PAGED fire retardant plywood produced in Pisz and Morąg

Paged
Synergy of nature and technology

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EPD program operator:

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ITB is the verified member of The European Platform for EPD program operators and LCA practitioners.

Manufacturer:

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ECO PLATFORM EPD EN 15804 VERIFIED

Basic information

This declaration is the type III Environmental Product Declaration (EPD) based on EN 15804 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (see point 5.3 of the standard).

Life cycle analysis (LCA): A1-A3 modules in accordance with EN 15804 (Cradle to Gate)
The year of preparing the EPD: 2021
Declared durability: Under normal conditions, Paged fire retardant plywood has reference service life (RSL) of 50 years
PCR: ITB PCR A (PCR based on EN 15804)
Declared unit: 1 m^3 of ready-to-use fire retardant plywood
Reasons for performing LCA: B2B
Representativeness: Polish product

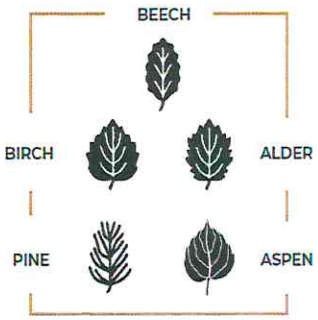
Manufacturer and Product Information

For over eighty years, Paged has been offering a wide range of products and services to its customers in Europe. Product portfolio includes natural hardwood and conifer plywood, coated and film-faced plywood, fire-retardant plywood as well as specialty plywood composites such as ELKON® or COMPREG. As a business Paged strives to deliver the industry's best solutions and products to its partners. As a result, their products create value in a range of applications, from construction sites to heavy duty road transportation, specialty packaging and furniture industries

Production of all Pageds plywood is located in two sites, one in Morąg and one in Pisz. Raw wood like pine, birch, alder, aspen and beech comes from sustainably managed forests, under FSC® or PEFC™ systems for both plywood mills in north-eastern Poland. Production facilities operate in line with PN-EN ISO 9001:2015 Quality Management system, the PN-EN ISO 14001:2015 environmental management system and the occupational safety and hygiene management system PN-ISO 45001:2018.

All plywood products adhere to the new, lower formaldehyde emission norms as confirmed by ZE05 certificate and E01 as confirmed by Hygienic Certificate according to CARB and TSCA IV regulations. Products also conform with low VOC emission norms, details of which can be found in relevant technical documentation.

Plywood is made up of thin multiple cross-banded veneers. In addition to standard cross-banded construction a range of orientated special constructions, aimed at specific end uses are available. Construction of plywood can be homogenous with all veneers throughout the construction of the same wood species or combi with same species veneers on each face and alternate inner veneers of softwood and hardwood species.



Natural plywood is used widely in construction (e.g. wall, floor and roof panelling), interior design and fit-out (e.g. decorative panels), furniture manufacturing, window and door manufacturing and in the production of engineered wooden flooring and stairs. All of manufactured plywood is graded as one of the four appearance classes: I, II, III and IV according to PN-EN 635-2 /635-3.

Fire retardant plywood

Main application include:

- construction industry,
- transport industry (buses, coaches, recreational vehicles),
- rolling stock manufacturing.

Paged FR plywood in rolling stock manufacturing

Plywood is widely used in rolling stock manufacturing as an element of floors and flooring systems, wall and ceiling lining as well as for furniture and fit-out. Today, all materials used in rail vehicles must follow the EN 45545-2 standard in order to achieve the highest level of safety possible in the

event of a fire. The standard affects manufacturers of rail vehicles including high speed trains, regional trains and trains in industrial transportation.

Selected sets determined by the area of application - rolling stock manufacturing	
	Horizontal / vertical interior surfaces, e.g. ceiling and walls, window frames or display screens
	Interior surfaces of gangways- Type B, air ducts on locomotives, etc.
	Interior horizontal upwards facing surfaces floor composites

Paged FR Plywood in construction –Reaction to fire classification	
	B-s1, d0 (walls and ceilings), Bfl-s1 (floors) in accordance with CE1 and CE2+ systems to be used as structural elements in construction applications.
	The letter "s" in reaction to fire classification indicates smoke production. From highest classification s1 via s2 to s3 being the lowest level of performance.
The letter "d" in reaction to fire classification indicates burning droplet forming. From highest classification d0 via d1 to d2 being the lowest level of performance. Burning droplets can cause fire to spread onto other surfaces and elements.	

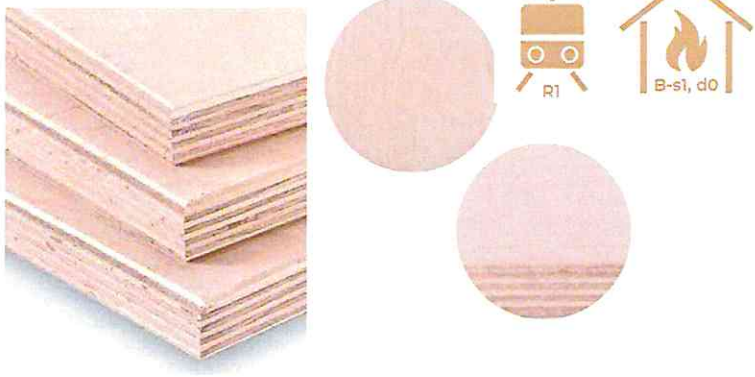
PN-EN 45545-2+A1:2015 standard defines requirements for the fire behavior of materials and components including flooring, seats and cables on railway vehicles. Part 2 of the standard specifies the test methods, test condition and reaction to fire performance requirements.

Products are classified according to 26 requirement sets (R1-R26) depending on where the materials are used. Each requirement has a corresponding series of test performance criteria. As an example R1 requirement applies to horizontal / vertical interior surfaces, e.g. ceiling and walls, window frames or display screens.

Below you may find plywood types, which are grouped in this Environmental declaration as fire retardant plywood

Paged BirchPly FR

Fire retardant hardwood plywood with special veneer construction, fire proofed with an innovative immersion method which provides for the highest fire rating ofwood based panels in construction and rail industries. BirchPly FR is used as a construction element in accordance with CE1 (walls and ceilings) as well as HL3 in R1 class for rolling stock manufacturing.



Specification of BirchPly FR

Standard sizes	1250/1500*2500 mm 1500*3000mm
Nominal thickness	12-30 mm*
Density	720-880 kg/m^3**
Release of formaldehyde (EN 717-1)	½ E1
Fire classification (EN 13501-1)	B_{fl}–s1, d0
Bonding quality (EN 314-2)	Class 3
Fire classification (EN 45545-2)	HL3 (R1)

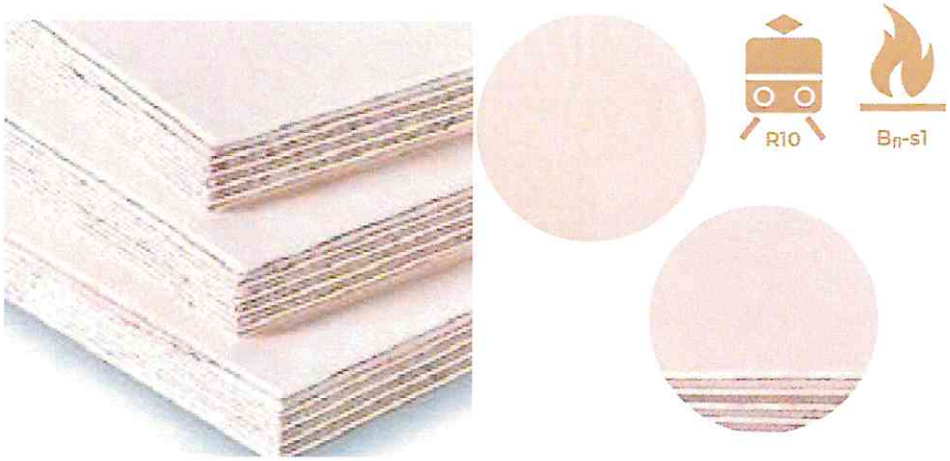
*other thicknesses available upon request
** as measured at 8-12% moisture content

Advantages

- ✓ high strength/weight ratio
- ✓ improved fire protection
- ✓ highest fire classification for wood products

Paged BirchPly FR

Fire retardant hardwood plywood available raw, in natural finish or filmed with high density phenolic film. It is characterized by high mechanical resistance and load strength and boasts highest fire classification for wood and wood-based panels used in construction, joinery, shopfitting and rail industries. Paged BirchPly FR plywood is manufactured to highest standards in order to suit its use as a structural component according to CE1 and CE2+ systems (floors) and it meets the highest level of fire classification, i.e. HL3 in R10 class.



Specification of BirchPly FR

Standard sizes	1250/1500*2500 mm 1500*3000mm
Nominal thickness	9-45 mm*
Density	640-760 kg/m³**
Release of formaldehyde (EN 717-1)	½ E1
Fire classification (EN 13501-1)	B_{fl}–s1
Bonding quality (EN 314-2)	Class 3
Fire classification (EN 45545-2)	HL3 (R10)

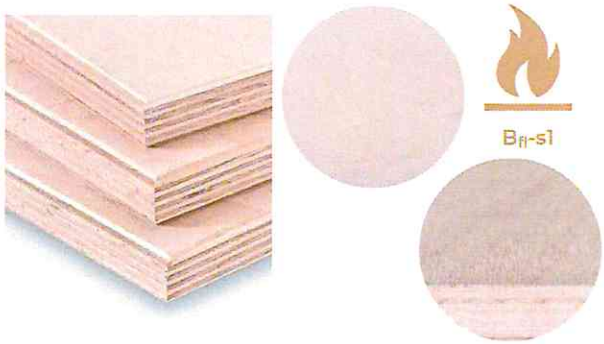
*other thicknesses available upon request;
9mm thickness for R10 only, 35-45mm thicknesses for B_{fl}–s1
** as measured at 8-12% moisture content

Advantages

- ✓ high strength/weight ratio
- ✓ improved fire protection
- ✓ highest fire classification for wood products

Paged BeechPly FR

Beech plywood panel of highest rigidity, uniform face veneer structure, surface protected with high class fire retardant. Paged BeechPly FR is widely used in transportation and construction industries as it is recognized for it durability and sheer strength when used as a flooring panel. This product is manufactured as a bearing construction element in line with CE1 requirements (flooring applications).



Specification of BeechPly FR

Standard sizes	1250/1500*2500 mm 1250*1950/2250 mm 2500*1500/1250 mm
Nominal thickness	9-24 mm*
Density	700-950 kg/m³**
Release of formaldehyde (EN 717-1)	½ E1
Bonding quality (EN 314-2)	Class 2
Fire classification (EN 13501-1)	B_{fl}–s1

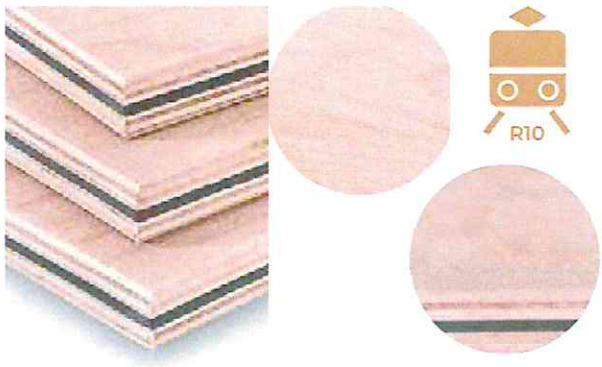
*other thicknesses available upon request
** as measured at 8-12% moisture content

Advantages

- ✓ strong and rigid
- ✓ improved fire protection
- ✓ easy to machine and fasten
- ✓ HL3 fire classification

Paged BeechPly Phon FR

Beech plywood panel of highest rigidity, uniform face veneer structure, surface protected with high class fire retardant. Paged BeechPly FR is widely used in transportation and construction industries as it is recognized for it durability and sheer strength when used as a flooring panel. This product is manufactured as a bearing construction element in line with CE1 requirements (flooring applications).



Specification of BeechPly Phon FR

Standard sizes	1250/1500*2500 mm 1500*3000 mm
Nominal thickness	15-30 mm*
Density	920-1050 kg/m^3**
Release of formaldehyde (EN 717-1)	½ E1
Bonding quality (EN 314-2)	Class 2
Fire classification (EN 45545-2)	HL3(R10)

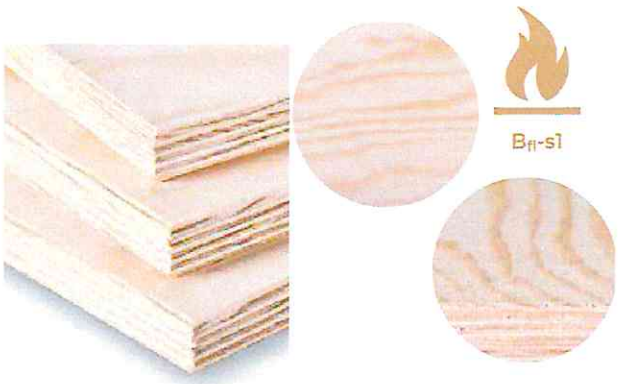
*other thicknesses available upon request
** as measured at 8-12% moisture content

Advantages

- ✓ strong and rigid
- ✓ sound and vibration absorbing properties
- ✓ improved fire protection
- ✓ HL3 fire classification

Paged Softwood ThinPly FR

Fire retardant softwood plywood with pine outer veneers and mixed, hardwood-softwood core, with enhanced fire protection which allowed it to reach the highest fire classification rating for wood based panels in construction applications. Paged softwood ThinPly FR is used a construction panel in accordance with CE1 system (floors).



Specification of Softwood ThinPly FR

Standard sizes	2500*1250/1500 mm 1500*3000 mm
Nominal thickness	9-45 mm*
Density	550-650 kg/m^3**
Release of formaldehyde (EN 717-1)	½ E1
Bonding quality (EN 314-2)	Class 3
Fire classification (EN 13501-1)	B_{fl}–s1

*other thicknesses available upon request
** as measured at 8-12% moisture content

Advantages

- ✓ made from high quality Baltic Pine veneers
- ✓ strong and lightweight
- ✓ easy to machine and fasten
- ✓ highest fire classification for wood products

Paged Softwood ThickPly FR

Fire retardant thickply softwood plywood with enhanced fire performance and high mechanical and physical properties of the panel. Safe and approved chemical composition of the fire retardant additives. Paged Softwood ThickPly is used as a construction panel in accordance with CE1 (walls, ceilings and floors).

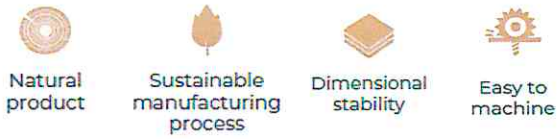
Specification of Softwood ThickPly FR

Standard sizes	2500*1250 mm 2440*1220 mm
Nominal thickness	9-40 mm*
Density	550-700 kg/m³**
Release of formaldehyde (EN 717-1)	½ E1
Bonding quality (EN 314-2)	Class 3
Fire classification (EN 13501-1)	B–s1,d0, B_{fl}–s1

*other thicknesses available upon request; applicable to B_{fl}–s1
** as measured at 8-12% moisture content

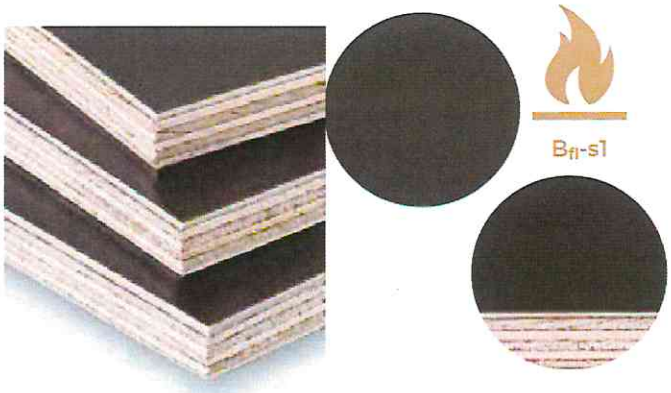
Advantages

- ✓ high quality bonding
- ✓ impact resistance
- ✓ easy to machine and fasten
- ✓ highest fire classification for wood products



Paged Twin Form FR

High quality, birch-pine plywood made with thick ply pine veneers, overlaid with purpose-designed thick phenolic films. With its lower weight, high mechanical resistance and highest fire classification rating for wood based panels it can be mounted with joists directly on Euroclass A1 and A2 material. Paged Twin Form FR is used as a construction panel in accordance with CE2+ system (floors). It is available with phenolic film overlay with smooth or structured (mesh) finish.



Specification of Twin Form FR

Standard sizes	1250*2500 mm 1220*2440 mm
Nominal thickness	9-40 mm*
Density	605 kg/m^{3}**
Release of formaldehyde (EN 717-1)	½ E1
Bonding quality (EN 314-2)	Class 3
Fire classification (EN 13501-1)	B_{fl}–s1

*other thicknesses available upon request
** as measured at 8-12% moisture content

Advantages

- ✓ high quality bonding
- ✓ low weight and durability
- ✓ easy to machine and fasten
- ✓ highest fire classification for wood products

Environmental characteristics (LCA) for Paged for fire retardant plywood products presented in table below and it is a mix of PF hardwood, MUPF hardwood, UF hardwood plywood with birch and beech wood for interior and exterior usage produced in two manufactures in Pisz and Morąg. Among shown products, fire retardant plywood consists of 3.7% of the whole production in Pisz and 0.6% of the whole production in Morąg

Product	Description	% of production in Morąg	% of production in Pisz
PF hardwood	Phenolic formaldehyde resin hardwood plywood for outdoor usage	41.47	66.1
MUPF hardwood	Melamine-urea-phenolic formaldehyde resin hardwood plywood for humid conditions	0.02	9.1
UF hardwood	Urea formaldehyde resin hardwood plywood for indoor usage	17.42	9.1
MUPF softwood	Melamine-urea-phenolic resin softwood plywood for humid conditions	1.15	14.8
compreg	Layered wood material, hot-pressed under high pressure, made of beech or birch veneers coated with special phenolic resin	-	0.1
elkon	Elkon is a high density wooden laminate commonly used for the production of power transformers	-	0.8
PF softwood	Phenolic resin softwood plywood for outdoor usage	39.94	-

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Allocation

The allocation rules used for this EPD are based on general ITB-PCR A. The PAGED fire retardant plywood products production is a line process with multiple co-products. Allocation was done on product mass basis.

All impacts from raw materials extraction are allocated in A1 module of EPD. 99.9% of impacts from line production were inventoried and allocated to PAGED fire retardant plywood production. Municipal waste and waste water of whole factory were allocated to module A3. Electricity was inventoried for whole production process. Emissions are measured separately as well and presented in A3 module.

System limits

The life cycle analysis of the examined products covers "Product Stage", A1-A3 modules (Cradle to Gate) in accordance with EN 15804+A1 and ITB-PCR A. Details on systems limits are provided in product specific report. All materials and energy consumption inventoried in factory were included in calculation. Office impacts were also taken into consideration. In the assessment, all significant parameters from gathered production data are considered, i.e. all material used per formulation, utilized thermal energy, internal fuel and electric power consumption, direct production waste, and all available emission measurements. This study also takes into account some material flows of less than 1% and energy flows with a proportion of less than 1 %. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804, machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

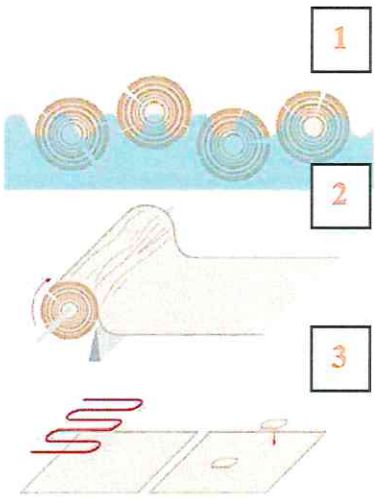
A1 and A2 Modules: Raw materials supply and transport

Raw materials for PAGED fire retardant plywood components production come from local suppliers and more distant locations. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Means of transport include trucks and Polish and European fuel averages are applied.

The main raw material for module A1 is wood, which has a 'negative' biogenic carbon dioxide value. Wooden waste generated during the mechanical debarking is further internally used in the energy generation process. The values of the environmental impact of the product in module A1 of a component are the sum of raw materials in the production of plywood.

A3: Production

Figures to the right, show the working process during the production of PAGED fire retardant plywood products in Pisz and Morąg.



1) Wood logs which are the raw material for plywood manufacturing undergo hydrothermal processing. The hydrothermal processing is carried out in soaking pools filled with water at a temperature of 40–60°C depending on the wood species. Next, through mechanical debarking, the logs are cleared of bark and mineral residues accumulated in the bark during the process of logging and transport.

2) A cut to size wood log is delivered to a rotary peeling machine. Once fitted at a right angle against a rotary lathe, a log is being rotated against the blade. The peeling blade cuts a layer of veneer in the form of a veneer band.

3) Drying and surface repairing of veneers.

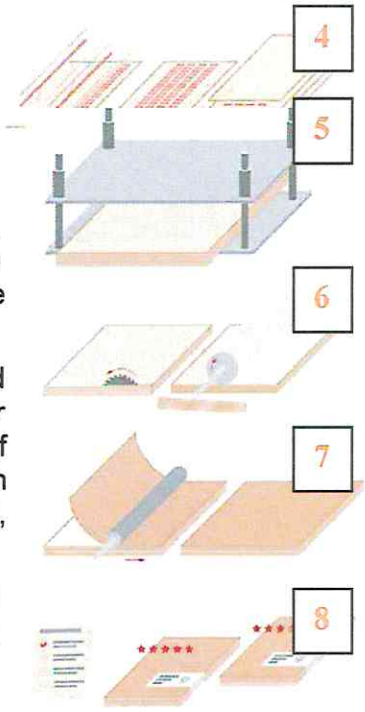
4) Adhesive application and plywood sets assembly.

5) Hot pressing. The sets of veneers are hot-pressed under pressure in hydraulic multi-platen presses. The veneers are pressed together and from now are permanently bonded.

6) Final processing and sanding. Following the seasoning of plywood, the plywood sheets are finally processed and cut to target size with the excess material cut off on a profiling machine. Next the surfaces of face veneers are calibrated and sanded in a precise sanding machine.

7) Overlaying, filming, surface treatment. If required by the end application of plywood panel, at this stage in the process a special paper impregnated with resin (also referred to as film) is applied onto the surface of plywood board. This process is carried out in high pressure and high temperature environment, causing the resin to pass to the core veneers and, as a result, to produce a surface with new performance properties.

8) Quality inspection and grade sorting. Sorting of plywood is based on quality inspection and classification of plywood face veneers in line with quality systems' requirements, technical standards and specifications.



Data collection period

The data for manufacture of the examined products refer to period between 01.01.2019-31.12.2019. The life cycle assessments were prepared for Poland as reference area.

Data quality

The values determined to calculate the LCA originate from verified Paged inventory data.

Assumptions and estimates

The impacts of the representative Paged products for each fire retardant plywood were aggregated using weighted average. The weighted average method was used according to the percentage of each product in hardwood plywood based on the relation to whole production quantity. Impacts for each product and factory were inventoried and calculated separately.

Calculation rules

LCA was done in accordance with PCR A document.

Databases

The data for the processes come from the following databases: Ecoinvent, ITB-Data. Specific data quality analysis was a part of external ISO 14001 audit. Characterization factors are CML ver. 4.2 based on EN 15804:2013+A1 version (PN-EN 15804+A1:2014-04)

LIFE CYCLE ASSESSMENT (LCA) - Results

Declared unit

The declaration refers to 1 m^3 of complete Paged fire retardant plywood.

Table 2. System boundaries for environmental characteristic for Paged fire retardant plywood

Environmental assessment information (MNA – Module not assessed, MD – Module Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
MD	MD	MD	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

Paged fire retardant plywood

Environmental impacts: (1 m^3)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	kg CO2 eq.	1.49E+00	2.12E+00	4.72E+00	8.33E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	6.00E-05	0.00E+00	0.00E+00	6.00E-05
Acidification potential of soil and water	kg SO_2 eq.	2.99E+00	1.55E-02	2.46E-01	3.25E+00
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	1.73E+00	1.13E-03	5.33E-03	1.74E+00
Formation potential of tropospheric ozone	kg Ethene eq.	1.08E+00	2.74E-03	4.06E-02	1.12E+00
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	3.81E+00	0.00E+00	1.75E-05	3.81E+00
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	1.18E+04	1.92E+01	3.28E+01	1.19E+04
Environmental aspects on resource use: (1 m^3)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	8.54E+03	2.61E-02	3.25E+00	8.54E+03
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.25E+04	2.11E+01	3.60E+01	1.26E+04
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	3.16E+03	3.16E+03
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	dm^3	4.33E+02	1.82E+00	2.94E+02	7.29E+02
Other environmental information describing waste categories: (1 m^3)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	kg	6.04E-03	0.00E+00	1.04E+00	1.04E+00
Non-hazardous waste disposed	kg	5.23E+01	0.00E+00	8.45E+00	8.45E+00
Radioactive waste disposed	kg	1.85E-02	0.00E+00	0.00E+00	0.00E+00
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	1.04E+00	1.04E+00
Materials for energy recover	kg	0.00E+00	0.00E+00	6.63E+01	6.63E+01
Exported energy	MJ per energy carrier	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Verification

The process of verification of this EPD is in accordance with EN ISO 14025, ISO 21930 and ECO checklist document. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3) ☒ external ☐ internal
External verification of EPD: PhD. Eng. Halina Prejzner LCA, LCI audit and input data verification: M.Sc. Eng. Dominik Bekierski, d.bekierski@itb.pl Verification of LCA: PhD Eng. Michał Piasecki, m.piasecki@itb.pl

References

- ITB PCR A- General Product Category Rules for Construction Products
- ISO 14025:2006 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services
- ISO 14044:2006. Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets -- Service life planning -- Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets -- Service-life planning -- Part 8: Reference service life and service-life estimation
- EN 15804:2012+A1:2013 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- EN 15942:2011 Sustainability of construction works - Environmental product declarations - Communication format business-to-business

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02-656 Warsaw, Ksawerów 21

CERTIFICATE № 254/2021
of TYPE III ENVIRONMENTAL DECLARATION

Product:

PAGED fire retardant plywood produced in Pisz and Morąg

Manufacturer:

Paged Pisz Sp. z o.o.

Kwiatowa 1, 12-200 Pisz, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

PN EN 15804+A1:2014-04

Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.

This certificate, issued for the first time on 4th November 2021 is valid for 5 years
or until amendment of mentioned Environmental Declaration

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Warsaw, 4 November 2021