Type III Environmental Product Declaration No. 975/2026

Polskie Stowarzyszenie Producentów Styropianu

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Expanded polystyrene (EPS) boards used in construction

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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, A4-A5, C1-C4 and D modules in accordance with EN 15804+A2 (Cradle-to-Gate with options)

Product Standards: EN 13163:2012+A1:2015

The year of preparing the EPD: 2026

Service Life: RSL depends on the specific installation and the exposure

PCR: ITB-PCR A, EN 16783:2017

Declared unit: 1 m^3, expanded polystyrene (EPS)

Reasons for performing LCA: B2B

Representativeness: Poland, European, 2025

Data for the preparation of the Type III Environmental Product Declaration for expanded polystyrene (EPS) boards for use in construction were collected from selected members of the Polish Association of Styrofoam Producers (PSPS). They represent general values of environmental impacts associated with the production and life cycle of EPS products manufactured in Poland.
All products covered by this EPD have a Declaration of Performance in accordance with EN 13163, and their detailed technical parameters are available on the websites of the individual manufacturers and at the PSPS office.
The EPD, together with the environmental impact data for EPS products presented therein, may be used for business-to-business communication. The EPD constitutes a reliable source of information on the life-cycle environmental impacts of EPS products and may support designers of environmentally sustainable buildings, architects, manufacturers of construction products, and other stakeholders in the construction sector.

EPS MANUFACTURERS

The Polish Association of Styrofoam Producers, based in Warsaw, has been operating since 2010 and brings together 29 leading manufacturers on the Polish market of EPS insulation boards used in construction.The Association contributes to the development of technical standards and legal regulations concerning the production and application of EPS boards for thermal insulation in buildings. It cooperates with national and international construction-sector organisations, scientific and technical institutions, and state and local government authorities to support the development of EPS products and their applications. The Association undertakes numerous activities aimed at ensuring the quality of EPS products for construction on the Polish market, while supporting and promoting the principles of fair competition and good standards in the construction sector. It is also actively involved in environmental initiatives of social importance, emphasising the role of building insulation in reducing energy consumption and air pollution, as well as the role of EPS boards in this area as an environmentally sound product. PSPS represents the Polish EPS manufacturing industry in the European Manufacturers of Expanded Polystyrene Association (EUMEPS).

***Figure 1**. Manufacturers of EPS boards affiliated with PSPS*

PRODUCT DESCRIPTION

TECHNICAL PROPERTIES

This EPD refers to expanded polystyrene (EPS) boards used in construction. The products are mainly used for thermal and acoustic insulation of buildings. Product dimensions may vary depending on the manufacturer, market requirements and the specific application.
This EPD applies to homogeneous EPS products (see note 2).
When correctly installed, EPS boards are water-resistant and durable in terms of their insulating, structural and dimensional properties. They are also resistant to biological corrosion, the effects of

microorganisms and most chemical substances. However, EPS should not be allowed to come into contact with organic solvents.
When properly used, the service life of EPS insulation is equivalent to the service life of the building, usually without the need for maintenance. The use of insulation material has a positive effect on the energy performance of buildings. However, the quantification of this effect is only possible in the building life-cycle stage related to its operation.

MATERIALS AND INPUT RAW MATERIALS

Information on the raw materials used for the production of EPS boards comes from LCI forms provided by selected PSPS members. Polystyrene, which is an intermediate product in the manufacture of EPS, is produced from natural raw materials, primarily crude oil. In commercial form, it is a hard, glassy granulate with a diameter ranging from 0.2 to 2.5 mm.
In the presence of a small amount of pentane, approximately 6%, used as a blowing agent, the material becomes expandable polystyrene. Pentane, acting as a pore-forming agent, is enclosed within the polystyrene particles. Its bulk density is approximately 650 kg/m³, while the density of the material itself is approximately 1030 kg/m³. Flame retardants account for approximately 1% of the raw material composition. For the purposes of this declaration, it is assumed that no other additives are used in production.

APPLICATION

The performance characteristics of EPS products make them suitable for numerous applications in construction. The range of products covered by this EPD is used in applications such as wall insulation, floor insulation, flat and pitched roof insulation, external thermal insulation composite systems (ETICS), cavity wall insulation, ceiling and roof insulation, ground floor insulation, foundation insulation, as well as insulation of building equipment and industrial installations.

IMPACT ON INDOOR AIR QUALITY

EPS boards are characterised by low emissions of volatile organic compounds, VOCs, which makes them suitable for use inside buildings. Laboratory tests carried out by ITB did not show VOC emissions at concentrations exceeding the recommended health-based thresholds, EU-LCI. Substances such as CFCs, HFCs and HCFCs, which contribute to ozone layer depletion, are not used in the EPS production process. Many EPS manufacturers hold certificates confirming low emissions from their products.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The reference value, i.e. the declared unit, is 1 m³ of expanded polystyrene (Facade).

Note 1: In addition to the declared unit of 1 m³ EPS, the document provides results for 1 m² of insulation with thermal resistance R_D = 1 m²K/W. The LCA results (Table 8-11) may be easily converted using the conversion factors below for other types of product. LCA values from the tables presenting impacts on functional unit of 1 m² of reference product with a thermal resistance of R = 1 m²K/W should be multiplied by a coefficient dedicated for specific product. It is assumed that the tables give appropriate conversion factors assuming that the EPS does not contain any exceptional additives in an amount that could non-linearly influence the LCA result.

Table 1. Conversion factors for LCA results for product types

EPS Type	Typical Thermal Conductivity λ [W/(m·K)]	Typical Density [kg/m³]	Mass per 1 m² for R_D = 1 m²K/W [kg/m²]	Conversion factor [-]
Facade EPS EPS S to EPS 80 λ 0,036–0,042	0.038	13	0.49	1.00
Roof/Floor EPS EPS 80 to EPS 100 λ 0,038-0,036	0.037	18	0.67	1.35
Parking / Inverted Roof EPS 120 to EPS 200 λ 0,036-0,034	0.035	26	0.91	1.84
Foundation EPS (Hydrophobic) EPS 100 to EPS 200 λ 0,038-0,034	0.036	24	0.86	1.74
Acoustic EPS T λ 0,050-0,045	0.048	9	0.43	0.87
Graphite EPS EPS S to EPS 70 λ 0,031-0,033 *	0.032	13	0.42	0.85

* The conversion factor for graphite EPS should be interpreted as an approximate mass-based conversion factor. It assumes that the small graphite content does not significantly change the upstream LCA profile of the EPS granulate compared with white EPS.

For specific products with other parameters, equation (1) can be used to calculate the environmental footprint:

$$Impact_{R_D=1,i} = Impact_{R_D=1,ref} \cdot k_i \qquad (1)$$

where k_i is the conversion factor for a given EPS type, ρ_i and $\lambda_{D,i}$ denote the density and declared thermal conductivity coefficient of that EPS type, respectively, and ρ_{ref} and $\lambda_{D,ref}$ refer to the reference product:

$$k_i = \frac{\rho_i \cdot \lambda_{D,i}}{\rho_{ref} \cdot \lambda_{D,ref}} = \frac{m_i}{m_{ref}} \qquad (2)$$

For R_D = 1 m²K/W the mass of material required to achieve this thermal resistance is numerically equal to:

$$m_i = \rho_i \cdot \lambda_{D,i} \qquad (3)$$

m_i denotes the mass of product type i per 1 m² of insulation with R_D = 1 m²K/W.

For a specific product with a declared thermal resistance $R_{D,i,}$ the environmental impact should be calculated by multiplying the result relative to R_D = 1 m^2K/W by the dimensionless coefficient:

$$\frac{R_{D,i}}{1m^2K/W} \quad (4)$$

In this case:

$$Impact_{product,i} = Impact_{R_D=1,i} \cdot \frac{R_{D,i}}{1m^2K/W} \quad (5)$$

where:

$$Impact_{R_D=1,i} = Impact_{R_D=1,ref} \cdot k_i \quad (6)$$

Note 2: The declaration covers EPS boards without facings, laminates, coatings, composite layers, and additional system components. This declaration does not cover: felt boards, laminated boards, sloped boards with additional layers, ETICS system components, or special packaging.

Note 3: The calculations include packaging materials such as pallets, foil and labels in the quantities indicated by the manufacturers (data providers).

System boundary

The life cycle analysis of the declared products includes the "Product stage" A1-A3, A4-A5 and the modules related to the end of life cycle C1-C4 and D (so-called from the cradle to the factory gate with options) in accordance with EN 15804 + A2 and ITB PCR A. The calculations consider input materials and energy consumption, inventoried in representative factories. The assessment considered all relevant parameters from the collected production data, i.e. all material used in the EPS recipe, blowing agent, heat energy used, internal fuel and electricity consumption. It is assumed that the sum of omitted processes does not exceed 1% of all impact categories. In accordance with the EN 15804 guidelines, machinery and equipment (capital goods) required for production were excluded from the calculations, as was the transport of employees.

Allocation

The allocation rules used for this EPD are based on general ITB-PCR A and EN 16783. Data from selected plants in Poland were used for the calculations, using the averaging principle. Impacts related to the extraction and processing of raw materials, including the production of polystyrene, n-pentane, flame retardants, packaging materials (foil), energy carriers and water were allocated to module A1 (production of raw materials). About 98% of all impacts from production lines have been inventoried and assigned to the production of EPS polystyrene boards. The calculations also took into account the disposal of packaging materials. Module A2 (transport) covers the transport of raw materials such as EPS, auxiliary materials from suppliers to production plants. Municipal and technological waste of factories has been assigned to module A3 (factory production). Energy resources were inventoried for all factories and 100% allocated to the production of EPS products. Factory emissions have been estimated using national conversion factors (KOBiZE - 2024) and assigned to module A3. Data from selected plants in Poland were used for the calculations, using the averaging principle. The average product density on the market was assumed for the calculations.

System limits

All raw materials submitted for the formulations and production data were taken into consideration. In the assessment, all available data from production have been considered, i.e. all raw materials/elements used as per formulation process, utilized thermal energy for heating, and electric power consumption. Thus, material and energy flows contributing less than 1 % of mass or energy have been considered. It can be assumed that the total sum of neglected processes does not exceed 1 % of energy usage and mass per modules A or D. Machines and facilities required during production are neglected. The production of etiquettes was not considered. It was assumed that grey and white polystyrene granulates have a similar carbon footprint for graphite content below 3% so the small graphite content does not significantly change the upstream LCA profile of the EPS granulate compared with white EPS.

Modules A1 and A2: ***Raw materials supply and transport***

Polystyrene, which is an intermediate in the production of commercial polystyrene, is in the form of hard, glassy granules with a diameter of 0.2 to 2.5 mm. It is transported to the plants producing polystyrene products in special containers. EPS insulation is a foamed porous plastic and is free from chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs). All components used for LCA calculations come from the LCI questionnaires and the Ecoinvent v 3.11 database. 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.

Module A3: ***Production***

Thermal insulation polystyrene boards intended for construction applications are made in a multi-stage process. Pre-foaming is the process of softening raw material granules (polystyrene) using steam at a temperature above 90°C. This process takes 2 to 5 minutes. During this time, the polystyrene granules expand, increasing their volume from 15 to 65 times. Directly after foaming, the process of cooling the foamed particles takes place. The resulting particles of expanded polystyrene must undergo the seasoning stage in airy silos before further processing. In this way, by diffusion, air enters their interior, giving them the stability necessary in the following stages. The granules of pre-expanded polystyrene are poured into large cuboidal forms and expanded again using steam at a temperature of 110°C to 120°C, under the influence of which they combine to form a closed, foam structure at this stage, recycled granulate may be added to the production. After cooling, the polystyrene blocks are taken out of the molds and seasoned. Cutting blocks into boards of the desired dimensions is carried out using thermal-mechanical devices. Additional edge profiling is performed by milling. The waste (cuttings) generated during the cutting of blocks into boards are subject to internal recycling and re-used in the production cycle. The block diagram in Figure 2 shows the basic elements of the technological process of an EPS production.

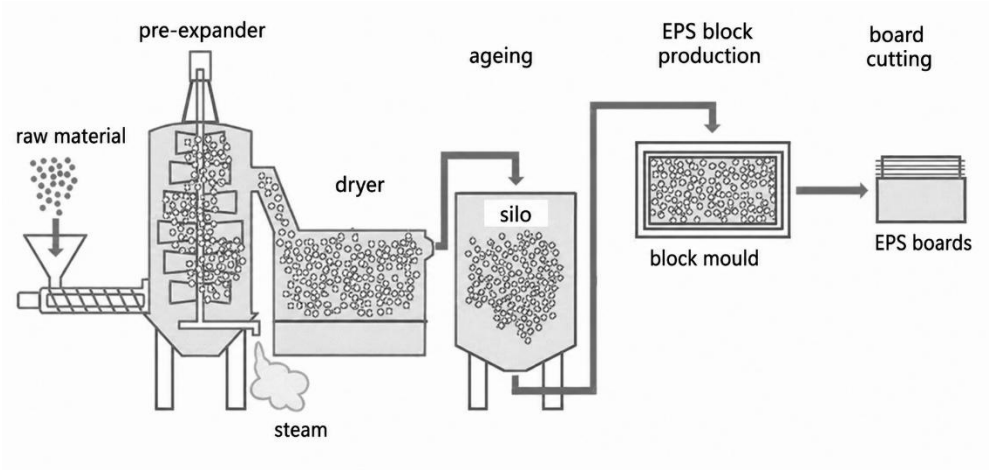

Figure 2*. The technological process of an EPS production.*

Module A4: transport to consumer

Vehicle transport at distance 500 km is considered (Euro 5).

Module A5: installation

The following scenario represents a conservative installation scenario for EPS boards, based mainly on façade applications. It is used as a generic A5 scenario for the declared product group. For other applications, actual installation impacts may be lower or may differ in process structure.
The scenario represents typical European construction practices and is intended for use in life cycle assessment (LCA) studies, particularly for the A5 – Installation stage according to EN 15804.
1. Delivery and Handling
EPS boards are unloaded from the delivery vehicle and manually transported to the installation area. Due to the lightweight nature of EPS, no significant mechanical lifting equipment is required. The average electricity consumption associated with handling is approximately 0.01 kWh per kg of installed EPS. No material losses are assumed during this step.
2. Cutting and Fitting
EPS boards are cut to fit corners, window openings, and façade details using a hot-wire cutter or hand saw. Material offcuts typically account for 3% of the installed EPS mass. Electricity consumption for cutting is approximately 0.02 kWh/kg.
3. Adhesive Application
A cement-based adhesive is applied using the perimeter-and-dabs method or a full-surface technique, depending on project specifications. The installation process consumes approximately 0.01 kWh/kg of EPS. Adhesive consumption is excluded from calculation.
4. Installation of EPS Boards
The prepared EPS boards are positioned and pressed onto the substrate to achieve the required alignment and bonding. This operation requires approximately 0.01 kWh/kg of EPS, with negligible material losses.
5. Mechanical Fixing
Where required by the installation design, mechanical anchors (excluded from calculation) are installed using electrically powered drilling equipment. The drilling and fixing process consumes approximately 0.01 kWh/kg of EPS. No EPS material losses occur during this stage.
6. Surface Sanding

After installation, the insulation surface is lightly sanded to remove uneven joints and ensure a flat substrate for reinforcement layers. This process consumes approximately 0.01 kWh/kg of EPS and generates 1% EPS dust, equivalent to 0.01kg of material per kilogram installed.

7. Waste Collection and Management

Offcuts and sanding residues are collected separately for recycling or disposal. Depending on local waste management practices, 70% of clean EPS waste can be recycled. Waste collection and handling require approximately 0.01 kWh/kg.

Overall Installation Results

For every 1 kg of installed EPS, the installation process typically results in:

- Total electricity consumption: approximately 0.08 kWh
- Material losses: approximately 4% of the installed EPS mass (0.04 kg)
- Recoverable waste: typically, 70% of clean cutting and sanding residues can be recycled.

These values represent typical European construction practice and are intended as generic reference data for the A5 (Installation) module in environmental product declarations (EPDs) and life cycle assessments (LCAs). Actual values may vary depending on installation techniques, project complexity, electricity mix, and on-site waste management practices. The production of lost material was included in A5

Modules B1-B7: Use

Modules B1–B7 are not declared. Under standard conditions of use, no maintenance, repair, replacement, refurbishment, operational energy use or operational water use is expected for the EPS board itself.

Modules C1 - C4: End of life cycle

The end-of-life management of expanded polystyrene (EPS) insulation boards depends on the condition of the material after dismantling and the local waste management infrastructure. In practice, EPS waste may be managed through a combination of recycling, energy recovery and landfill disposal rather than a single treatment route. The product (C1) is removed mechanically from the building. The end-of-life scenarios include transport to an incinerator or landfill (C2, 50 km). EPS has growing recycling potential. The following end-of-life scenario was adopted (Table 2).

Table 2. End-of-life scenario for waste EPS material

Scenario	Mass included
Mechanical recycling 30%, Energy recovery 50%, Landfill 20%	100%

The actual treatment shares depend on national waste management systems, collection schemes and the quality of the recovered material. EPS waste should be classified according to the European List of Waste. Typical waste codes are:

- 17 06 04 – insulation materials other than those mentioned in 17 06 01 and 17 06 03;
- 17 09 04 – mixed construction and demolition waste;
- 15 01 02 – plastic packaging (clean packaging waste);
- 07 02 13 – waste plastic from plastics manufacture (production scrap).

Mechanical recycling (0.25 kWh/kg) is feasible when EPS is collected separately and remains sufficiently clean. EPS contaminated with cement adhesive, mineral render, bituminous membranes, soil or other construction materials is generally unsuitable for mechanical recycling and is usually directed to energy recovery or, where no recovery option exists, landfill disposal.

Note: Although 30% of EPS waste is assumed to be mechanically recycled in the end-of-life scenario, no substitution credit for recycled EPS is claimed in Module D. Module D includes only benefits associated with energy recovery from waste incineration.

Module D - profits and losses outside the product system

Module D includes benefits from energy recovery of EPS waste in the end-of-life scenario. The reported benefits result from the substitution of conventional energy generation (heat from natural gas) by energy recovered from waste incineration, according to the assumptions implemented in the ITB-LCA model and the background datasets used for the calculation. No substitution credit for recycled EPS material is claimed in Module D.

Data representativeness

The data used for the LCA calculations are based on verified inventory data provided by representative members of the Association.

Data quality

The values determined in the LCA calculations are based on verified inventory data provided by representative members of the Association. No 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. The background data for the processes come from the following resources database Ecoinvent v.3.11. Specific (LCI) data quality analysis was a part of the input data verification. No mass balance approach used. Biogenic content in EPS is zero, and considering packing products is less than 5%. Biogenic carbon emission was balanced in life cycle.

Assumptions and estimates

The impacts of the representative products were aggregated using weighted average.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN 15804+A2. The core background data for the processes originate from the Ecoinvent v3.11. The environmental indicators presented in this EPD were calculated in accordance with EN 15804+A2 using the Environmental Footprint (EF 3.1) life cycle impact assessment method. Some impact categories should be interpreted with provided caution because their methodological development is still evolving and they are associated with higher uncertainty. In particular:

- Water Deprivation Potential (WDP) depends strongly on regional water scarcity assumptions and the geographical representativeness of background datasets. Results should therefore be interpreted as indicative rather than site-specific.
- Abiotic Depletion Potential (ADP) is sensitive to assumptions regarding future resource availability and the characterization factors adopted in the EF method. It should not be interpreted as a direct measure of physical resource exhaustion.
- Human toxicity and ecotoxicity indicators remain subject to considerable scientific uncertainty related to emission inventories, fate modelling, exposure pathways and characterization factors. Comparisons between products based solely on these indicators should therefore be made with caution.
- Ionising radiation results depend mainly on the electricity generation mix represented in background databases and may change as national electricity systems evolve.

Several additional environmental indicators are reported as INA (Indicator Not Assessed, Table 5). This designation does not imply zero impact. It indicates that these indicators are not declared because:

- they are currently optional and not sufficiently robust for routine EPD reporting under the applicable ITB PCR and ITB programme rules;
- ITB the programme operator did not require their declaration.

Consequently, the environmental performance of the product should primarily be assessed using the core indicators required by EN 15804+A2.

Additional information

Electricity consumption in module A3 (production) was modelled using the Polish national electricity mix (0.553 kg CO_2/kWh for 2024). The European electricity mix used in the calculations has an emission factor of 0.43 kg CO_2/kWh for 2024. The RSL depends on the installation and exposures and for the purpose of calculating elements or a building it can be equal to the service life of the building or partition under conditions of its validity: proper installation, no exposure to organic solvents, UV protection, and no persistent moisture beyond the conditions specified for the given application.

Expanded polystyrene (EPS) boards covered by this EPD are manufactured in accordance with applicable European chemicals legislation, including Regulation (EC) No 1907/2006 (REACH).

The products:

- do not intentionally contain substances listed on the current REACH Candidate List of Substances of Very High Concern (SVHC) above the concentration threshold of 0.1% (w/w);
- are manufactured without ozone-depleting blowing agents such as CFCs, HCFCs or HFCs;
- use pentane as the blowing agent, which is emitted almost entirely during production and the early conditioning period before delivery. Residual pentane content in the installed product is negligible.

Where flame retardants are used to fulfil fire performance requirements according to EN 13163, they comply with the applicable requirements of REACH and other relevant European chemicals legislation (based on the LCI declaration). This declaration does not specify a particular flame retardant because formulations may differ between manufacturers. Laboratory testing performed by ITB demonstrated VOC emissions below the recommended EU-LCI values, making the products suitable for indoor applications. EPS does not release fibres or respirable mineral dust during normal service. During cutting and installation, limited quantities of EPS particles may be generated. Mechanical cutting or hot-wire cutting should be carried out in well-ventilated areas, with collection of offcuts for recycling whenever possible. Standard occupational hygiene measures should be applied to minimize the release of dust and lightweight particles into the environment. Manufacturers use polymeric flame retardants or equivalent flame-retardant systems compliant with current EU legislation.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 m^3 of EPS. The following life cycle modules (Table 3) were included in the analysis. The following tables 4-7 and 8-11 show the environmental impacts of the life cycle of selected modules (A1-A5, C1-C4, and D).

Table 3. System boundaries for the environmental characteristic of the EPS

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**	**MD**	**MD**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MD**	**MD**	**MD**	**MD**	**MD**

Table 4. Life cycle assessment (LCA) results of the EPS boards – environmental impacts (DU: 1 m^3)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	4.26E+01	9.80E-01	6.57E+00	5.05E+01	1.23E+00	9.59E-01	9.17E-01	1.23E-01	2.13E+01	1.35E-02	-2.71E+01
Greenhouse potential - fossil	eq. kg CO_2	4.29E+01	9.79E-01	6.53E+00	5.04E+01	1.22E+00	9.21E-01	8.90E-01	1.22E-01	2.13E+01	1.35E-02	-2.71E+01
Greenhouse potential - biogenic	eq. kg CO_2	-2.53E-02	8.41E-04	4.86E-02	2.41E-02	1.05E-03	4.86E-02	2.60E-02	1.05E-04	2.01E-02	3.38E-05	-4.54E-02
Global warming potential - land use and land use change	eq. kg CO_2	4.98E-04	4.75E-04	8.82E-04	1.86E-03	5.94E-04	9.42E-04	3.12E-04	5.94E-05	2.95E-04	1.29E-05	-1.27E-03
Stratospheric ozone depletion potential	eq. kg CFC 11	3.92E-08	2.13E-08	9.78E-07	1.04E-06	2.66E-08	2.02E-08	1.82E-08	2.66E-09	2.91E-08	5.54E-09	-4.16E-06
Soil and water acidification potential	eq. mol H+	1.64E-01	3.19E-03	4.43E-02	2.12E-01	3.99E-03	4.05E-03	9.88E-03	3.99E-04	9.95E-03	1.27E-04	-3.27E-02
Eutrophication potential - freshwater	eq. kg P	5.68E-04	6.85E-05	2.91E-03	3.54E-03	8.56E-05	4.44E-04	1.69E-03	8.56E-06	1.29E-03	1.27E-06	-1.60E-03
Eutrophication potential - seawater	eq. kg N	2.54E-02	1.10E-03	1.38E-02	4.03E-02	1.37E-03	7.00E-04	1.43E-03	1.37E-04	1.41E-02	4.42E-05	-8.35E-03
Eutrophication potential - terrestrial	eq. mol N	2.79E-01	1.16E-02	1.51E-01	4.42E-01	1.45E-02	6.68E-03	1.21E-02	1.45E-03	2.21E-02	4.68E-03	-8.71E-02
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.23E-01	4.77E-03	1.70E-01	2.98E-01	5.96E-03	2.40E-03	3.38E-03	5.96E-04	5.66E-03	1.42E-04	-2.95E-02
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	8.57E-06	3.21E-06	9.35E-06	2.11E-05	4.01E-06	1.07E-06	4.34E-06	4.01E-07	3.85E-06	3.12E-07	-1.22E-05
Abiotic depletion potential - fossil fuels	MJ	1.09E+03	1.40E+01	1.04E+02	1.21E+03	1.75E+01	2.18E+01	1.51E+01	1.75E+00	1.31E+01	3.74E-01	-4.64E+02
Water deprivation potential	eq. m^3	2.81E+01	6.86E-02	6.66E-01	2.88E+01	8.57E-02	5.68E-01	3.12E-01	8.57E-03	6.89E-01	1.17E-03	-9.10E-01

Table 5. Life cycle assessment (LCA) results of the EPS – additional impacts indicators (DU: 1 m^3)

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

Table 6. Life cycle assessment (LCA) results of the EPS boards - the resource use (DU: 1 m^3)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	7.42E+00	2.15E-01	2.18E+00	9.81E+00	2.69E-01	1.61E+00	1.12E+00	2.69E-02	8.78E-01	3.12E-03	-2.03E+00
Consumption of renewable primary energy resources used as raw materials	MJ	2.86E+00	0.00E+00	0.00E+00	2.86E+00	0.00E+00	3.43E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	1.03E+01	2.15E-01	2.18E+00	1.27E+01	2.69E-01	1.64E+00	1.12E+00	2.69E-02	8.78E-01	3.12E-03	-2.03E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	5.87E+02	1.40E+01	1.05E+02	7.06E+02	1.75E+01	1.57E+01	1.51E+01	1.75E+00	-2.38E+02	3.64E-01	-4.65E+02
Consumption of non-renewable primary energy resources used as raw materials	MJ	5.05E+02	0.00E+00	0.00E+00	5.05E+02	0.00E+00	6.06E+00	0.00E+00	0.00E+00	2.51E+02	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.09E+03	1.40E+01	1.05E+02	1.21E+03	1.75E+01	2.18E+01	1.51E+01	1.75E+00	1.32E+01	3.64E-01	-4.65E+02
Consumption of secondary materials	kg	1.18E-02	6.29E-03	1.74E-02	3.55E-02	7.87E-03	8.07E-04	1.38E-03	7.87E-04	3.37E-03	7.88E-05	-2.38E-02
Consumption of renew. secondary fuels	MJ	9.65E-02	8.00E-05	5.80E-05	9.66E-02	1.00E-04	1.16E-03	7.68E-06	1.00E-05	1.81E-05	2.05E-06	-3.64E-05
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	2.01E-02	2.01E-02	0.00E+00	9.77E-03	1.22E-02	0.00E+00	9.16E-03	0.00E+00	-9.16E-03
Net consumption of freshwater	m^3	6.53E-01	1.67E-03	5.34E-02	7.08E-01	2.09E-03	1.51E-02	4.10E-03	2.09E-04	4.83E-03	3.90E-04	-2.05E-02

Table 7. Life cycle assessment (LCA) results of the EPS – waste categories (DU: 1 m^3)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	5.61E-01	9.38E-03	5.25E-02	6.23E-01	1.17E-02	3.69E-02	1.56E-04	1.17E-03	6.51E-02	3.90E-04	-8.85E-02
Non-hazardous waste	kg	1.45E+00	2.85E-01	4.94E-01	2.23E+00	3.56E-01	1.97E+00	8.11E-03	3.56E-02	6.70E+00	5.20E-03	-1.36E+00
Radioactive waste	kg	1.08E-05	4.51E-06	2.18E-05	3.72E-05	5.64E-06	1.34E-05	1.13E-05	5.64E-07	1.04E-05	1.38E-08	-1.49E-05
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	2.19E-03	1.02E-04	8.12E-05	2.37E-03	1.28E-04	8.85E-05	1.56E-05	1.28E-05	3.90E+01	7.28E-07	-1.16E-04
Materials for energy recovery	kg	6.92E-07	8.58E-07	1.09E-06	2.64E-06	1.07E-06	6.14E-08	1.37E-07	1.07E-07	6.50E+01	8.84E-09	-1.66E-06
Exported Energy	MJ	1.54E+00	5.21E-03	2.34E-01	1.78E+00	6.51E-03	9.13E-02	4.50E-02	6.51E-04	9.58E+01	5.20E-04	-1.85E-01

Table 8. Life cycle assessment (LCA) results of the EPS boards – environmental impacts (DU: R_D = 1 m²K/W, λ = 0.038 W/(m·K))

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	1.63E+00	3.73E-02	2.50E-01	1.92E+00	4.66E-02	3.69E-02	3.48E-02	4.66E-03	8.09E-01	5.16E-04	-1.03E+00
Greenhouse potential - fossil	eq. kg CO_2	1.63E+00	3.72E-02	2.48E-01	1.92E+00	4.65E-02	3.50E-02	3.38E-02	4.65E-03	8.08E-01	5.14E-04	-1.03E+00
Greenhouse potential - biogenic	eq. kg CO_2	-9.60E-04	3.20E-05	1.85E-03	9.18E-04	3.99E-05	1.85E-03	9.88E-04	3.99E-06	7.64E-04	1.28E-06	-1.73E-03
Global warming potential - land use and land use change	eq. kg CO_2	1.89E-05	1.81E-05	3.35E-05	7.05E-05	2.26E-05	3.58E-05	1.19E-05	2.26E-06	1.12E-05	4.91E-07	-4.84E-05
Stratospheric ozone depletion potential	eq. kg CFC 11	1.49E-09	8.09E-10	3.71E-08	3.94E-08	1.01E-09	7.69E-10	6.92E-10	1.01E-10	1.11E-09	2.10E-10	-1.58E-07
Soil and water acidification potential	eq. mol H+	6.24E-03	1.21E-04	1.68E-03	8.05E-03	1.52E-04	1.54E-04	3.75E-04	1.52E-05	3.78E-04	4.84E-06	-1.24E-03
Eutrophication potential - freshwater	eq. kg P	2.16E-05	2.60E-06	1.10E-04	1.35E-04	3.25E-06	1.69E-05	6.42E-05	3.25E-07	4.90E-05	4.84E-08	-6.07E-05
Eutrophication potential - seawater	eq. kg N	9.65E-04	4.17E-05	5.23E-04	1.53E-03	5.21E-05	2.66E-05	5.43E-05	5.21E-06	5.35E-04	1.68E-06	-3.17E-04
Eutrophication potential - terrestrial	eq. mol N	1.06E-02	4.41E-04	5.72E-03	1.68E-02	5.51E-04	2.54E-04	4.59E-04	5.51E-05	8.39E-04	1.78E-04	-3.31E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.66E-03	1.81E-04	6.47E-03	1.13E-02	2.27E-04	9.11E-05	1.28E-04	2.27E-05	2.15E-04	5.41E-06	-1.12E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	3.26E-07	1.22E-07	3.55E-07	8.03E-07	1.53E-07	4.08E-08	1.65E-07	1.53E-08	1.46E-07	1.19E-08	-4.64E-07
Abiotic depletion potential - fossil fuels	MJ	4.15E+01	5.31E-01	3.96E+00	4.60E+01	6.64E-01	8.28E-01	5.73E-01	6.64E-02	4.96E-01	1.42E-02	-1.76E+01
Water deprivation potential	eq. m^3	1.07E+00	2.61E-03	2.53E-02	1.09E+00	3.26E-03	2.16E-02	1.19E-02	3.26E-04	2.62E-02	4.45E-05	-3.46E-02

Table 9. Life cycle assessment (LCA) results of the EPS – additional impacts indicators (DU: R_D = 1 m²K/W)

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

Table 10. Life cycle assessment (LCA) results of the EPS boards - the resource use (DU: R_D = 1 m²K/W)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.82E-01	8.18E-03	8.28E-02	3.73E-01	1.02E-02	6.11E-02	4.25E-02	1.02E-03	3.33E-02	1.19E-04	-7.73E-02
Consumption of renewable primary energy resources used as raw materials	MJ	1.09E-01	0.00E+00	0.00E+00	1.09E-01	0.00E+00	1.30E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	3.91E-01	8.18E-03	8.28E-02	4.82E-01	1.02E-02	6.24E-02	4.25E-02	1.02E-03	3.33E-02	1.19E-04	-7.73E-02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.23E+01	5.31E-01	3.97E+00	2.68E+01	6.64E-01	5.98E-01	5.75E-01	6.64E-02	-9.05E+00	1.38E-02	-1.77E+01
Consumption of non-renewable primary energy resources used as raw materials	MJ	1.92E+01	0.00E+00	0.00E+00	1.92E+01	0.00E+00	2.30E-01	0.00E+00	0.00E+00	9.55E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	4.15E+01	5.31E-01	3.97E+00	4.60E+01	6.64E-01	8.28E-01	5.75E-01	6.64E-02	5.00E-01	1.38E-02	-1.77E+01
Consumption of secondary materials	kg	4.47E-04	2.39E-04	6.62E-04	1.35E-03	2.99E-04	3.07E-05	5.24E-05	2.99E-05	1.28E-04	2.99E-06	-9.05E-04
Consumption of renew. secondary fuels	MJ	3.67E-03	3.04E-06	2.20E-06	3.67E-03	3.80E-06	4.41E-05	2.92E-07	3.80E-07	6.88E-07	7.81E-08	-1.38E-06
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	7.65E-04	7.65E-04	0.00E+00	3.71E-04	4.64E-04	0.00E+00	3.48E-04	0.00E+00	-3.48E-04
Net consumption of freshwater	m^3	2.48E-02	6.34E-05	2.03E-03	2.69E-02	7.92E-05	5.74E-04	1.56E-04	7.92E-06	1.83E-04	1.48E-05	-7.81E-04

Table 11. Life cycle assessment (LCA) results of the EPS – waste categories (DU: R_D = 1 m²K/W)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	2.13E-02	3.56E-04	1.99E-03	2.37E-02	4.45E-04	1.40E-03	5.93E-06	4.45E-05	2.47E-03	1.48E-05	-3.36E-03
Non-hazardous waste	kg	5.50E-02	1.08E-02	1.88E-02	8.46E-02	1.35E-02	7.50E-02	3.08E-04	1.35E-03	2.55E-01	1.98E-04	-5.16E-02
Radioactive waste	kg	4.12E-07	1.71E-07	8.30E-07	1.41E-06	2.14E-07	5.11E-07	4.30E-07	2.14E-08	3.96E-07	5.24E-10	-5.65E-07
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	8.31E-05	3.89E-06	3.08E-06	9.01E-05	4.87E-06	3.36E-06	5.93E-07	4.87E-07	2.55E-01	2.77E-08	-4.40E-06
Materials for energy recovery	kg	2.63E-08	3.26E-08	4.14E-08	1.00E-07	4.08E-08	2.33E-09	5.19E-09	4.08E-09	1.16E-01	3.36E-10	-6.32E-08
Exported Energy	MJ	5.86E-02	1.98E-04	8.89E-03	6.77E-02	2.47E-04	3.47E-03	1.71E-03	2.47E-05	3.64E+00	1.98E-05	-7.01E-03

Verification

The process of verification of this EPD is in accordance with ISO 14025. 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 (sub clause 8.1.3.) [x] external [ ] internal
External verification of EPD: Halina Prejzner, PhD. Eng. LCA, LCI audit and input data verification: 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 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.

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 (ISO 17025/17065/17029). 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 16783:2017 Thermal insulation products - Product category rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations
- 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+A2:2019 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
- ISO 20915:2018 Life cycle inventory calculation methodology for steel products
- KOBiZE Wskaźniki emisyjności CO_2, SO_2, NOx, CO i pyłu całkowitego dla energii elektrycznej. December 2024
- https://ecoinvent.org/

LCA, LCI audit and input data verification
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CERTIFICATE № 975/2026

of TYPE III ENVIRONMENTAL DECLARATION

Product:

Expanded polystyrene (EPS) boards used in construction

Manufacturer:

Polskie Stowarzyszenie Producentów Styropianów

ul. Puławska 145, 02-715 Warsaw, 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 for the first time on
10th June 2026
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

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director
for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, June 2026