Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

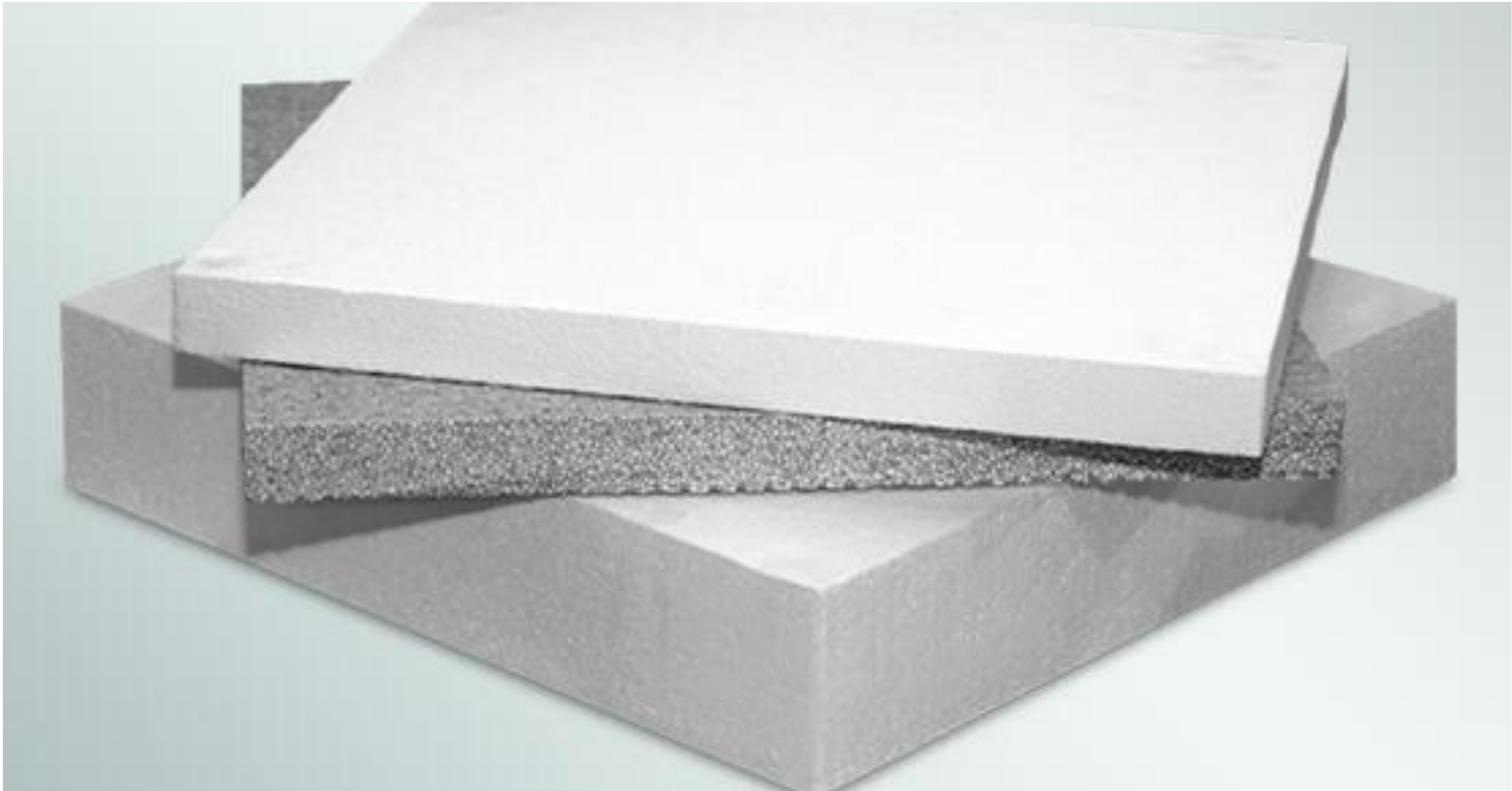
$1m^2$ of Expanded Polystyrene (EPS) insulation boards

from

Kauno šilas UAB

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-05614
Publication date:	2023-12-12
Valid until:	2028-12-11

EPD of multiple products, based on worst-case results.
Product list: EPS70, EPS80, EPS100 and EPS70 Neo, EPS80 Neo, EPS100 Neo



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *PCR2019-14 Construction products v1.3.1 and as complementary c-PCR the c-PCR-005 Thermal insulation products (EN 16783)*
PCR review was conducted by: *The Technical Committee of the International EPD® System.*
Life Cycle Assessment (LCA)
LCA accountability: *Bureau Veritas Latvia, riga@bureauveritas.com*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Elisabet Amat, eamat@greenize.es* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Kauno šilas UAB

Contact: Nerijus Miliukas, +370 677 10034, nerijus@kaunosilas.lt

Description of the organization: UAB "Kauno šilas" is the largest manufacturer of thermal insulation from polystyrene foam in Lithuania. The company started its activities back in 1990, when UAB "Kauno šilas" became the first heat-insulating material, i.e. polystyrene foam, manufacturer in Lithuania. Now company also offer consultations and solutions to clients and customers - standard and individually desired dimensions of all types of EPS heat-insulating panels, in accordance with construction regulations.

Product-related or management system-related certifications: The company's production and quality control systems are certified according to international management standards ISO 9001 and ISO 14001.

Name and location of production site(s): Energetikų g. 32, LT-52485, Kaunas, Lithuania

Product information

Product name: Expanded Polystyrene (EPS) insulation boards

Product identification: EPS70, EPS80, EPS100 and EPS70 Neo, EPS80 Neo, EPS100 Neo

Product description: factory made EPS thermal insulation products

Product within the scope of this study is a group of manufacturer's EPS insulation materials, that are defined as EPS and EPS Neo. For the purpose of this LCA study manufacturer has provided consumption of raw materials and other resources on 2 types of EPS insulation products with common manufacturing stages and ingredients. EPS (expanded polystyrene insulation) is manufactured using beads of foam within a mold. Heat (steam) is applied directly to the beads, causing them to expand and fuse together. 1m^3 of EPS contains about 10 million beads, each counting approximately 3,000 cells which are closed off and filled with air. EPS is, in other words, composed of approximately 2% polystyrene and 98% air. The manufacturing process results in a closed-cell structure, but not a closed-cell insulation board (due to voids that can occur between the beads).

UN CPC code: 54650 - Insulation services

Geographical scope: This EPD has a European geographical scope

Multiple products: This EPD is representative of a "worst-case" thermal insulation material produced by Kauno šilas UAB. The following table shows all the products that fit under this EPD. PCR 2019:14 Construction products v1.3.1 guidelines have been followed for declaration of results for multiple products, i.e. impact indicator results for included products differ by more than 10%, therefore, "worst-case" product scenario has been followed. Technical parameters of EPS thermal insulation products included in this study and declared in set of results for EPD are listed in the following Table.

Table 1. Technical parameters of insulation products

Product name	Density (kg/m^3)	Thermal conductivity (W/m*K)	Thermal resistance (R) of 250mm board (m^{2}K/W)	Compressive stress @ 10% deformation (kPa)	Tensile strength (kPa)	Long-term water absorption (%)
Šiloporas EPS70	14,5	0,039	**6,410**	≥ 70 kPa	≥ 115 kPa	≤ 2,0 %
Šiloporas Neo EPS70	14,5	0,032	**7,813**	≥ 70 kPa	≥ 115 kPa	≤ 2,0 %
Šiloporas EPS80	16,5	0,037	**6,757**	≥ 80 kPa	≥ 125 kPa	≤ 5,0 %
Šiloporas Neo EPS80	16,5	0,031	**8,065**	≥ 80 kPa	≥ 125 kPa	≤ 5,0 %
Šiloporas EPS100	18,5	0,035	**7,143**	≥ 100 kPa	≥ 150 kPa	≤ 2,5 %
Šiloporas Neo EPS100	18,5	0,030	**8,333**	≥ 100 kPa	≥ 100 kPa	≤ 4,0 %

LCA information

Functional unit / declared unit: 1m² EPS and EPS Neo insulation board with 250mm thickness and thermal resistance as declared in Table 1.

Reference service life: 50 years, as the minimum for the thermal performance characteristics of thermal insulation products

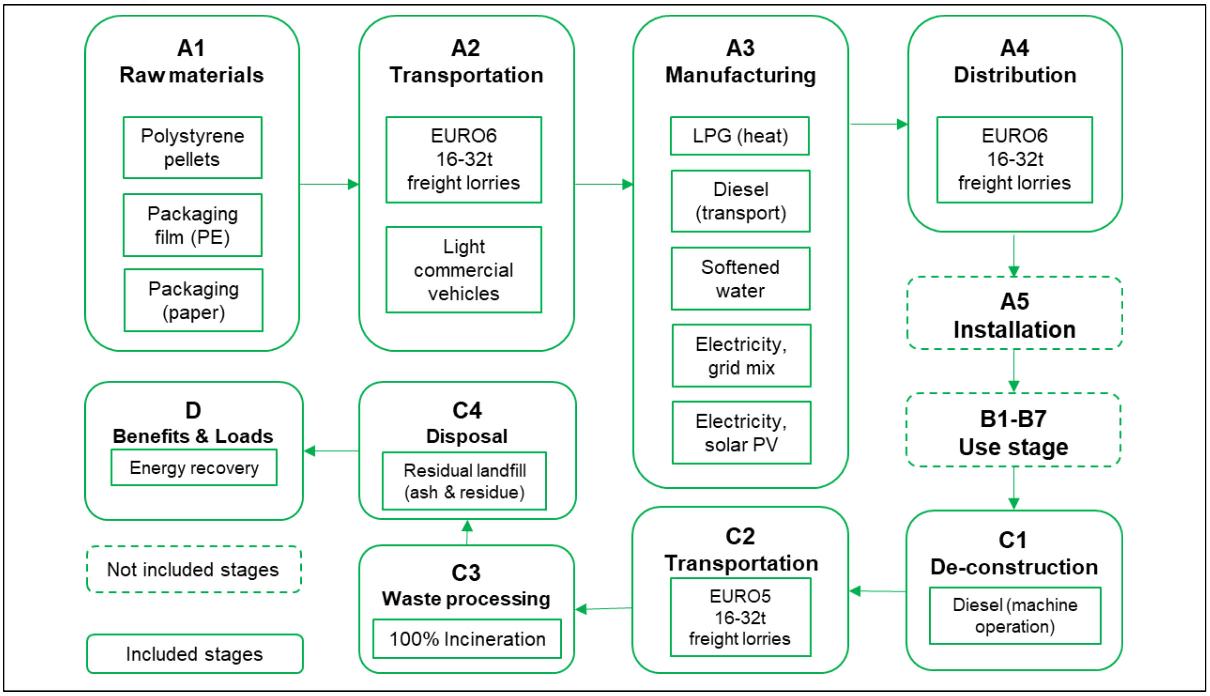
Time representativeness: The production data are from 2022, database compiled in November 2021, i.e., no data is older than ten years.

Database(s) and LCA software used: Ecoinvent v3.8 has been used to conduct quantitative evaluation in this study, providing LCI data for raw materials and processes. SimaPro 9.5 has been used to obtain impact assessment results

Description of system boundaries:

LCA performed in the "Cradle-to-gate with options, modules C1 – C4, module D, and with optional module A4" form. All primary materials, resource use, energy use and waste have been included for product stages A1-A3, A4, C1-C4, and D. Installation (A5) and Use stage (B1-B7) are not mandatory, therefore, have not been declared in this LCA study.

System diagram:



More information:

Heat, electricity, resource use and waste in production are calculated as an average weight per produced units of all products using yearly production data and the rate for 2022. Manufacturing processes and raw materials consider National (Lithuanian) grid mix of Electricity along with photovoltaic solar panel generated Electricity, produced on-site (16.2% share of total consumption). Secondary data on materials' flow information has been gathered from the Ecoinvent v3.8 database. In addition, the allocation performed following the provisions of EN 15804:2012+A2:2019. With waste production in-house, incoming energy and water are allocated equally among all products through mass allocation. The “Polluter pays” and Modularity principles have been followed.

This is a cradle-to-gate with options LCA study, therefore, stages A1-A3, A4, C1-C4 and Module D have been included. Although, some flows are not included in the system boundaries:

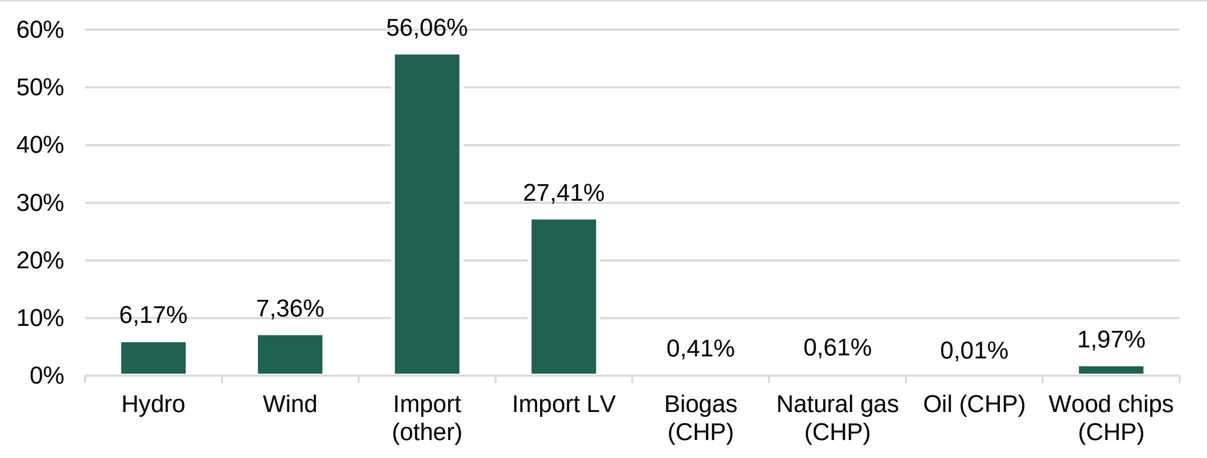
- emissions related to infrastructure processes;
- manufacture of equipment used in production, buildings, or any other capital goods;
- transportation of personnel to and within the manufacturing plant.

Data quality: The foreground data has been collected internally, considering the latest available average production amounts and measurements during the year 2022. Data regarding waste treatment scenarios and similar processes have been acquired from Ecoinvent v3.8.

The data quality level in this study is qualified as "Good" according to the UN Environment Global Guidance criteria on LCA database development. Data is geographically representative as it comes from the area of study. It is technically representative as it comes from processes and products under study using the same state of technology defined in goal and scope. According to the documentation, it is also time representative. Data quality rating has been performed using a rating system where 1 means Excellent, and 5 means Poor. An average for each criterion is presented in the table Below:

Technological Representativeness, TeR	Geographic representativeness, GeR	Time Representativeness, TiR	Precision, P	Average DQR
2,25	**2,04**	**2,00**	**2,96**	**2,31**

Electricity mix used in LCA calculations represents Lithuanian national grid mix and is based on the data present in Ecoinvent v3.8 (see Figure below).



Lithuanian national electricity grid mix, per Ecoinvent v3.8 dataset

Major contributors to Lithuanian national electricity grid mix are:
- 27,41% import from Latvia
- 56,06% import from other countries
- 13,53% are a combined value for renewable energy sources, i.e. onshore/offshore wind farms (7,36%) and hydropower (6,17%) plants.

It is necessary to note, that according to manufacturer provided data on consumed Electricity, 16.22% share of consumption is covered by renewable energy source, i.e. solar PV system on the roof of the manufacturing plant (see Figure below).

Greenhouse gas emission from the use of electricity in the manufacturing phase:
National production mix from import, medium voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing prosess (A3). 16% of consumed electricity is provided by manufacturer's solar panel system on the roof of the factory. Therefore, emission factor acquired from Ecoinvent v3.8, representing Lithuanian electricity grid mix (0,658 kgCO_2eq/kWh), has been recalculated to represent emission factor that is specific to manufacturing plant and has solar power share included in it:

National electricity grid	Unit	Value
Weighted value, incl. 16% share of solar panel system generation	kgCO_2eq/kWh	0,384

Kauno šilas UAB solar panel system on the roof of manufacturing plant

Module A1 includes raw materials production and production of packaging for final product, while Module A2 involves transportation of raw materials and packaging to the manufacturer. In module A1, extraction and processing of raw materials and generation of electricity and heat from primary energy resources to produce these raw materials.
Raw materials for all products included in this study are the same, i.e., polystyrene pellets and packaging materials for the final product - polyethylene (PE) packaging film and paper for labels.

In **Module A2**, transport type and distances from the locations of raw material suppliers to the manufacturing plant in Lithuania are included according to the data provided by manufacturer. Distances that are covered by each raw material and ingredients are the same for each type of product, but amount differs, therefore, only distance and type of vehicles are declared in the following Table.

Material	Type of vehicle	Distance, km	Fuel consumption, l/tkm
Polystyrene pellets	Lorry 16-32t, EURO6	1400	0,0431
PE packaging film	Light commercial vehicle	100	0,4828
Paper	Light commercial vehicle	100	0,4828

Module A3 represents manufacturing stage of EPS thermal insulation can be divided in 3 main stages: pre-expansion, maturing and final forming.
The technological process of polystyrene foam production consists of the following operations:

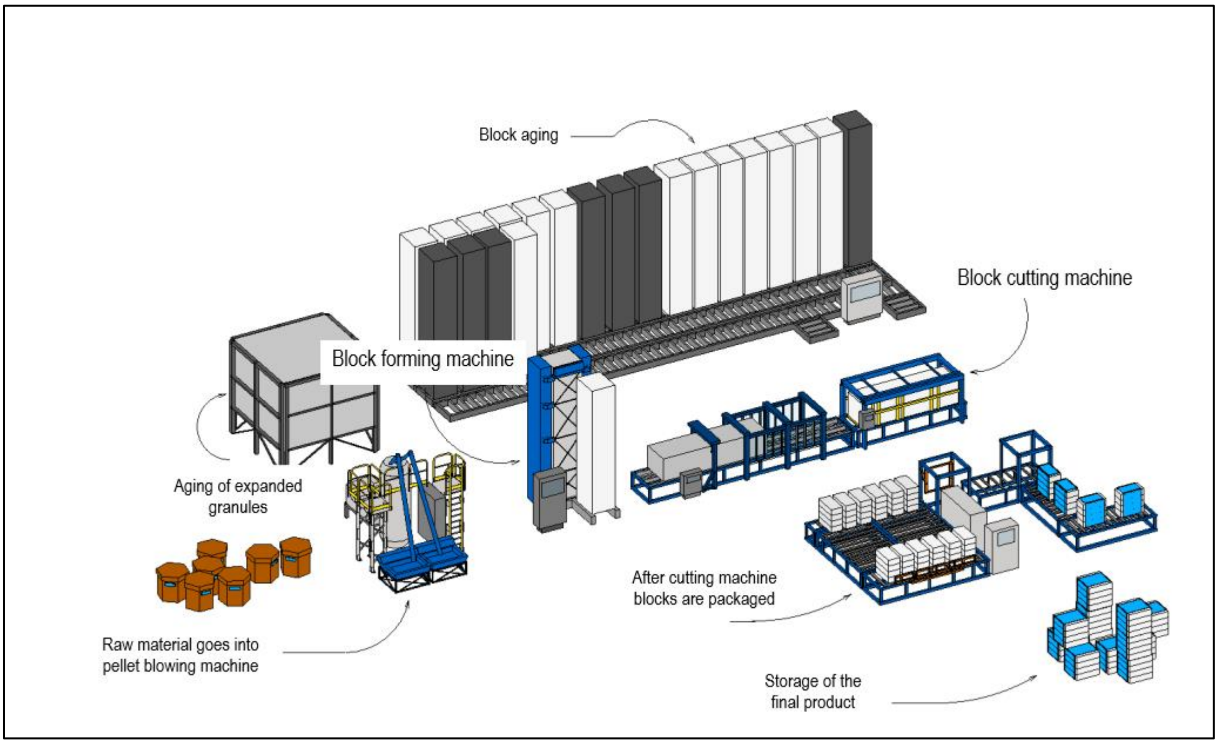
1. Raw material storage
2. Primary expansion of polystyrene foam granules
3. Expansion granules aging
4. Formation of polystyrene foam blocks
5. Block aging
6. Cutting blocks into sheets
7. Finished product storage

The first step in the production process is raw material storage. Raw materials from suppliers are delivered on pallets in single-use cardboard containers - octabins. Each container is marked with the factory logo, which specifies the raw material grade, thickness, and specifications. Octabins are stored in separate rooms where the temperature does not exceed 25°C, complying with fire safety requirements. Each batch of supplied raw materials comes with a quality-certifying certificate. Pallets with raw materials are transported to the primary expansion bar by a forklift, where the granules are emptied from the container into the filling elevator of the expander.
The second step in the production process is the expansion of polystyrene foam granules. Granules are fed into the filling chamber of the expander by a screw conveyor, after filling the elevator. Inside the expansion device chamber, there are four special design holes at the bottom, where steam is injected at a temperature of 110–130°C and a pressure of 0.005–0.03 MPa. A mixer inside the chamber ensures uniform expansion of the entire mass of granules and feeds it towards the exit chamber. The expanded granules, having reached the required degree of expansion, pass through overflow gates and enter the drying chamber. There, they are blown with warm air, dried, and pneumatically transported to aging bunkers.
The expansion process is continuously monitored automatically by weighing the expanded granules. The interval between weighing is 4 minutes.
The third step in the production process is aging of the expanded granules. Granules, after entering the drying chamber, are blown with warm air (up to 30°C) for a certain period (1-5 minutes) and are pneumatically transported (by a fan) to aging bunkers. Depending on the grade, granules in the bunker can age for 2 to 48 hours (at 15–20°C). During aging, the granules dry and their outer shell hardens. Freshly expanded granules contain residual moisture and blowing agent - pentane. As the granules dry, moisture and pentane are released. During this period, the granules are sensitive to mechanical stress. When the air entering the granules equalizes the pressure difference, the granule stabilizes. The aging time of granules depends on the properties of the raw materials, expansion conditions, granule grade, air temperature, and humidity.
The fourth step in the production process is the formation of polystyrene foam blocks. Expanded and aged granules are drawn into a block mold until it is completely filled. Filling is automatically recorded. To reduce steam consumption, decrease blowing time, and increase the pressure drop after steaming, the filled mold is evacuated.
Next is the steaming process. During this phase, blow and condensate discharge lines are automatically opened and later closed at the right moment. In the sealed mold, granules, receiving thermal energy from 100–120°C steam, further expand and fuse together. During the fusion process, the pressure in the mold reaches its maximum value, up to 1.2 bar. Then, the pressure is maintained for several seconds to improve the surface appearance of the blocks.
The subsequent phase is pressure reduction (or cooling) - a key factor determining the duration of the block forming cycle. During this phase, the block's pressure, mold wall, and internal block temperature are effectively reduced, allowing the block to be easily removed from the forming device. The sequence and parameters of the block forming phases are maintained, controlled, and adjusted by computer.

The fifth step in the production process is block aging. Formed polystyrene foam blocks are transported by a forklift to the block aging conveyor. Blocks are stored vertically in rows next to each other in a room where drafts are not predominant. The minimum aging time for blocks before cutting is 8 hours. The specific maintenance (aging) of blocks for each grade of polystyrene foam is carried out considering the conditions and requirements of the intended use.

The sixth step in the production process is cutting blocks into sheets of various dimensions and packaging them. Formed and aged blocks are transported to a cutting bar where they are cut into sheets of various thicknesses and dimensions (length up to 4 meters, thickness up to 0.5 meters, width up to 1 meter) using hot wires. Blocks are cut horizontally and vertically. The construction of the cutting machines allows for adjusting the wire heating temperature and cutting speed. Cut blocks are then transported on a conveyor and automatically packaged.

The final step in the production process is the storage of finished products. Cut sheets are transported to a storage area for finished products, where they are loaded into pallets according to grades and dimensions. Sheets are stored while complying with fire safety requirements.



Production process scheme

Moreover, also the waste treatment of packaging materials from incoming raw materials is included. The waste scenarios follow the data present in Ecoinvent v3.8 and, considering information collected during manufacturing plant visit, datasets of processes associated with collection of waste and national (Lithuania) scenarios of waste treatment for Wood, Plastics, Cardboard and Wastewater treatment.

Following Table describes distribution scenarios for **Module A4** transportation of the final product and its packaging from Kauno šilas UAB manufacturing plant in Lithuania to its customers. The average distance to customers has been provided by manufacturer, considering all sales have been conducted locally, i.e., in Lithuania.

Product	Vehicle	kg/DU	Distance, km	Fuel consumption, l/tkm	Value, l/t
EPS 100	Lorry 16-32t, EURO6	4,6883	130	0,0431	5,60
EPS 80		4,1815			
EPS 70		3,6747			
EPS Neo 100		4,6883			
EPS Neo 80		4,1815			
EPS Neo 70		3,6747			

Modules B1-B7, that define Use stage of the product, are not declared for this study – those are not mandatory for life cycle analysis type “Cradle-to-gate with options”.

Module C1 assumes demolition process and associated fuel consumption for building machine operation, described in technical report “Model for Life Cycle Assessment (LCA) of buildings” by Joint Research Centre (JRC). Report states that module C1 includes all processes and activities used on-site for the deconstruction of the building frame. This shall ideally include the use of equipment, supply of fuel and the quantification of other emissions due to the activities performed on-site. Therefore, energy used for the demolition/deconstruction of structural frame has been used as a reference value, foreseeing insignificant share of this consumption allocated to EPS thermal insulation product. Due to the lack of reliable data for the removal of EPS insulation from buildings, C1 is usually assumed to not require energy or material inputs, therefore, chosen scenario could be considered as a conservative one.

Module C2 considers an average transport distance of 50 km by 16-32 metric ton EURO5 freight lorry.

As c-PCR-005 does not provide any specific guidelines on waste processing **Module C3** and EN 16783:2017 only states that thermal insulation products can be sorted and separated for recycling or for energy recovery (incineration), guidelines of NPCR 012 Part B have been used for the purpose of this study. Waste processing, therefore, follows the default conservative scenario provided in NPCR 012 Part B, which is municipal incineration with energy recovery (module C3). Ashes and solids after incineration are disposed of via Landfilling in module C4.

According to dataset available in ecoinvent v3.8, 1 kg of incinerated waste polystyrene produces 0,006424 kg of residues and 0,02981 kg of bottom ash, both considered for average incineration residue for Landfill in **Module C4**. Waste disposal (C4) includes physical pre-treatment and management of the residual material landfill site. Emissions from waste disposal are considered a part of the product system under study and, therefore, a part of this module.

This study also considers **Module D** (reuse, recovery, recycling, potential), where energy recovered from incineration of EPS insulation in module C3 is assumed to substitute Electricity (national grid mix) and District heat. Since Installation Module A5 has not been declared, it is also not possible to declare benefits and loads of packaging materials. Specific values of Net energy from Incineration are as follows:

- 3,67 MJ/kg of Electricity
- 7,39 MJ/kg of Thermal energy

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU	EU	LT	EU	ND	ND	ND	ND	ND	ND	ND	ND	EU	EU	EU	EU	EU
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	The results for GWP-GHG indicator for modules A1-A3 of all Kauno šilas UAB products included in this EPD is greater than 10%, "worst-case" product declared. -11% for EPS 80 and 80 Neo -22% for EPS 70 and 70 Neo			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	N/A			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Polystyrene	4,625	0,00	0,00
TOTAL	**4,625**	**0,00**	**0,00**
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
PE packaging film	0,062	1,34	0,000
Paper	0,001	0,02	0,008
TOTAL	**0,063**	**1,36**	**0,008**

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg CO_2.

The product does not contain any REACH SVHC substances.

Results of the environmental performance indicators

Declared unit of 1m^2 of EPS100 or EPS100 Neo thermal insulation board with 250mm thickness has been chosen as the "worst-case" product with following results of impact assessment:

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	**2,1E+01**	8,2E-02	2,8E-04	3,2E-02	1,5E+01	4,7E-02	-3,9E+00
GWP-biogenic	kg CO_2 eq.	**4,4E-02**	-3,4E-05	-9,7E-08	-1,3E-05	-4,4E-05	-3,1E-05	1,4E-01
GWP-luluc	kg CO_2 eq.	**2,2E-03**	6,7E-07	6,9E-09	2,6E-07	1,6E-05	2,6E-06	-1,3E-02
GWP-total	kg CO_2 eq.	**2,1E+01**	8,2E-02	2,8E-04	3,2E-02	1,5E+01	4,7E-02	-3,8E+00
ODP	kg CFC 11 eq.	**3,9E-07**	2,0E-08	6,2E-11	7,6E-09	7,6E-09	1,2E-09	-4,7E-07
AP	mol H^+ eq.	**6,9E-02**	1,6E-04	3,0E-06	1,1E-04	1,6E-03	1,0E-04	-1,2E-02
EP-freshwater	kg P eq.	**5,0E-05**	4,2E-08	2,0E-10	1,6E-08	6,6E-07	1,1E-06	-9,2E-05
EP-marine	kg N eq.	**1,1E-02**	2,7E-05	1,3E-06	3,6E-05	7,4E-04	3,1E-05	-2,0E-03
EP-terrestrial	mol N eq.	**1,2E-01**	3,0E-04	1,5E-05	3,9E-04	8,3E-03	3,6E-04	-2,3E-02
POCP	kg NMVOC eq.	**5,3E-02**	1,1E-04	4,0E-06	1,1E-04	2,2E-03	9,3E-05	-7,0E-03
ADP-minerals&metals*	kg Sb eq.	**1,9E-06**	3,6E-09	1,4E-11	1,4E-09	9,2E-09	9,5E-10	-4,2E-08
ADP-fossil*	MJ	**4,2E+02**	1,2E+00	3,9E-03	4,5E-01	4,1E-01	1,7E-01	-6,9E+01
WDP*	m^3	**1,1E+01**	-2,0E-04	9,9E-07	-7,6E-05	1,7E-02	9,7E-04	-4,1E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption							

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	**2,0E+01**	8,18E-02	2,76E-04	3,18E-02	1,45E+01	4,67E-02	-3,89E+00
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017								

Resource use indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	**2,5E+00**	1,3E-03	4,6E-06	5,2E-04	2,1E-02	2,4E-02	-6,8E+00
PERM	MJ	**1,2E+00**	4,4E-04	1,6E-06	1,7E-04	2,8E-03	2,3E-03	-2,4E+00
PERT	MJ	**3,8E+00**	1,8E-03	6,2E-06	6,9E-04	2,4E-02	2,7E-02	-9,2E+00
PENRE	MJ	**4,2E+02**	1,2E+00	3,9E-03	4,5E-01	4,1E-01	1,7E-01	-6,9E+01
PENRM	MJ	**9,4E-04**	4,9E-07	2,2E-08	1,9E-07	1,9E-05	2,1E-06	-1,9E-04
PENRT	MJ	**4,2E+02**	1,2E+00	3,9E-03	4,5E-01	4,1E-01	1,7E-01	-6,9E+01
SM	kg	**0,0E+00**	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
RSF	MJ	**0,0E+00**	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
NRSF	MJ	**0,0E+00**	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
FW	m^3	**2,5E-01**	3,0E-06	6,2E-08	1,2E-06	2,2E-03	1,2E-04	-3,1E-02
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Waste indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	**5,8E-05**	3,1E-06	1,0E-08	1,2E-06	4,4E-06	1,2E-07	-6,8E-05
Non-hazardous waste disposed	kg	**2,0E-01**	4,8E-05	2,4E-07	1,9E-05	1,2E-01	3,4E-01	-3,5E-02
Radioactive waste disposed	kg	**1,3E-04**	8,3E-06	2,8E-08	3,2E-06	8,3E-07	8,9E-07	-2,0E-04

Output flow indicators

Results per functional or declared unit								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	**0,0E+00**	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Material for recycling	kg	**4,1E-02**	4,1E-02	4,1E-02	4,1E-02	4,1E-02	4,1E-02	4,1E-02
Materials for energy recovery	kg	**5,5E-03**	5,5E-03	5,5E-03	5,5E-03	5,5E-03	5,5E-03	5,5E-03
Exported energy, electricity	MJ	**1,2E-02**	1,2E-02	1,2E-02	1,2E-02	1,2E-02	1,2E-02	1,2E-02
Exported energy, thermal	MJ	**2,4E-02**	2,4E-02	2,4E-02	2,4E-02	2,4E-02	2,4E-02	2,4E-02

Biogenic Carbon Content

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in the product	kg C	0,0E+00
Biogenic carbon content in packaging	kg C	6,5E-04

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg CO_2

LCA Interpretation

Individual Life Cycle Assessments have been carried out for each type of product and each respective group under the scope of the study to identify their environmental impact following the framework described in the ISO 14025 (2006) and EN 15804:2012+A2:2019. Additionally, PCRs have been considered for the purpose of this study. The LCAs have been performed considering same declared unit for each product – 1 m^2 of EPS thermal insulation board with 250mm thickness. An individual EPD® has been developed under The International EPD System for "worst-case" product described in this document.

The impact on the various environmental impact categories in the life cycle of declared unit of EPS and EPS Neo products is primarily driven by the production stage (A1-A3) with raw material module A1 having major share of impact.

In terms of primary energy demand, the production stage (A1-A3) is the main driver and is accountable for 99% of total consumption, followed by equal remaining share of total impact coming from Distribution module A4 and End-of-life stage (C1-C4).

Estimated impact assessment results are only relative statements that do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins, or risks. According to the EN 15804:2012+A2:2019 standard, the LCIA results are relative expressions translating impacts into environmental themes such as climate change and ozone depletion (midpoint impact category). Thus, the LCIA results do not predict impacts on category endpoints, such as the impact on the extinction of species. In addition, the results do not provide information about exceeding thresholds, safety margins, or risks.

Additional environmental information

EPS insulation boards are produced in different thicknesses. The environmental impact of the product with different thicknesses can be estimated by multiplying the LCA results of each impact category in the environmental impact table with the corresponding factors given in Table below:

Thickness of EPS board, mm	EPS70 & EPS70 Neo	EPS80 & EPS80 Neo	EPS100 & EPS100 Neo
20mm	0,06	0,07	0,08
30mm	0,09	0,11	0,12
50mm	0,16	0,18	0,20
100mm	0,31	0,36	0,40
120mm	0,38	0,43	0,48
150mm	0,47	0,54	0,60
180mm	0,56	0,64	0,72
200mm	0,63	0,71	0,80
230mm	0,72	0,82	0,92
250mm	0,78	0,89	**1,00**
280mm	0,88	1,00	1,12
300mm	0,94	1,07	1,20
350mm	1,10	1,25	1,40

Information related to Sector EPD

This EPD® is individual.

Differences versus previous versions

This document is the first version of EPD®.

References

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EN 15804:2012+A2:2019. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

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