Institut Bauen und Umwelt e.V.,

www.bau-umwelt.com, 2017

PCR Part B

Part B: Requirements on the EPD for Laminates,
09/2022

REACH

Regulation (EC) No 1907/2006 concerning the
Registration, Evaluation, Authorisation and Restriction
of Chemicals (REACH)

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