ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

FINNFOAM XPS INSULATION

FINNFOAM OY,

FINNFOAM AB,

FINNFOAM UAB

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Finnfoam Oy, Finnfoam AB, Finnfoam UAB
Address	Finnfoam OY, Satamakatu 5, 24100 Salo, Finland Finnfoam AB, Hinkebogatan 7, 68191 Kristinehamn, Sweden Finnfoam UAB, Kokybės g. 5, Biruliškių km, Kaunas, Lithuania
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Website	www.finnfoam.fi www.finnfoam.se www.finnfoam.lt

PRODUCT IDENTIFICATION

Product name	Finnfoam XPS Insulation
Place(s) of production	Salo, Finland, Kristinehamn, Sweden, Kaunas, Lithuania

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RTS EPD Committee secretary

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Managing Director

EPD INFORMATION

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	The Building Information Foundation RTS sr / Building Information Ltd Malminkatu 16 A, 00100 Helsinki, Finland http://cer.rts.fi
EPD standards	This EPD is in accordance with EN 15804 +A1, +A2 and ISO 14025 standards.
Product category rules (PCR)	The CEN standard EN 15804+A2 serves as the core PCR. In addition, the RTS PCR (English version, 26.8.2020) is used.
EPD author	Ipek Goktas, at Bionova Ltd Suvilahdenkatu 10 B 00500 Helsinki, Finland www.bionova.fi
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
Verification date	04.06.2021
EPD number	RTS_113_21
Publishing date	10.06.2021
EPD valid until	04.06.2026

PRODUCT INFORMATION

PRODUCT DESCRIPTION

Finnfoam is an XPS thermal insulation product made from extruded polystyrene, which retains its insulating capacity in even the most demanding conditions. The panels special feature is its completely closed and consistent cell structure, which ensures a high insulating capacity and impermeability. In addition to thermal insulation, Finnfoam also facilitates various other construction stages, thus enabling high-quality and energy efficient results. Structures produced using Finnfoam do not require separate vapor barriers or wind-proofing panels, which means that a single installation takes care of several work elements. Finnfoam is also mold-proof, as verified by VTT using the most stringent mold testing available.

PRODUCT APPLICATION

Finnfoam is well-suited for ground frost insulation, base floors, walls, ceilings, inverted roofs, and infrastructure building applications.

TECHNICAL SPECIFICATIONS

Finnfoam thermal insulation (XPS) panels are produced with different sizes and properties due to which their nominal densities can vary. The following nominal densities have been used in the calculations; 35 kg/m3 for Finland and Lithuania and 33 kg/m3 for Sweden. Thermal conductivity is between 0.033-0.039 W/mK and thickness 20-400 mm. As the product is homogeneous, the results represent all available thicknesses. The panels are used as building insulation, mainly for ground frost insulation and base floors.

PRODUCT STANDARDS

EN 13164:2012+A1:2015 Thermal insulation products for buildings. Factory made extruded polystyrene foam (XPS) products.

PHYSICAL PROPERTIES OF THE PRODUCT

Detailed physical information can be found from the manufacturer's webpage: (http:// www.finnfoam.fi/tuotteet/finnfoam-eristelevyt/).

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.finnfoam.fi, www.finnfoam.se, www.finnfoam.lt.

PRODUCT RAW MATERIAL COMPOSITION

Material	Weight, kg
Polystyrene	0.92 – 0.95
Blowing Agent and Colour	0.05 – 0.08

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	-
Minerals	-	-
Fossil materials	100	Europe
Bio-based materials	-	-

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE CYCLE

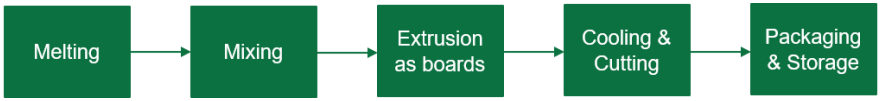
MANUFACTURING AND PACKAGING (A1-A3)

Polystyrene and colour are melted and mixed after which the mass is expanded with CO_2 and ethanol. This mixed mass is then extruded between tables as boards. After cooling it is cut.

The XPS insulation product is produced in 3 different plants: in Finland, Sweden and Lithuania. While grid mix energy is used in the plants in Finland and Sweden, renewable energy is used in the plant in Lithuania. During the production the generated product-based waste is sent back to the melting process, therefore there is no waste from the product itself. The only generated waste derives from the packaging of the raw materials. Also, all CO_2 and some ethanol added to the product are emitted in one month in the storage area.

As packaging material plastic film is used for the final product.

Manufacturing flow chart



TRANSPORT AND INSTALLATION (A4-A5)

Annual export rates are taken into consideration for delivery scenario. The transported mass is calculated by taking the weight loss due to CO2 and ethanol emission in the storage before delivery into consideration. There is no significant weight loss due to the emission of the rest of the blowing agent in the product during transportation.

This EPD does not cover installation (Module A5). Air, soil and water impacts during installation have not been studied.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover use phase. Air, soil and water impacts during the use phase have not been studied. During the service life of the product, rest of the ethanol is emitted, however it does not have any harmful impact; therefore, it is not taken into consideration.

PRODUCT END OF LIFE (C1-C4, D)

All blowing agent is assumed to be emitted during the service life of the product; therefore, the mass loss due to the blowing agent is taken into consideration in end-of-life stage. Consumption of energy and natural resources in demolition process is assumed to be negligible. (C1) The distance for transportation to disposal is assumed as 50 km and the transportation method is assumed to be lorry. (C2) Considering the manufacturer's information, 100% of end-of-life XPS product is assumed to be recovered to energy in incineration plant as it is easy to collect and qualified for energy recovery. (C3) The environmental impacts of disposal are zero since 100% of the end-of-life product is considered to be recovered to energy. (C4) Thanks to the energy recovery process end-of-life XPS replaces heat and electricity. (D)

LIFE CYCLE ASSESSMENT

LIFE CYCLE ASSESSMENT INFORMATION

Period for data	year 2019

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 kg (produced XPS)
Mass per declared unit	1 kg

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0

SYSTEM BOUNDARY

The scope of the EPD is "cradle to gate with modules A4, C1-C4 and D". The modules A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport) as well as C1 (Deconstruction/ demolition), C2 (Transport at end-of-life), C3 (Waste processing), C4 (Disposal) and D (benefits and loads beyond the system boundary) are included in the study.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the *EN 15804A1:2012+A2:2019* and *RTS PCR*. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes which data are available for are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows do also not exceed 5% of energy usage or mass. The life cycle analysis includes all industrial processes from raw material acquisition to production, distribution, and end-of-life stages.

The modules A5, B1-B7 have not been calculated nor included in the LCA calculations.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy, and water use related to company management and sales activities are excluded.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is based on annual production rate and made with high accuracy and precision. The values for 1 kg of the produced product which is used within this study are calculated by considering the total product weight per annual production. The product output is fixed to 1 kg and the corresponding amount of product is used in the calculations.

In the production plants, several kinds of products are produced; since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the produced product output fixed to 1 kg and the corresponding amount of product is used in the calculations.

This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs. All estimations and assumptions are given below.

- Module A2, A4 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality it may vary but as the role of transportation emission in total results is small and so the variety in load assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by transportation companies to serve the needs of other clients.
- Module A3: Since renewable energy is used in the plant in Lithuania, the share of the renewable energy sources is assumed according to the data provided by European Commission.
- Module A4: Transportation doesn't cause losses as products are packaged properly. Additionally, it is assumed that there is no significant weight loss due to the emission of the rest of the blowing agent in the product during transportation. Also, volume capacity utilisation factor is assumed to be 1 for the nested packaged products. Additionally, transportation distances and vehicle types are assumed according to the exports in the last year.
- Module C1: The impacts of the disassembly stage are assumed zero, since the consumption of energy and natural resources for disassembling the end-of-life product is negligible.
- Module C2: Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is assumed as lorry which is the most common.
- Module C3, C4, D: 100% of the end-of-life product is assumed to be recovered to energy. According to the manufacturer's information, Module C3 includes the incineration of the product, including the landfilling of the formed slag and ash. Module C4 impacts are zero as the products are considered to be 100 % collected for incineration. Module D considers the benefits of energy recovery which replaces district heat and electricity.

AVERAGES AND VARIABILITY

Product stage impacts have been calculated separately for the three production plants. For the other modules, the weighted average of the LCA results have been calculated according to the production rates.

ENVIRONMENTAL IMPACT DATA

The LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Note: "ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930" and "ENVIRONMENTAL IMPACTS - TRACI 2.1" are presented in ANNEX-1 and ANNEX-2 respectively.

Note: Environmental performance results are presented per declared unit, defined as 1 kg of XPS insulation product. Environmental impacts per 1 m^2 of XPS insulation product with different thicknesses can be calculated by multiplying the environmental impact results by the scaling factors presented in ANNEX-3.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3 (Finland)	A1-A3 (Sweden)	A1-A3 (Lithuania)	A4	A5	B1-B7	C1	C2	C3	C4	D
Climate change – total	kg CO_2e	2.57E+00	2.66E+00	2.53E+00	1.81E-02	MND	MND	0.00E+00	5.92E-03	1.72E+00	0.00E+00	-1.92E+00
Climate change – fossil	kg CO_2e	2.57E+00	2.65E+00	2.53E+00	1.82E-02	MND	MND	0.00E+00	5.92E-03	1.72E+00	0.00E+00	-1.92E+00
Climate change – biogenic	kg CO_2e	1.43E-03	1.47E-03	2.11E-03	1.30E-05	MND	MND	0.00E+00	3.63E-06	5.93E-05	0.00E+00	-9.20E-04
Climate change – LULUC	kg CO_2e	1.10E-03	1.12E-03	2.03E-04	5.57E-06	MND	MND	0.00E+00	2.09E-06	7.54E-06	0.00E+00	-7.98E-05
Ozone depletion	kg CFC11e	4.41E-08	5.86E-08	3.27E-08	4.28E-09	MND	MND	0.00E+00	1.36E-09	4.35E-09	0.00E+00	-3.97E-07
Acidification	mol H^+e	7.37E-03	7.34E-03	7.69E-03	8.28E-05	MND	MND	0.00E+00	2.44E-05	3.14E-04	0.00E+00	-1.73E-02
Eutrophication, aquatic freshwater [1]	kg Pe	1.88E-05	1.18E-05	2.62E-05	1.47E-07	MND	MND	0.00E+00	5.11E-08	2.75E-07	0.00E+00	-3.76E-06
Eutrophication, aquatic marine	kg Ne	1.48E-03	1.49E-03	1.65E-03	2.46E-05	MND	MND	0.00E+00	7.22E-06	1.51E-04	0.00E+00	-1.63E-03
Eutrophication, terrestrial	mol Ne	1.64E-02	1.65E-02	1.81E-02	2.71E-04	MND	MND	0.00E+00	7.98E-05	1.50E-03	0.00E+00	-1.59E-02
Photochemical ozone formation	kg NMVOCe	5.61E-03	5.65E-03	6.04E-03	8.60E-05	MND	MND	0.00E+00	2.50E-05	4.46E-04	0.00E+00	-5.25E-03
Abiotic depletion, minerals & metals [2]	kg Sbe	3.59E-06	4.47E-06	3.76E-06	3.09E-07	MND	MND	0.00E+00	1.48E-07	4.71E-07	0.00E+00	-1.13E-06
Abiotic depletion of fossil resources [2]	MJ	8.56E+01	8.74E+01	8.33E+01	2.83E-01	MND	MND	0.00E+00	9.03E-02	3.45E-01	0.00E+00	-2.45E+01
Water use [2]	m^3e deprived	4.75E-01	4.75E-01	4.64E-01	1.05E-03	MND	MND	0.00E+00	3.21E-04	6.13E-03	0.00E+00	-3.59E-01

[1] The required characterisation method and data are in kg P-eq; to get PO_4e, multiply the result by 3.07.

[2] EN 15804+A2 Disclaimer 2: "The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator."

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3 (Finland)	A1-A3 (Sweden)	A1-A3 (Lithuania)	A4	A5	B1-B7	C1	C2	C3	C4	D
Particulate matter	Incidence	5.09E-08	5.71E-08	6.48E-08	1.64E-09	MND	MND	0.00E+00	4.57E-10	5.05E-09	0.00E+00	-1.59E-07
Ionizing radiation, human health [3]	kBq U235e	5.65E-01	5.79E-01	4.95E-01	1.24E-03	MND	MND	0.00E+00	3.95E-04	1.09E-03	0.00E+00	-1.08E-01
Eco-toxicity (freshwater) [2]	CTUe	1.19E+01	1.26E+01	1.48E+01	2.16E-01	MND	MND	0.00E+00	7.05E-02	2.41E+00	0.00E+00	-1.25E+01
Human toxicity, cancer effects [2]	CTUh	4.65E-10	4.82E-10	5.21E-10	5.60E-12	MND	MND	0.00E+00	2.00E-12	3.22E-10	0.00E+00	-7.91E-10
Human toxicity, non-cancer effects [2]	CTUh	2.78E-08	2.90E-08	2.96E-08	2.55E-10	MND	MND	0.00E+00	8.09E-11	5.48E-09	0.00E+00	-7.07E-09
Land use related impacts/soil quality [2]	-	1.31E+00	2.97E+00	7.27E-01	4.23E-01	MND	MND	0.00E+00	1.01E-01	4.83E-01	0.00E+00	-4.21E-01

[2] EN 15804+A2 Disclaimer 2: "The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator."

[3] EN 15804+A2 Disclaimer 1: "This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator."

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3 (Finland)	A1-A3 (Sweden)	A1-A3 (Lithuania)	A4	A5	B1-B7	C1	C2	C3	C4	D
Renewable PER used as energy	MJ	2.28E+00	2.31E+00	5.26E+00	3.54E-03	MND	MND	0.00E+00	1.28E-03	5.87E-03	0.00E+00	-6.91E-02
Renewable PER used as materials	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable PER	MJ	2.28E+00	2.31E+00	5.26E+00	3.54E-03	MND	MND	0.00E+00	1.28E-03	5.87E-03	0.00E+00	-6.91E-02
Non-renewable PER used as energy	MJ	4.04E+01	4.13E+01	3.82E+01	2.83E-01	MND	MND	0.00E+00	9.03E-02	3.45E-01	0.00E+00	-2.45E+01
Non-renewable PER used as materials	MJ	4.52E+01	4.61E+01	4.51E+01	0.00E+00	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable PER	MJ	8.56E+01	8.74E+01	8.33E+01	2.83E-01	MND	MND	0.00E+00	9.03E-02	3.45E-01	0.00E+00	-2.45E+01
Use of secondary materials	kg	4.05E-04	3.45E-04	4.63E-04	0.00E+00	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m^3	1.22E-02	1.26E-02	1.25E-02	5.86E-05	MND	MND	0.00E+00	1.71E-05	4.54E-04	0.00E+00	-2.93E-03

PER abbreviation stands for primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1-A3 (Finland)	A1-A3 (Sweden)	A1-A3 (Lithuania)	A4	A5	B1-B7	C1	C2	C3	C4	D
Hazardous waste	kg	7.02E-03	7.42E-03	6.81E-03	2.75E-04	MND	MND	0.00E+00	9.40E-05	0.00E+00	0.00E+00	-8.03E-03
Non-hazardous waste	kg	2.65E-01	3.71E-01	2.20E-01	3.02E-02	MND	MND	0.00E+00	7.81E-03	0.00E+00	0.00E+00	-1.18E-01
Radioactive waste	kg	5.15E-05	5.86E-05	2.24E-05	1.94E-06	MND	MND	0.00E+00	6.18E-07	0.00E+00	0.00E+00	-1.78E-04

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3 (Finland)	A1-A3 (Sweden)	A1-A3 (Lithuania)	A4	A5	B1-B7	C1	C2	C3	C4	D
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	0.00E+00	9.29E-01	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3 (Finland)	A1-A3 (Sweden)	A1-A3 (Lithuania)	A4	A5	B1-B7	C1	C2	C3	C4	D
Climate change – total	kg CO_2e	2.57E+00	2.66E+00	2.53E+00	1.82E-02	MND	MND	0.00E+00	5.92E-03	1.72E+00	0.00E+00	-1.92E+00
Abiotic depletion. minerals & metals [2]	kg Sbe	3.59E-06	4.47E-06	3.76E-06	3.09E-07	MND	MND	0.00E+00	1.48E-07	4.71E-07	0.00E+00	-1.13E-06
Abiotic depletion of fossil resources [2]	MJ	8.56E+01	8.74E+01	8.33E+01	2.83E-01	MND	MND	0.00E+00	9.03E-02	3.45E-01	0.00E+00	-2.45E+01
Water use [2]	m^3e deprived	4.75E-01	4.75E-01	4.64E-01	1.05E-03	MND	MND	0.00E+00	3.21E-04	6.13E-03	0.00E+00	-3.59E-01
Use of secondary materials	kg	4.05E-04	3.45E-04	4.63E-04	0.00E+00	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content in product	kg C	0.00E+00	0.00E+00	0.00E+00	N/A	MND	MND	N/A	N/A	N/A	N/A	N/A
Biogenic carbon content in packaging	kg C	0.00E+00	0.00E+00	0.00E+00	N/A	MND	MND	N/A	N/A	N/A	N/A	N/A

[2] EN 15804+A2 Disclaimer 2: "The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator."

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Ecoinvent v3.6 is used as a background data. Electricity emissions have been calculated as per the average distribution considering all production plants
Electricity CO2e / kWh	0.0479 kg CO2e / kWh

Transport scenario documentation

Scenario parameter	Value
A4 specific transport CO2e emissions, kg CO_2e / tkm	0.0816
A4 average transport distance, km	231

End of life scenario documentation*

Scenario parameter	Value
Collection process – kg collected separately	0.9290
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	0
Recovery process – kg for energy recovery	0.9290
Disposal (total) – kg for final deposition	0
Scenario assumptions for transportation	End-of-life product is transported 50 km with an average lorry

* The values are based on the manufacturer's information regarding the end-of-life treatment of the product.

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ANNEX-1: ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1-A3 (Finland)	A1-A3 (Sweden)	A1-A3 (Lithuania)	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential	kg CO_2e	2.46E+00	2.54E+00	2.42E+00	1.81E-02	MND	MND	0.00E+00	5.87E-03	1.70E+00	0.00E+00	-1.91E+00
Depletion of stratospheric ozone	kg CFC11e	4.57E-08	5.73E-08	3.05E-08	3.40E-09	MND	MND	0.00E+00	1.08E-09	3.59E-09	0.00E+00	-3.14E-07
Acidification	kg SO_2e	6.04E-03	5.92E-03	6.30E-03	4.24E-05	MND	MND	0.00E+00	1.21E-05	2.41E-04	0.00E+00	-1.51E-02
Eutrophication	kg $(PO_4)^{3-}$e	6.65E-04	6.34E-04	7.54E-04	8.04E-06	MND	MND	0.00E+00	2.51E-06	4.91E-03	0.00E+00	-7.55E-04
Photochemical ozone formation	kg C_2H_4e	8.67E-04	8.55E-04	8.78E-04	2.47E-06	MND	MND	0.00E+00	7.80E-07	4.72E-05	0.00E+00	-5.81E-04
Abiotic depletion of non-fossil resources	kg Sbe	3.59E-06	4.47E-06	3.76E-06	3.09E-07	MND	MND	0.00E+00	1.48E-07	4.71E-07	0.00E+00	-1.13E-06
Abiotic depletion of fossil resources	MJ	8.56E+01	8.74E+01	8.33E+01	2.83E-01	MND	MND	0.00E+00	9.03E-02	3.45E-01	0.00E+00	-2.45E+01

ANNEX-2: ENVIRONMENTAL IMPACTS - TRACI 2.1

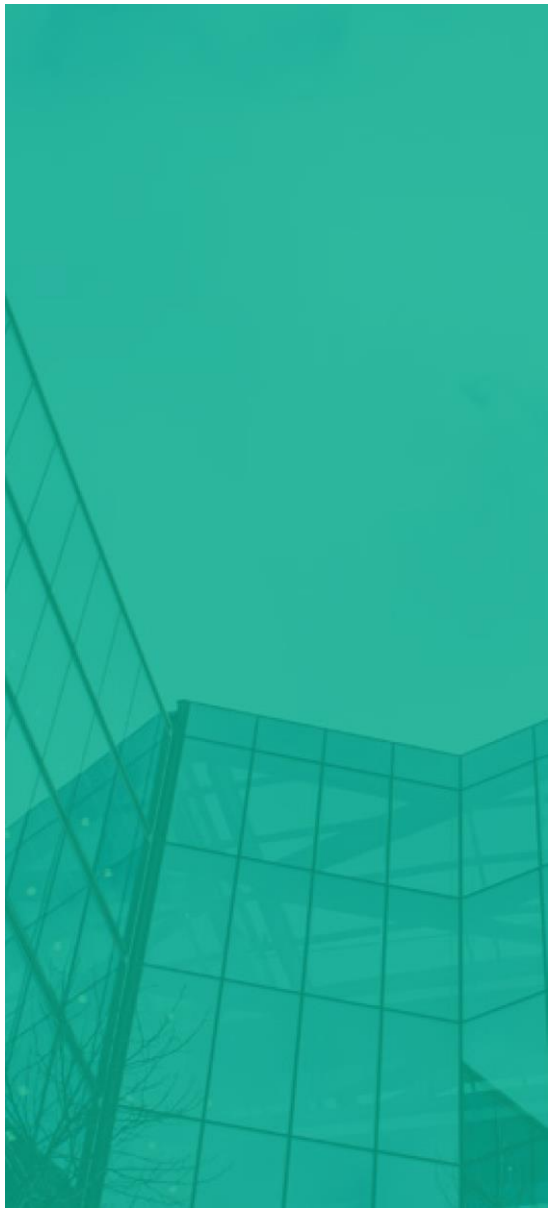
Impact category	Unit	A1-A3 (Finland)	A1-A3 (Sweden)	A1-A3 (Lithuania)	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential	kg CO_2e	2.47E+00	2.56E+00	2.43E+00	1.80E-02	MND	MND	0.00E+00	5.86E-03	1.70E+00	0.00E+00	-1.91E+00
Ozone depletion	kg CFC11e	5.31E-08	6.85E-08	3.44E-08	4.53E-09	MND	MND	0.00E+00	1.44E-09	4.61E-09	0.00E+00	-4.18E-07
Acidification	kg SO_2e	6.17E-03	6.16E-03	6.47E-03	7.20E-05	MND	MND	0.00E+00	2.12E-05	2.97E-04	0.00E+00	-1.37E-02
Eutrophication	kg Ne	3.64E-04	3.31E-04	4.14E-04	9.54E-06	MND	MND	0.00E+00	2.99E-06	9.36E-05	0.00E+00	-9.06E-04
Photochemical smog formation	kg O_3e	9.75E-02	9.80E-02	1.08E-01	1.56E-03	MND	MND	0.00E+00	4.57E-04	8.78E-03	0.00E+00	-9.23E-02
Depletion of non-renewable energy	MJ	1.28E+01	1.31E+01	1.27E+01	4.05E-02	MND	MND	0.00E+00	1.29E-02	4.86E-02	0.00E+00	-3.70E+00

ANNEX-3: SCALING FACTORS PER 1M^2 OF XPS INSULATION PRODUCT WITH DIFFERENT THICKNESSES

Product Code	Thickness	Scaling factor
F-200	50 mm	1.58
F-200	70 mm	2.21
F-200	100 mm	3.15
F-300	20 mm	0.64
F-300	30 mm	0.96
F-300	40 mm	1.28
F-300	50 mm	1.60
F-300	70 mm	2.24
F-300	80 mm	2.56
F-300	100 mm	3.20
F-300	120 mm	3.84
F-300	210 mm	6.72
F-300	250 mm	8.00

Product Code	Thickness	Scaling factor
F-300	370 mm	11.84
F-400	30 mm	1.02
F-400	40 mm	1.36
F-400	50 mm	1.70
F-400	60 mm	2.04
F-400	70 mm	2.38
F-400	80 mm	2.72
F-400	100 mm	3.40
F-400	120 mm	4.08
F-400	140 mm	4.76
F-400	150 mm	5.10
F-400	180 mm	6.12
F-400	200 mm	6.80

Product Code	Thickness	Scaling factor
F-400	220 mm	7.48
F-400	250 mm	8.50
F-400	300 mm	10.20
F-500	40 mm	1.48
F-500	50 mm	1.85
F-500	60 mm	2.22
F-500	70 mm	2.59
F-500	80 mm	2.96
F-500	100 mm	3.70
F-500	120 mm	4.44
F-700	50 mm	2.25
F-700	100 mm	4.50
FF-XPS 100 LATTIA	100 mm	3.10



ABOUT THE MANUFACTURER

Over nearly forty-year-long history, Finnfoam has become one of the leading manufacturers of plastic-based thermal insulation solutions. The roots of Finnfoam's thermal insulation competence are embedded into the frozen Finnish soil. Today, the group is known for quality, product development, and reliability. Finnfoam's product range includes XPS, EPS and PIR thermal insulation and the Tulppa - wet room boards. The entire Finnfoam (XPS) thermal insulation product range is suitable for use as frost insulation and for insulating floors, ceilings, and walls, as well as for various types of supplementary thermal insulation. As frost and floor insulation, Finnfoam is highly resistant to moisture, freezing, and load. FF-EPS is best suited for use as thermal insulation for walls and ceilings, where it provides a safe and highly cost-effective solution. It can also be used in floors that are not subjected to significant loads. The applications of FF-PIR polyurethane insulation products include the thermal insulation of walls and ceilings as well as saunas. FF-PIR insulation products have a very high thermal insulation capacity, which allows for lower structural thickness.

EPD AUTHOR AND CONTRIBUTORS

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EPD author	Bionova Ltd, www.bionova.fi
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD program	RTS EPD
Background data	Ecoinvent 3.6 (cut-off) & Plastics Europe 2012
LCA software	One Click LCA Pre-Verified Generator for Plastic Products