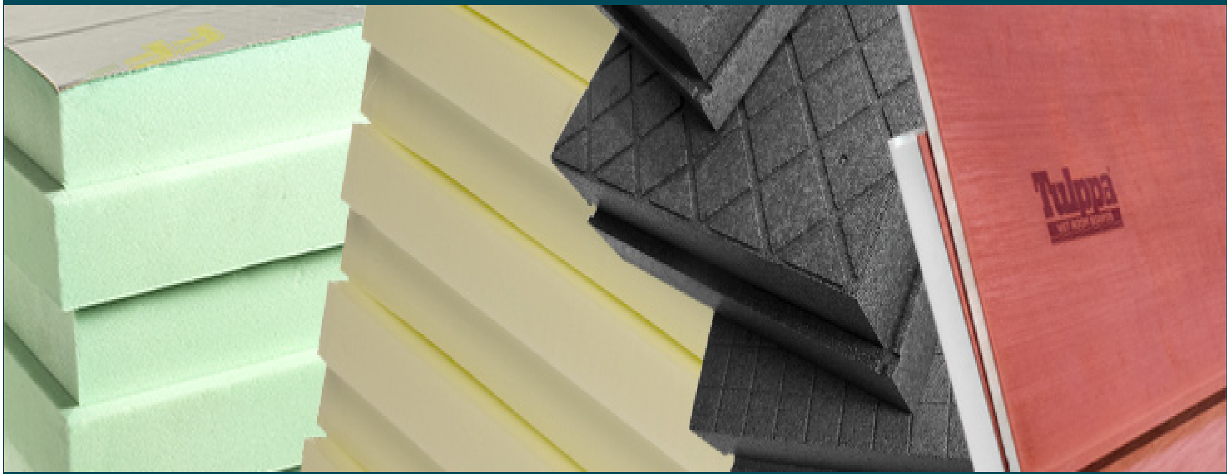
FINNFOAM®
MAAN PARAS ERISTE



Rakennustietosäätio RTS Building Information Foundation RTS

RTS EPD, No. 2

Finnfoam XPS

Scope of the declaration

This environmental product declaration covers the environmental impacts of the Finnfoam thermal insulation (XPS) panels produced at three different plants; Salo (Suomi), Kaunas (Liettua) and Vigo (Spain). The declaration has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version, 2.6.2016). This declaration covers the life cycle stages from cradle-to-customer as well as the treatment and recovery of the product at its end-of-life.

RAKENNUSTIETO

16.11.2016
Building Information Foundation
RTS
Malminkatu 16 A
00100 Helsinki

http://epd.rts.fi

Laura Sariola
Committee secretary

Matti Rautiola
RTS managing director

RTS · 3rd PARTY VERIFIED epd THE BUILDING INFORMATION FOUNDATION

FINNFOAM
MAAN PARAS ERISTE

General information, declaration scope and verification (7.1)

1. Owner of the declaration, manufacturer

Finnfoam Oy
Satamakatu 5, 24100 Salo, Finland
Asso Erävuoma
+358 44 544 0612
asso.eravuoma@finnfoam.fi

2. Product name and number

Finnfoam XPS

3. Place of production

Salo, Finland

4. Additional information

www.finnfoam.fi

5. Product Category Rules and the scope of the declaration

This EPD has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards together with the RTS PCR (English version, 2.6.2016). Product specific category rules have not been applied in this EPD. EPD of construction materials may not be comparable if they do not comply with EN 15804 and seen in a building context.

6. Author of the life-cycle assessment and declaration

Bionova Engineering, MSc Noora Miilumäki.
Hämeentie 31, 00500 Helsinki, Finland,
+358 40 820 8552, www.bionova.fi.

7. Verification

This EPD has been verified according to the requirements of ISO 14025:2010, EN 15804:2012 +A1:2013 and RTS PCR by a third party. The verification has been carried out by Bionova Ltd, MSc Tytti Bruce-Hyrkäs. Hämeentie 31, 00500 Helsinki, Finland, +358 500 655 020, www.bionova.fi.

8. Declaration issue date and validity

19.1.2017 - 18.1.2022

European standard EN 15804: 2014 A1 serves as the core PCR
Independent verification of the declaration and data, according to ISO14025:2010
☐ Internal ☑ External
Third party verifier: Tytti Bruce-Hyrkäs, Bionova Ltd

FINNFOAM®
MAAN PARAS ERISTE

Product information

9. Product description

This EPD represents Finnfoam thermal insulation (XPS) panel produced at three different sites located in Finland, Lithuania and Spain. The environmental impacts have been studied separately for all three plants and the environmental impacts are presented separately for each. The market area of the products are Scandinavia, Baltic region and Spain.

10. 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 Spain. Thermal conductivity is between 0.031-0.037 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 base floors.

11. Product standards

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

12. Physical properties

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

13. Raw-materials of the product

Salo, Finland and Kaunas, Lithuania

Product structure / composition / raw-material	Amount %
Polystyrene, non-renewable, Germany	93.88
Carbon dioxide, non-renewable, EU	3.88
Ethanol, non-renewable, EU	2.23
Colouring, non-renewable, Italy	0.02
*Carbon dioxide; evaporates	

Vigo, Spain

Product structure / composition / raw-material	Amount %
Polystyrene, non-renewable, Germany	92.10
Carbon dioxide, non-renewable, EU	4.09
Ethanol, non-renewable, EU	2.20
Colouring, non-renewable, Italy	0.03
*Carbon dioxide; evaporates	

14. Substances under European Chemicals Agency's REACH, SVHC restrictions

Name	EC Number	CAS Number
The product does not contain REACH SVHC substances.		

15. Functional / declared unit

1 kg

16. System boundary

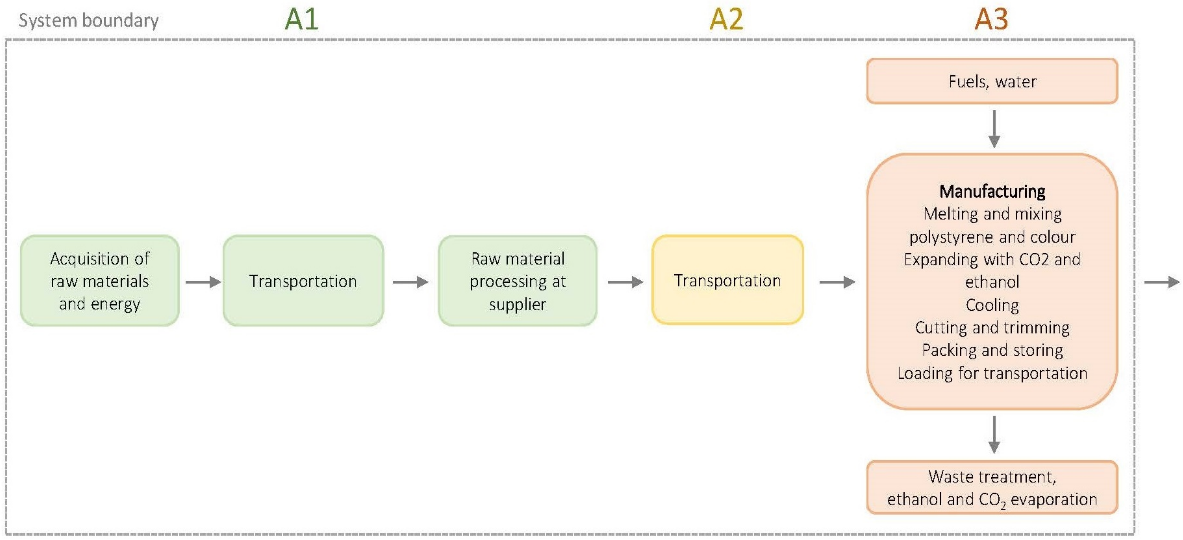
This EPD covers the following modules; A1 (Raw material supply), A2 (Transport), A3 (Manufacturing) and A4 (Transportation of the product to the building site) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary - have been included.

17. Cut-off criteria

A1 raw material supply, A2 transportation, A3 manufacturing. All main materials, energy, packing and transportation until the end-of-waste state have been included. Only the consumption of fire retardant at the Spanish plant has not been included due to the lack of data; negligible amount. CO2 manufacturing not included as it is a by-product from another process (economic value <1%). A4 transportation has been estimated to be 200 km, the return trip has not been considered. C1 and C2 have been included as a deconstruction scenario (C1) and the demolition waste transportation distance (C2) as per the requirements of the RTS PCR. C3 includes the incineration of the product, including the landfilling of the formed slag and ash. For C4 impacts are 0 as the products are considered to be 100 % collected for incineration (manufacturer information). Module D considers the benefits of energy recovery which replaces district heat.

18. Production process

The main raw materials of the Finnfoam thermal insulation (XPS) are polystyrene as well as carbon dioxide, ethanol and colouring. Polystyrene and the colouring are melted and mixed after which the mass is expanded with carbon dioxide and ethanol. The carbon dioxide evaporates and does not remain in the product. The ready product is cooled, cut and trimmed before packing. The insulation waste from the production process is melted and recycled back to the process. Thus no production losses occur. The production related data represents 2015 as a one year average.



FINNFORM
MAAN PARAS ERISTE

Scope of the Life-Cycle Assessment (7.2.1-2)

Mark all the covered modules of the EPD with X. Mandatory modules are marked with blue in the table below. This declaration covers “cradle-to-gate with options”. For other fields mark MND (module not declared) or MNR (module not relevant)

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

Mandatory modules

Scenario based optional modules

Environmental impacts and raw-material use (7.2.3-7.2.4)

19. Environmental impacts

The global warming potential (GWP) of the manufacturing process (A1-A3) is mainly caused by the manufacturing of the raw materials, i.e. polystyrene. Of the studied modules, the product stage (A1-A3) has the largest impacts on the GWP. Conversion factor of the results to per m3; 1) Finland and Lithuania: impacts x 35 and 2) Spain: impacts x 33.

Environmental impact (Salo, Finland)									
Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Global warming potential	kg CO2 -eqv	2,38E0	1,61E-1	4,06E-2	2,58E0	7,58E-3	2,38E0	0E0	-2,4E0
Depletion of stratospheric ozone layer	kg CFC11-eqv	4,82E-8	3,01E-8	4,11E-12	7,82E-8	1,51E-9	5,51E-9	0E0	-1,52E-7
Formation of photochemical ozone	kg C2H4 -eqv	8,63E-4	3,17E-5	2,8E-4	1,18E-3	7,58E-7	8,89E-6	0E0	-6,57E-4
Acidification	kg SO2 -eqv	6,23E-3	1,38E-3	1,26E-6	7,61E-3	3,53E-5	4,01E-3	0E0	-1,37E-2
Eutrophication	kg PO4 3--eqv	1,24E-3	2,34E-4	1,18E-7	1,47E-3	7,49E-6	2,8E-4	0E0	-2,1E-3
Abiotic depletion of non fossil resources	kg Sb-eqv	1,39E-6	8,88E-9	5,07E-11	1,4E-6	4,45E-10	9,54E-8	0E0	-4,94E-7
Abiotic depletion of fossil resources	MJ	7,42E1	4,14E0	3,86E-4	7,83E1	2,1E-1	3,95E-1	0E0	-2,67E1

FINNFORM
MAAN PARAS ERISTE

Environmental impact (Kaunas, Lithuania)									
Parameter	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**C3**	**C4**	**D**
Global warming potential	kg CO2 -eqv	2,67E0	5,87E-2	4,14E-2	2,77E0	7,58E-3	2,38E0	0E0	-2,4E0
Depletion of stratospheric ozone layer	kg CFC11-eqv	7,15E-8	1,17E-8	4,11E-12	8,32E-8	1,51E-9	5,52E-9	0E0	-1,52E-7
Formation of photochemical ozone	kg C2H4 -eqv	9,11E-4	5,87E-6	2,8E-4	1,2E-3	7,58E-7	8,89E-6	0E0	-6,57E-4
Acidification	kg SO2 -eqv	6,85E-3	2,74E-4	1,26E-6	7,13E-3	3,53E-5	4,01E-3	0E0	-1,37E-2
Eutrophication	kg PO4 3--eqv	1,33E-3	5,8E-5	1,18E-7	1,39E-3	7,49E-6	2,8E-4	0E0	-2,1E-3
Abiotic depletion of non fossil resources	kg Sb-eqv	1,42E-6	3,45E-9	5,07E-11	1,43E-6	4,45E-10	9,54E-8	0E0	-4,94E-7
Abiotic depletion of fossil resources	MJ	7,96E1	1,63E0	3,86E-4	8,12E1	2,1E-1	3,95E-1	0E0	-2,67E1

Environmental impact (Vigo, Spain)									
Parameter	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**C3**	**C4**	**D**
Global warming potential	kg CO2 -eqv	2,65E0	7,43E-2	4,36E-2	2,77E0	7,58E-3	2,38E0	0E0	-2,4E0
Depletion of stratospheric ozone layer	kg CFC11-eqv	7,55E-8	1,48E-8	4,11E-12	9,03E-8	1,51E-9	5,52E-9	0E0	-1,52E-7
Formation of photochemical ozone	kg C2H4 -eqv	9,29E-4	7,43E-6	2,8E-4	1,22E-3	7,58E-7	8,89E-6	0E0	-6,57E-4
Acidification	kg SO2 -eqv	7,69E-3	3,46E-4	1,26E-6	8,04E-3	3,53E-5	4,01E-3	0E0	-1,37E-2
Eutrophication	kg PO4 3--eqv	1,7E-3	7,35E-5	1,18E-7	1,77E-3	7,49E-6	2,8E-4	0E0	-2,1E-3
Abiotic depletion of non fossil resources	kg Sb-eqv	1,76E-6	4,36E-9	5,07E-11	1,76E-6	4,45E-10	9,55E-8	0E0	-4,94E-7
Abiotic depletion of fossil resources	MJ	7,78E1	2,06E0	3,86E-4	7,98E1	2,1E-1	3,95E-1	0E0	-2,67E1

FINNFOAM
MAAN PARAS ERISTE

20. Use of natural resources

Resource use (Salo, Finland)

Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	2,07E0	6,77E-3	9,84E-6	2,07E0	3,3E-4	1,84E-2	0E0	-1,74E1
Renewable primary energy resources used as raw materials	MJ	1,55E0	0E0	0E0	1,55E0	0E0	0E0	0E0	0E0
Total use of renewable primary energy resources	MJ	3,61E0	6,77E-3	9,84E-6	3,62E0	3,3E-4	1,84E-2	0E0	-1,74E1
Nonrenewable primary energy resources used as energy carrier	MJ	3,96E1	5,83E-1	4,2E-4	4,02E1	2,17E-1	4,46E-1	0E0	-2,91E1
Nonrenewable primary energy resources used as materials	MJ	4,5E1	3,7E0	0E0	4,87E1	0E0	0E0	0E0	0E0
Total use of nonrenewable primary energy resources	MJ	8,45E1	4,28E0	4,2E-4	8,88E1	2,17E-1	4,46E-1	0E0	-2,91E1
Use of secondary materials	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of nonrenewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	2,1E-2	5,8E-5	1,6E-6	2,11E-2	2,88E-6	3,86E-3	0E0	-1,21E-3

Resource use (Kaunas, Lithuania)

Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	1,53E0	2,56E-3	9,84E-6	1,54E0	3,3E-4	1,84E-2	0E0	-1,74E1
Renewable primary energy resources used as raw materials	MJ	1,58E0	0E0	0E0	1,58E0	0E0	0E0	0E0	0E0
Total use of renewable primary energy resources	MJ	3,11E0	2,56E-3	9,84E-6	3,11E0	3,3E-4	1,84E-2	0E0	-1,74E1
Nonrenewable primary energy resources used as energy carrier	MJ	4,29E1	1,68E0	4,2E-4	4,46E1	2,17E-1	4,46E-1	0E0	-2,91E1
Nonrenewable primary energy resources used as materials	MJ	4,59E1	0E0	0E0	4,59E1	0E0	0E0	0E0	0E0
Total use of nonrenewable primary energy resources	MJ	8,88E1	1,68E0	4,2E-4	9,04E1	2,17E-1	4,46E-1	0E0	-2,91E1
Use of secondary materials	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of nonrenewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	2,12E-2	2,24E-5	1,6E-6	2,12E-2	2,88E-6	3,86E-3	0E0	-1,21E-3

Resource use (Vigo, Spain)									
Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Renewable primary energy resources used as energy carrier	MJ	2,68E0	3,24E-3	9,84E-6	2,69E0	3,3E-4	1,84E-2	0E0	-1,74E1
Renewable primary energy resources used as raw materials	MJ	2,26E0	0E0	0E0	2,26E0	0E0	0E0	0E0	0E0
Total use of renewable primary energy resources	MJ	4,94E0	3,24E-3	9,84E-6	4,95E0	3,3E-4	1,84E-2	0E0	-1,74E1
Nonrenewable primary energy resources used as energy carrier	MJ	4,34E1	2,13E0	4,2E-4	4,55E1	2,17E-1	4,46E-1	0E0	-2,91E1
Nonrenewable primary energy resources used as materials	MJ	4,51E1	0E0	0E0	4,51E1	0E0	0E0	0E0	0E0
Total use of nonrenewable primary energy resources	MJ	8,84E1	2,13E0	4,2E-4	9,06E1	2,17E-1	4,46E-1	0E0	-2,91E1
Use of secondary materials	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of nonrenewable secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	2,47E-2	2,83E-5	1,6E-6	2,47E-2	2,88E-6	3,85E-3	0E0	-1,21E-3

21. End of life - Waste

Waste (Salo, Finland)									
Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Hazardous waste	kg	1,69E-6	6,21E-7	6,56E-10	2,32E-6	2,98E-8	1,35E-6	0E0	-1,26E-5
Non-hazardous waste	kg	3,56E-2	5,4E-4	6,33E-5	3,62E-2	2,69E-5	6,08E-2	0E0	-8,98E-2
Radioactive waste	kg	5,69E-4	1,7E-5	1,46E-9	5,86E-4	8,54E-7	1,4E-6	0E0	-5,8E-5

Waste (Kaunas, Lithuania)									
Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Hazardous waste	kg	4,95E-6	2,31E-7	6,56E-10	5,18E-6	2,98E-8	1,36E-6	0E0	-1,26E-5
Non-hazardous waste	kg	3,8E-2	2,08E-4	6,33E-5	3,83E-2	2,69E-5	6,08E-2	0E0	-8,98E-2
Radioactive waste	kg	5,64E-4	6,62E-6	1,46E-9	5,71E-4	8,54E-7	1,41E-6	0E0	-5,8E-5

Waste (Vigo, Spain)									
Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Hazardous waste	kg	6,17E-6	2,92E-7	6,56E-10	6,47E-6	2,98E-8	1,35E-6	0E0	-1,26E-5
Non-hazardous waste	kg	5,2E-2	2,64E-4	6,33E-5	5,23E-2	2,69E-5	6,08E-2	0E0	-8,98E-2
Radioactive waste	kg	5,8E-4	8,37E-6	1,46E-9	5,88E-4	8,54E-7	1,4E-6	0E0	-5,8E-5

22. End of life - Output flow

Output flow (Salo, Finland)									
Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Components for reuse	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for energy recovery	kg	0E0	0E0	7,81E-4	7,81E-4	0E0	1E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0

Output flow (Kaunas, Lithuania)									
Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Components for reuse	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for energy recovery	kg	0E0	0E0	7,81E-4	7,81E-4	0E0	1E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0

Output flow (Vigo, Spain)									
Parameter	Unit	A1	A2	A3	A1-A3	A4	C3	C4	D
Components for reuse	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for energy recovery	kg	0E0	0E0	7,81E-4	7,81E-4	0E0	1E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0

FINNFORM
MAAN PARAS ERISTE

Scenarios and additional technical information (7.3)

23. Electricity in the manufacturing phase (7.3.A3)

A3 data quality of electricity and CO2 emission kg CO2 eq. / kWh	FI 0,185 LT 0,612 ES 0,336	The emissions of Finnish electricity are based on electricity production fuel mix from Statistics Finland for the year 2014. The benefit sharing method has been used in the calculation. Lithuanian and Spanish electricity production fuel mixes have been collected from IEA's database and represent year 2013 (most recent data). The emissions of the fuels are based on ecoinvent 3.3 -database (cut-off allocation).

*The most recent country electricity mixes has been used instead of supplier specific data for the production year. This is a reasonable estimation as the impacts of A3 are minor compared to A1.

24. Transport from production place to user (7.3.2A4)

Variable	Amount	Data quality
Fuel type and consumption in **liters / 100 km**	50	Trailer combination, diesel
Transportation distance **km**	200	FI average
Transport capacity utilization **%**	100	Transportation of a full load to production site
Bulk density of transported products **kg/m^3**	35 and 33	Manufacturer product information
Volume capacity utilisation factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products)	1	

25. End-of-life process description (7.3.4)

Processes	**Unit** (expressed per functional unit or per declared unit of components products or materials and by type of material)	**Amount kg/kg** **Data quality**
Collection process specified by type	kg collected separately	1*
	kg collected with mixed construction waste	-
Recovery system specified by type	kg for re-use	-
	kg for recycling	-
	kg for energy recovery	1*
Disposal specified by type	kg product or material for final deposition	-
Assumptions for scenario development, e.g. transportation	units as appropriate	Transportation distance estimation 200 km based on incinerator locations

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

FINNFOAM®
MAAN PARAS ERISTE

26. Additional technical information

Detailed technical information available from Finnfoam's websites
http://www.finnfoam.fi/tuotteet/finnfoam-eristelevyt/ominaisuudet/

27. Product data sheet

28. Additional information (7.4)

Air, soil and water impacts during the use phase have not been studied

29. Bibliography

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

EN 15804:2012+A1 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

RTS PCR 2.6.2016 RTS PCR protocol: EPDs published by the Building Information Foundation RTS sr. PT 18 RT EPD Committee. (English version).