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Flame retardant plywood



Owner of the EPD:

Bydgoskie Zakłady Sklejek

“Sklejka-Multi” S. A.

Address: Fordońska 154

85-752 Bydgoszcz, Poland

Tel.: +48 52 342 50 61

Website: www.sklejka.pl

Contact: sekretariat@sklejka.pl

EPD Program Operator:

Instytut Techniki Budowlanej (ITB)

Address: Filtrowa 1

00-611 Warsaw, Poland

Website: www.itb.pl

Contact: energia@itb.pl

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Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804 + A2 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 and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 + A2.

Life cycle analysis (LCA): A1-A3, C1-C4 and D modules in accordance with EN 15804 + A2 (Cradle-to-Gate with options)

The year of preparing the EPD: 2024

Product standard: EN 13986, EN 635, EN 636

Service Life: > 30 years

PCR: ITB-PCR A, v. 1.6

Declared unit: 1 m³

Reasons for performing LCA: B2B

Representativeness: Polish, European

MANUFACTURER



Fig. 1 A view of Bydgoskie Zakłady Sklejek "Sklejka-Multi" S. A. production plant located in Bydgoszcz (Poland).

Bydgoskie Zakłady Sklejek "Sklejka-Multi" S. A. is located in Bydgoszcz, Fordońska 154 Street. The area of the production plant, auxiliary departments and the office part occupies 64 052 m². The company has existed since 1914. The main recipients are domestic customers and customers of European countries: Germany, Sweden, Denmark, Austria, the Netherlands, Belgium, Norway, Hungary, France, Spain, Great Britain, Israel. The main products are general-purpose plywood with a raw surface, plywood covered with surface films and flame retardant plywood. We use birch, pine, beech and alder wood to produce plywood. Plywood is classified in accordance with the requirements contained in PN-EN standards, both in terms of technical requirements and surface appearance. Plywood is used in the production of furniture, interior design, construction, production of packaging, transport boxes, for building means of transport (buses, railway wagons), etc.

PRODUCTS DESCRIPTION AND APPLICATION

Flame retardant plywood is a wood-based board consisting of layers of wood glued together (outer and inner layers), with the fibers of adjacent layers usually running at right angles.

Plywood made of pine or birch wood, protected with agents that increase fire resistance. The product is classified in reaction to fire class B-s1, d0 according to PN-EN 13501-1.

Plywood made of beech wood, protected with agents that increase fire resistance. The product is classified in the reaction to fire class B_{fl}-s1 according to PN-EN 13501-1.

Plywood can be used in dry or humid conditions.

The quality of the plywood surface is determined according to PN-EN 635, technical requirements according to PN-EN 636.

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Fig. 2. A birch flame retardant plywood sheet (left) and pine flame retardant plywood sheet (right) produced by Sklejka – Multi.

Table. 1 Converters showing the number of plywood sheets used for the permissible thickness per 1 m³ of the plywood produced by Sklejka - Multi.

Format	length (mm)	2500	2440	2130
	width (mm)	1250	1220	1250
Area of one sheet (m ²)		3,125	2,9768	2,6625
Thickness (mm)		number of sheets per 1 m ³		
4		80	84	94
6		53	56	63
9		36	37	42
12		27	28	31
15		21	22	25
18		18	19	21
21		15	16	18
24		13	14	16
27		12	12	14
30		11	11	13
35		9	10	11
40		8	8	9

More information can be found on Bydgoskie Zakłady Sklejek “Sklejka-Multi” S. A. website: <https://www.sklejka.pl/>.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Declared Unit

The declaration refers to declared unit (DU) – 1 m³ of flame retardant plywood

Allocation

The allocation rules used for this EPD are based on general ITB-PCR A. Flame retardant plywood production is a line process with multiple co-products in one factory located in Bydgoszcz (Poland). Allocation is done on product mass basis.

All impacts from raw materials extraction and processing are allocated in A1 module of EPD. 99% of impacts from line production were inventoried and allocated to all flame retardant plywood production. Municipal waste and waste water of whole factory were allocated to module A3. Energy supply was inventoried for whole production process. Emissions in Sklejka - Multi are measured and were allocated to module A3. Packaging materials were taken into consideration They are recycled in a closed loop.

System limits

The life cycle analysis (LCA) of the declared products covers product stage – modules A1-A3, end of life – modules C1-C4 and benefits and loads beyond the system boundary – module D (cradle-to-gate with options) in accordance with EN 15804 + A2 and ITB PCR A, v. 1.6. The details of systems limits are provided in product technical 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, utilised thermal energy, internal fuel and electric power consumption, direct production waste, and all available emission measurements. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804 + A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

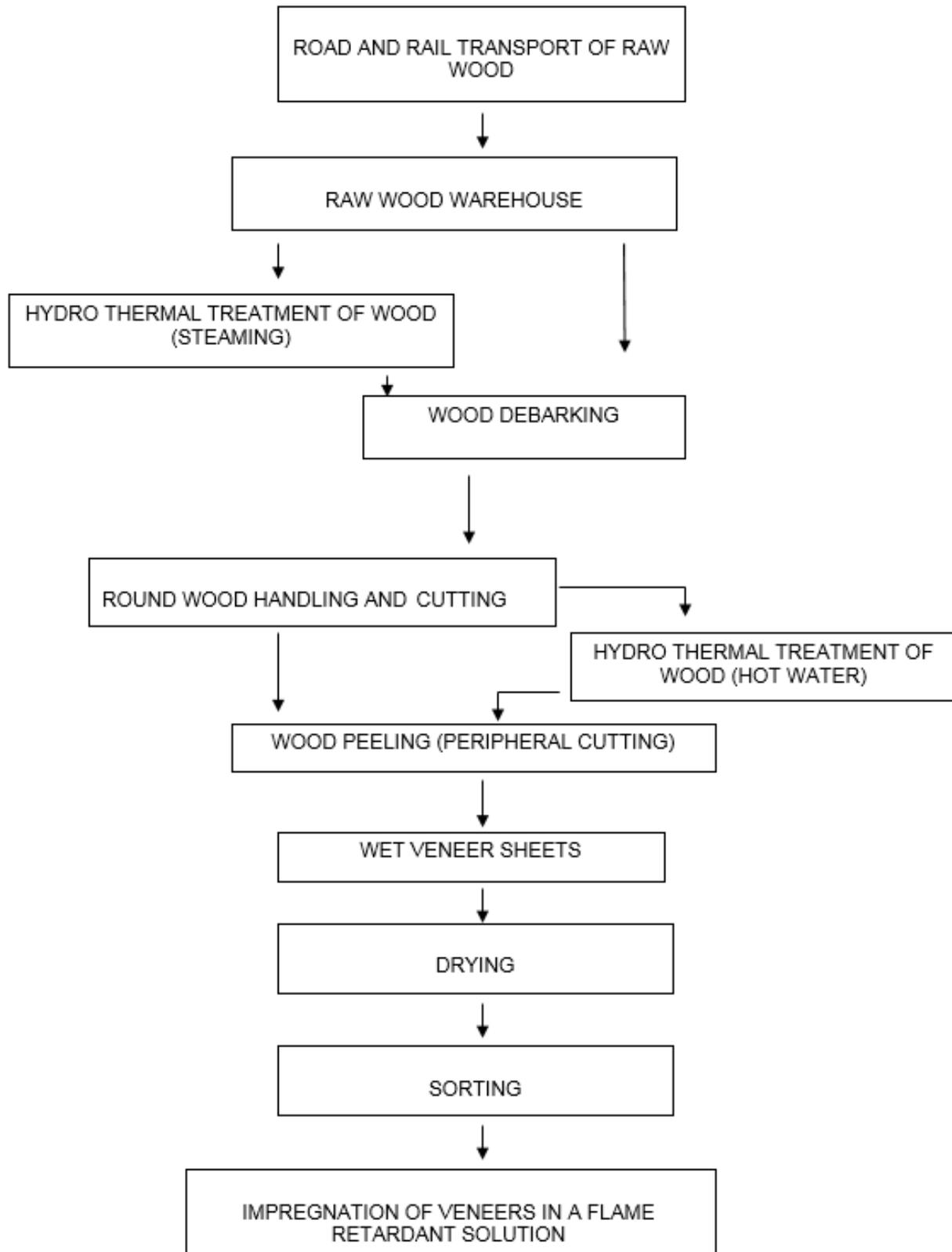
Modules A1 and A2: Raw materials supply and transport

Raw materials such as softwood and hardwood logs, resins, hardeners or flame retardants come from local and foreign suppliers. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Means of transport include 16-32 t lorry EURO 5 and train (round wood). European standards for average combustion were used for calculations.

Module A3: Production

The Fig. 3 shows the working process during the production of the flame retardant plywood. Round wood is delivered to factory located in Bydgoszcz, where is manufacturing in a few step process including wood debarking, handling and cutting, peeling, drying, sanding and impregnation. Then the plywood is sorted by grade and type, packaged and then stored prior to the shipment of the final product. The facility is EN ISO 9001 and ISO 14001 certified.

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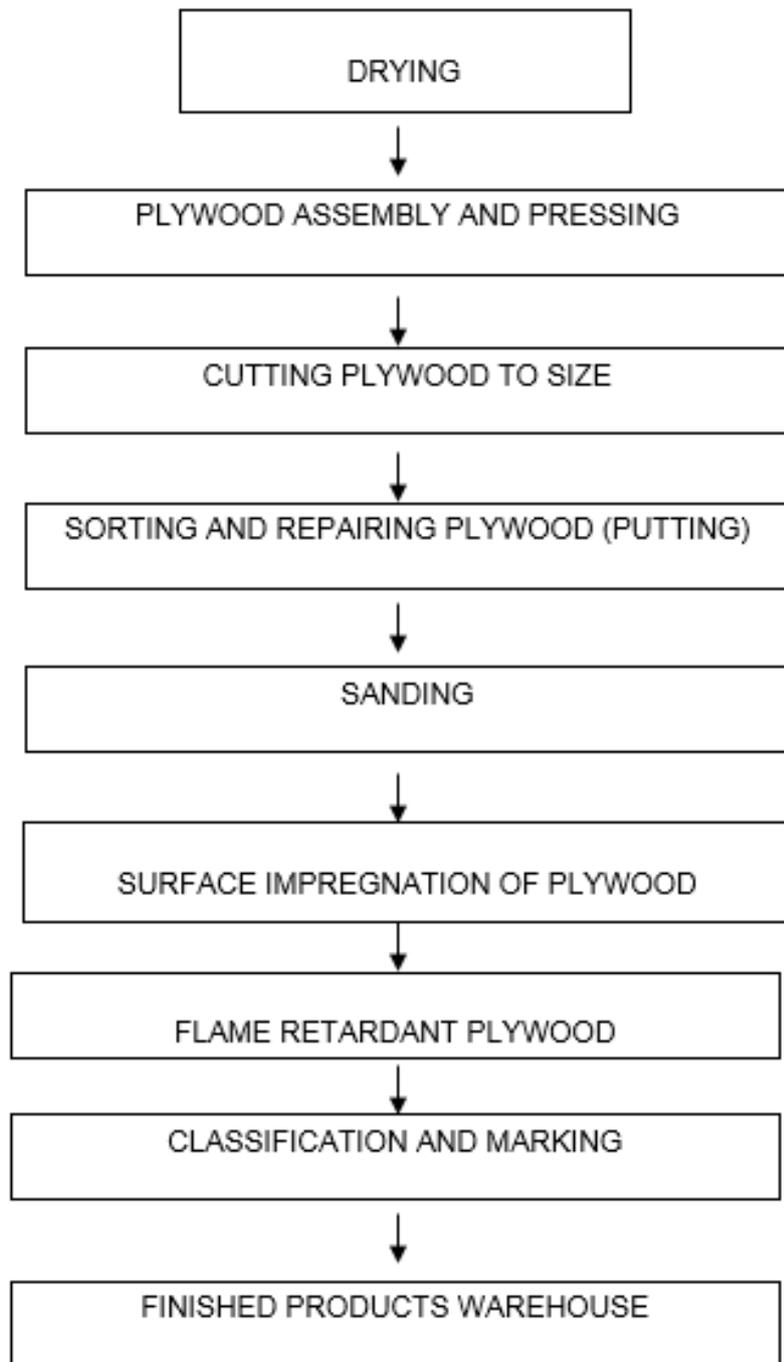


Fig. 3. A scheme of flame retardant plywood production by Sklejka-Multi (Poland)

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Modules C1-C4 and D: *End-of-life (EoL)*

In the adapted scenario, deconstruction of the flame retardant plywood is performed with the use of electrical tools (module C1). The resulting waste is transported to a waste processing plant distant about 60 km, on 16-32 t lorry EURO 5 (module C2). It is assumed that at the EoL cycle 90% of the plywood is recovered in municipal incineration (module C3) while 10% undergo landfilling (module C4). Module D presents credits resulting from the benefits from avoided thermal energy production in exchange for using waste from plant (peeling chips) which were used for own production line: hydrothermal treatment of wood, wood dryers, plywood gluing presses and central heating.

Data quality

The data selected for LCA originate from ITB-LCI questionnaires completed by Sklejka - Multi using the inventory data, ITB database, Ecoinvent database v. 3.9.1 and KOBiZE. No specific data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency are judged as good. Polish electricity was calculated based on Ecoinvent v 3.9.1 supplemented by actual national KOBiZE data. Polish electricity mix used (production) is 0.761 kg CO₂/kWh (KOBiZE 2022).

Data collection period

Primary data provided by Sklejka - Multi covers a period of 01.01.2022 – 31.12.2022 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

Assumptions and estimates

The impacts of the representative of flame retardant plywood were aggregated using weighted average. Impacts were inventoried and calculated for all products in flame retardant plywood product group and they were presented in Tables 3-6.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN 15804 + A2.

Databases

The data for the processes comes from Ecoinvent v. 3.9.1 and ITB-Database. Specific data quality analysis was a part of external audit. Polish electricity mix used (production) is 0.761 kg CO₂/kWh (KOBiZE 2022).

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LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 m³ of flame retardant plywood manufactured by Sklejka – Multi

Table 2. System boundaries for the environmental characteristic of flame retardant plywood manufactured by Sklejka - Multi

Environmental assessment information (MD – Module Declared, MND – Module Not 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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD	MD	MD

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Table 3. LCA results for 1 m³ of flame retardant plywood - environmental impacts

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	-2.05E+03	1.29E+02	6.24E+02	-1.30E+03	5.07E-01	8.05E+00	9.65E+02	7.74E+00	-1.17E+03
Greenhouse gas potential - fossil	eq. kg CO ₂	4.75E+02	1.28E+02	6.19E+02	1.22E+03	4.98E-01	8.04E+00	1.03E+01	9.00E-01	-6.07E+01
Greenhouse gas potential - biogenic	eq. kg CO ₂	-2.42E+03	6.65E-01	5.43E+00	-2.42E+03	8.99E-03	6.99E-03	9.55E+02	6.84E+00	-1.23E+03
Global warming potential - land use and land use change	eq. kg CO ₂	1.58E+01	7.48E-02	5.88E-02	1.59E+01	1.17E-04	3.97E-03	2.67E-03	6.62E-04	-1.49E+00
Stratospheric ozone depletion potential	eq. kg CFC 11	2.10E-05	2.69E-06	7.99E-05	1.04E-04	8.75E-09	1.75E-07	1.73E-07	2.02E-08	-1.21E-06
Soil and water acidification potential	eq. mol H ⁺	2.07E+00	3.05E-01	1.89E+00	4.26E+00	4.84E-03	1.76E-02	1.05E-01	6.19E-03	-3.10E-01
Eutrophication potential - freshwater	eq. kg P	1.65E-01	1.76E-02	2.48E-01	4.31E-01	8.29E-04	5.71E-04	4.43E-03	1.72E-04	-3.15E-02
Eutrophication potential - seawater	eq. kg N	4.11E-01	8.20E-02	5.50E-01	1.04E+00	6.88E-04	4.43E-03	5.63E-02	2.74E-02	-1.16E-01
Eutrophication potential - terrestrial	eq. mol N	4.46E+00	8.30E-01	3.19E+00	8.48E+00	5.90E-03	4.50E-02	5.40E-01	2.45E-02	-1.18E+00
Potential for photochemical ozone synthesis	eq. kg NMVOC	2.37E+00	4.51E-01	1.02E+00	3.84E+00	1.66E-03	2.73E-02	1.37E-01	9.96E-03	-7.35E-01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	4.04E-03	4.22E-04	4.21E-04	4.88E-03	6.59E-07	2.68E-05	2.01E-05	1.86E-06	-1.71E-04
Abiotic depletion potential - fossil fuels	MJ	1.19E+04	1.83E+03	1.04E+04	2.41E+04	7.45E+00	1.15E+02	8.67E+01	1.88E+01	-9.34E+02
Water deprivation potential	eq. m ³	3.73E+02	1.04E+01	1.04E+02	4.87E+02	1.51E-01	5.71E-01	4.36E+01	1.07E-01	-3.09E+01

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Table 4. LCA results for 1 m³ of flame retardant plywood - the resource use

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.46E+04	4.66E+01	1.78E+02	1.48E+04	5.41E-01	1.79E+00	-9.13E+03	-1.01E+03	-1.23E+04
Consumption of renewable primary energy resources used as raw materials	MJ	1.24E+04	0.00E+00	0.00E+00	1.24E+04	0.00E+00	0.00E+00	9.13E+03	1.01E+03	-9.89E+03
Total consumption of renewable primary energy resources	MJ	2.70E+04	4.66E+01	1.79E+02	2.72E+04	5.41E-01	1.79E+00	1.96E+00	3.63E-01	-2.22E+04
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	7.96E+03	1.83E+03	1.03E+04	2.01E+04	7.89E+00	1.15E+02	8.67E+01	1.88E+01	-9.35E+02
Consumption of non-renewable primary energy resources used as raw materials	MJ	3.95E+03	0.00E+00	2.94E+00	3.95E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.19E+04	1.83E+03	1.05E+04	2.43E+04	7.89E+00	1.15E+02	8.67E+01	1.88E+01	-9.35E+02
Consumption of secondary materials	kg	3.55E+00	9.49E-01	7.94E-01	5.30E+00	6.02E-04	5.25E-02	2.09E-01	7.13E-03	-6.63E-01
Consumption of renewable secondary fuels	MJ	6.64E-01	1.03E-02	2.01E-03	6.76E-01	3.29E-06	6.68E-04	4.89E-04	2.45E-04	-1.68E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00						
Net consumption of freshwater resources	m ³	8.54E+00	2.58E-01	2.17E+00	1.10E+01	2.42E-03	1.39E-02	-1.47E-01	1.87E-02	-3.66E-01

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Table 5. LCA results for 1 m³ of flame retardant plywood – additional impacts indicators

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate matter	disease incidence	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

Table 6. LCA results for 1 m³ of flame retardant plywood– waste categories

Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Hazardous waste. neutralized	kg	1.55E+01	1.56E+00	2.40E+00	1.95E+01	1.54E-06	7.82E-02	1.17E+00	1.68E-02	-1.22E+00
Non-hazardous waste. neutralised	kg	5.25E+02	7.87E+01	4.66E+01	6.50E+02	4.40E-02	2.38E+00	6.33E+00	5.10E-01	-6.26E+01
Radioactive waste	kg	1.78E-01	9.98E-04	3.30E-03	1.82E-01	6.41E-06	3.75E-05	2.52E-05	6.22E-06	-3.92E-04
Components for re-use	kg	0.00E+00	0.00E+00	9.46E-08	9.46E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	9.14E-02	1.59E-02	1.67E-02	1.24E-01	4.53E-05	8.53E-04	9.10E-04	1.44E-04	-1.67E-02
Materials for energy recovery	kg	3.01E-04	1.14E-04	5.67E-05	4.72E-04	6.33E-08	7.16E-06	1.27E-05	6.32E-07	-4.29E-05
Energy exported	MJ	1.24E+01	1.11E+00	1.12E+01	2.47E+01	2.16E-02	4.34E-02	2.89E-02	3.31E-03	-1.17E+00

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Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. 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 + A2 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3) <input checked="" type="checkbox"/> external <input type="checkbox"/> internal
External verification of EPD: Halina Prejzner, PhD Eng LCA, LCI audit and input data verification: Mateusz Kozicki, PhD Verification of LCA: Michał Piasecki, PhD, D.Sc. Eng

Note 1: The declaration owner has the sole ownership, liability and responsibility for the information provided and contained in EPD. Declarations within the same product category but from different programs may not be comparable. Declarations of construction products may not be comparable if they do not comply with EN 15804 + A2. For further information about comparability, see EN 15804 + A2 and ISO 14025. Depending on the application, a corresponding conversion factor such as the specific weight per surface area must be taken into consideration.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (17065/17025 certified). ITB-EPD program is recognized and registered member of The European Platform – Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- EN 13986:2004+A1:2015 Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking
- EN 635 Plywood - Classification by surface appearance
- EN 636:2013+A1:2015 Plywood - Specifications
- 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 + A2: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- KOBIZE Wskaźniki emisyjności CO₂, SO₂, NO_x, CO i pyłu całkowitego dla energii elektrycznej, 2022



Instytut Techniki Budowlanej

00-611 Warsaw, Filtrowa 1

Thermal Physics, Acoustics and Environment Department

02-656 Warsaw, Ksawerów 21

CERTIFICATE No 594/2024
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Flame retardant plywood

Manufacturer:

Bydgoskie Zakłady Sklejek "Sklejka-Multi" S. A.

ul. Fordońska 154, 85-752 Bydgoszcz, Poland

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

EN 15804+A2

Sustainability of construction works.

Environmental product declarations.

Core rules for the product category of construction products.

This certificate, issued on 26th January 2024 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics
and Environment Department


Agnieszka Winkler-Skalna, PhD



Deputy Director
for Research and Innovation


Krzysztof Kuczyński, PhD

Warsaw, January 2024