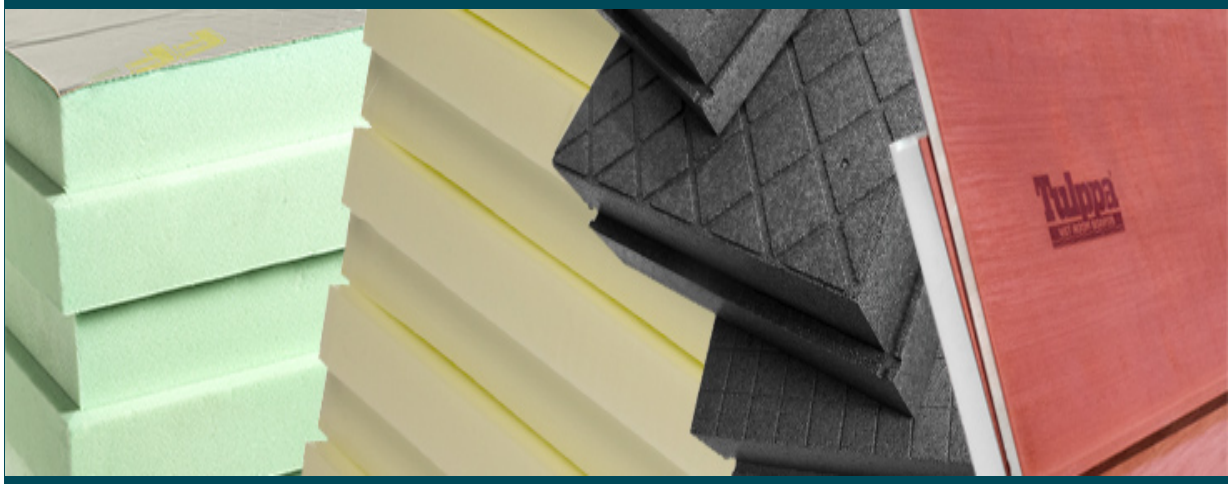
FINNFOAM
MAAN PARAS ERISTE



Rakennustietosäätio RTS Building Information Foundation RTS

RTS EPD, No. 3

Finnfoam PIR

Scope of the declaration

This environmental product declaration covers the environmental impacts of the Finnfoam FF-PIR insulation panel. 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
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http://epd.rts.fi

Laura Sariola
Committee secretary

Matti Rautiola
RTS managing director

3rd PARTY VERIFIED · RTS FOUNDATION · THE BUILDING INFORMATION

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 PIR

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

Product information

9. Product description

This EPD represents the Finnfoam FF-PIR insulation panel produced in Salo, Finland. The insulation consists of polyurethane insulation and an aluminium, gypsum or plastic coating. This EPD covers the PIR-insulation with aluminium coating due it being the most common alternative. The market area of the product is Scandinavia.

10. Technical specifications

FF-PIR is available in thicknesses 30 - 240 mm. The study has been conducted on an average FF-PIR insulation panel, with a total thickness of 100 mm, of which 9 mm is aluminium coating. Nominal density of the panel is 33 kg/m3 without coating, and 36.2 kg/m3 with the aluminium coating. Thermal conductivity is 0.023 W(mK). FF-PIR panels are mainly used in insulating roofs and walls.

11. Product standards

EN 13165:2012 Thermal insulation products for buildings. Factory made rigid polyurethane foam (PUR) products. Specification.

12. Physical properties

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

13. Raw-materials of the product

Product structure / composition / raw-material	Amount %
MDI isocyanate, non-renewable, Netherlands	57,8
Polyester polyol, non-renewable, Netherlands	28,8
Pentane, non-renewable, France	4,5
Aluminium foil, non-renewable, Austria	8,8

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

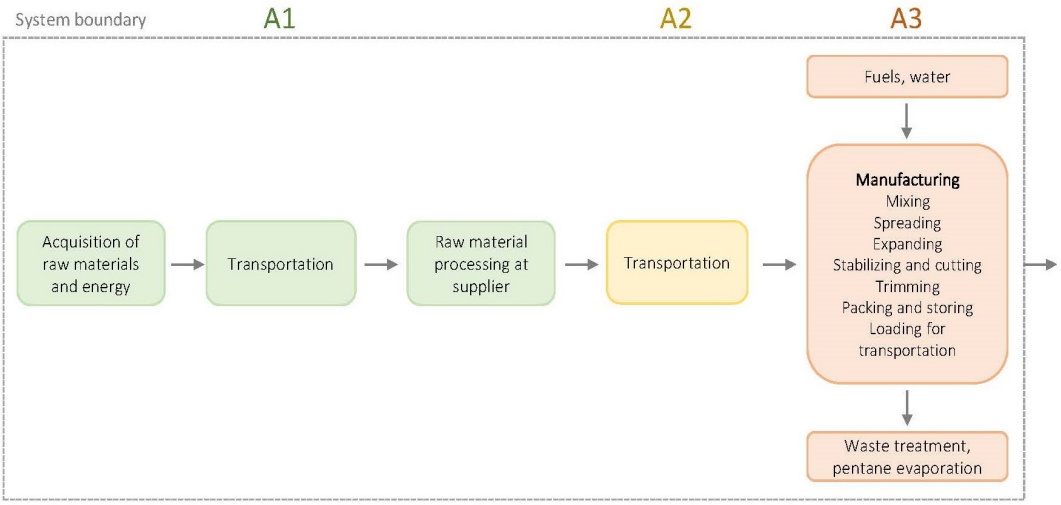
This EPD covers the following modules; A1 (Raw material supply), A2 (Transport), A3 (Manufacturing) and A4 (Transportation of the product to the building site) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and 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 materials with negligible quantities have not been included; catalysts, silicone, release agent, fire-retardant, colour paste and cleaning agent. 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 (point 25, environmental impacts not calculated). 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 polyurethane production include MDI-isocyanate and polyesterpolyol. The product also contains small amounts of fire retardants as well as colouring. The raw materials are first mixed, after which the mass is evenly spread and expanded with pentane. Most of the pentane remains in the product. The panel is then coated with aluminium laminate and cut. The finished product is trimmed, packed into plastic and moved to storage from where it can be shipped to the customers. PIR-waste produced during the manufacturing process is directed to incineration. The production loss is considered in the mass balance. The production related data represents 2015 as a one year average.



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 GWP of modules A1-A3 is mainly caused by material manufacturing, MDI-isocyanite having the highest impacts (71 % of A1). Due to the insulation consisting of different layers, the A1-A3 GWP impacts of the panel do not change linearly with its thickness. Panels with thicknesses ranging from 80 - 240 mm are within 10 % variability of the GWP impacts of the 100 mm thick panel.

Environmental impact								
Parameter	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**C3**	**C4**	**D**
Global warming potential	kg CO2 -eqv	5,69E0	1,49E-1	1,63E-1	6E0	7,58E-3	2,18E0	0E0	-1,36E0
Depletion of stratospheric ozone layer	kg CFC11-eqv	5,52E-8	2,8E-8	6,31E-9	8,94E-8	1,51E-9	5,03E-9	0E0	-8,56E-8
Formation of photochemical ozone	kg C2H4 -eqv	2,31E-3	2,8E-5	9,99E-3	1,24E-2	7,58E-7	8,11E-6	0E0	-3,72E-4
Acidification	kg SO2 -eqv	1,36E-2	1,22E-3	3,14E-4	1,52E-2	3,53E-5	3,65E-3	0E0	-7,75E-3
Eutrophication	kg PO4 3--eqv	1,69E-3	2,1E-4	6,75E-5	1,97E-3	7,49E-6	2,56E-4	0E0	-1,19E-3
Abiotic depletion of non fossil resources	kg Sb-eqv	6,57E-6	8,26E-9	1,1E-5	1,75E-5	4,45E-10	8,7E-8	0E0	-2,79E-7
Abiotic depletion of fossil resources	MJ	1,12E2	3,85E0	5,42E-1	1,16E2	2,1E-1	3,6E-1	0E0	-1,51E1

20. Use of natural resources

Resource use									
Parameter	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**C3**	**C4**	**D**
Renewable primary energy resources used as energy carrier	MJ	8,04E0	6,28E-3	5,28E-1	8,57E0	3,3E-4	1,67E-2	0E0	-9,85E0
Renewable primary energy resources used as raw materials	MJ	4,97E-1	0E0	0E0	4,97E-1	0E0	0E0	0E0	0E0
Total use of renewable primary energy resources	MJ	8,54E0	6,28E-3	5,28E-1	9,07E0	3,3E-4	1,67E-2	0E0	-9,85E0
Nonrenewable primary energy resources used as energy carrier	MJ	9,67E1	8,83E-1	6,36E-1	9,82E1	2,17E-1	4,06E-1	0E0	-1,65E1
Nonrenewable primary energy resources used as materials	MJ	3,13E1	3,1E0	0E0	3,44E1	0E0	0E0	0E0	0E0
Total use of nonrenewable primary energy resources	MJ	1,28E2	3,98E0	6,36E-1	1,33E2	2,17E-1	4,06E-1	0E0	-1,65E1
Use of secondary materials	kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of renewable secondary fuels	MJ	5,37E-3	0E0	0E0	5,37E-3	0E0	0E0	0E0	0E0
Use of nonrenewable secondary fuels	MJ	5,47E-3	0E0	0E0	5,47E-3	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	3,22E-2	5,39E-5	8,49E-4	3,31E-2	2,88E-6	3,52E-3	0E0	-6,8E-4

21. End of life - Waste

Waste									
Parameter	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**C3**	**C4**	**D**
Hazardous waste	kg	9,27E-4	5,75E-7	7,54E-7	9,28E-4	2,98E-8	1,24E-6	0E0	-7,12E-6
Non-hazardous waste	kg	3,36E-1	5,02E-4	5,04E-3	3,42E-1	2,69E-5	5,55E-2	0E0	-5,08E-2
Radioactive waste	kg	2,63E-3	1,58E-5	3,93E-6	2,65E-3	8,54E-7	1,28E-6	0E0	-3,28E-5

22. End of life - Output flow

Output flow									
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	5,35E-2	5,35E-2	0E0	9,12E-1	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0	0E0

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	0,185	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. The emissions of the fuels are based on the ecoinvent 3.3 (cut-off allocation).

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

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

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**	36.2	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.

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26. Additional technical information

Detailed technical information available at http://www.finnfoam.fi/tuotteet/ff-pir/tekniset-tiedo

27. Product data sheet

Tuote	Koko		kpl/pkt	pkt/lava
FFPIR 30 SAUNA	600 x 1200 mm	ympäritäyspontattu	10	8
FFPIR 30 ALK	600 x 2400 mm	ympäritäyspontattu	10	8
FFPIR 40 ALK	600 x 2400 mm	ympäritäyspontattu	10	6
FFPIR 50 ALK	600 x 2400 mm	ympäritäyspontattu	8	6
FFPIR 70 ALK	600 x 2400 mm	ympäritäyspontattu	6	6
FFPIR 80 ALK	600 x 2400 mm	ympäritäyspontattu	5	6
FFPIR 100 ALK	600 x 2400 mm	ympäritäyspontattu	4	6
FFPIR 120 ALK	600 x 2400 mm	ympäritäyspontattu	3	6
FFPIR 130 ALK	600 x 2400 mm	ympäritäyspontattu	3	6
FFPIR 150 ALK	600 x 2400 mm	ympäritäyspontattu	2	8
FFPIR 160 ALK	600 x 2400 mm	ympäritäyspontattu	2	8
FFPIR 200 ALK	600 x 2400 mm	ympäritäyspontattu	2	6
FFPIR 240 ALK	600 x 2400 mm	ympäritäyspontattu	2	6
FFPIR 50 ALI	600 x 2400 mm	suorareunainen	8	6
FFPIR 100 ALI	600 x 2400 mm	suorareunainen	4	6
FFPIR 150 ALI	600 x 2400 mm	suorareunainen	2	8
FFPIR 40 ALS	600 x 2600 mm	saneerauslevy	10	6
FFPIR 100 K600	520 x 2600 mm	runkolevy	4	6
FFPIR 150 K600	520 x 2600 mm	runkolevy	2	8
FFPIR 40 GYL	600 x 2600 mm	puolipontti (kipsilevy)	60 kpl/lava	
FFPIR 70 GYL	600 x 2600 mm	puolipontti (kipsilevy)	34 kpl/lava	
FFPIR 40 PLK	600 x 2400 mm	ympäritäyspontattu (muovikalvopintainen)	10	6
FFPIR 50 PLK	600 x 2400 mm	ympäritäyspontattu (muovikalvopintainen)	8	6
FFPIR 70 PLK	600 x 2400 mm	ympäritäyspontattu (muovikalvopintainen)	6	6
FFPIR 100 PLK	600 x 2400 mm	ympäritäyspontattu (muovikalvopintainen)	4	6
FFPIR 120 PLK	600 x 2400 mm	ympäritäyspontattu (muovikalvopintainen)	3	6
FFPIR 150 PLK	600 x 2400 mm	ympäritäyspontattu (muovikalvopintainen)	2	8
FFPIR 160 PLK	600 x 2400 mm	ympäritäyspontattu (muovikalvopintainen)	2	8
FFPIR 200 PLK	600 x 2400 mm	ympäritäyspontattu (muovikalvopintainen)	2	6
FFPIR 240 PLK	600 x 2400 mm	ympäritäyspontattu (muovikalvopintainen)	2	6

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).