ENVINEER

PRE-ENVIRONMENTAL PRODUCT DECLARATION

In accordance with SFS-EN 15804:2012+A2:2019 & ISO 14025 / ISO 21930

INORA LUONTO EPS 100 LATTIA

INORA OY

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Inora Oy
Address	Muovikatu 9, 74120 Iisalmi
Contact details	matti.aronen@inora.fi
Website	www.inora.fi

PRODUCT IDENTIFICATION

Product name	INORA LUONTO EPS 100 LATTIA
Place(s) of production	Finland

The Building Information Foundation RTS sr
EPDs within the same product category but from different programmes may not be comparable.

PRE-EPD INFORMATION

The Pre-EPD owner has the sole ownership, liability, and responsibility for the Pre-EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRE-EPD standards	This Pre-EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version, 26.8.2020) is used.
PRE-EPD author	Teija Kapynen and Matias Mutila, Envineer Oy
PRE-EPD verification	Independent verification of this PRE-EPD and data, according to ISO 14025: External verification
Verification date	17.10.2022
PRE-EPD verifier	Heini Koutonen, Ramboll Finland Oy
Publishing date	Not published
PRE-EPD valid until	17.04.2024

PRODUCT INFORMATION

PRODUCT DESCRIPTION

Inora Luonto EPS 100 Lattia is thermal insulation for buildings made of expanded polystyrene (EPS). Raw material is biobased Styropor P BMB.

PRODUCT APPLICATION

Thermal insulation of floor and perimeter with the requirements specified their physical properties.

TECHNICAL SPECIFICATIONS

Inora Luonto EPS 100 Lattia's thermal conductivity is 0,036 W/mK, compressive strength is 100 kPa (EN13163:2015), and bending strength is 150 kPa (EN13163:2015), water vapor permeability is 0,009-0,020 mg/(Pahm) and fire class is F.

Further details can be found from the manufacturer.

PRODUCT STANDARDS

SFS-EN 13163 + A1 :2015

PHYSICAL PROPERTIES OF THE PRODUCT

The product is ready for use when delivered to the customer. Contents of the product is presented in the tables below.

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	%
Styropor P BMB	100

Other manufacturing materials account for <1p%.

SUBSTANCES, REACH – VERY HIGH

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)

Manufacturing starts from the raw material supply. All major upstream processes of raw material supply are included. The environmental impacts of raw material supply include emissions from raw material production and processing. All raw materials and energy (electricity from the grid) are transported to the manufacturer.

The EPS is expanded in a pre-expander, after which the expanded EPS is transferred to silos. In the next step, the expanded EPS is molded as blocks in a block mould. The moulded blocks are transferred to the storage area, after which they are cut according to the needs of the customer.

In the production stage, the manufacturing of ancillary materials used in the production is included. Manufacturers' fuels use and waste handling is considered in the production stage.

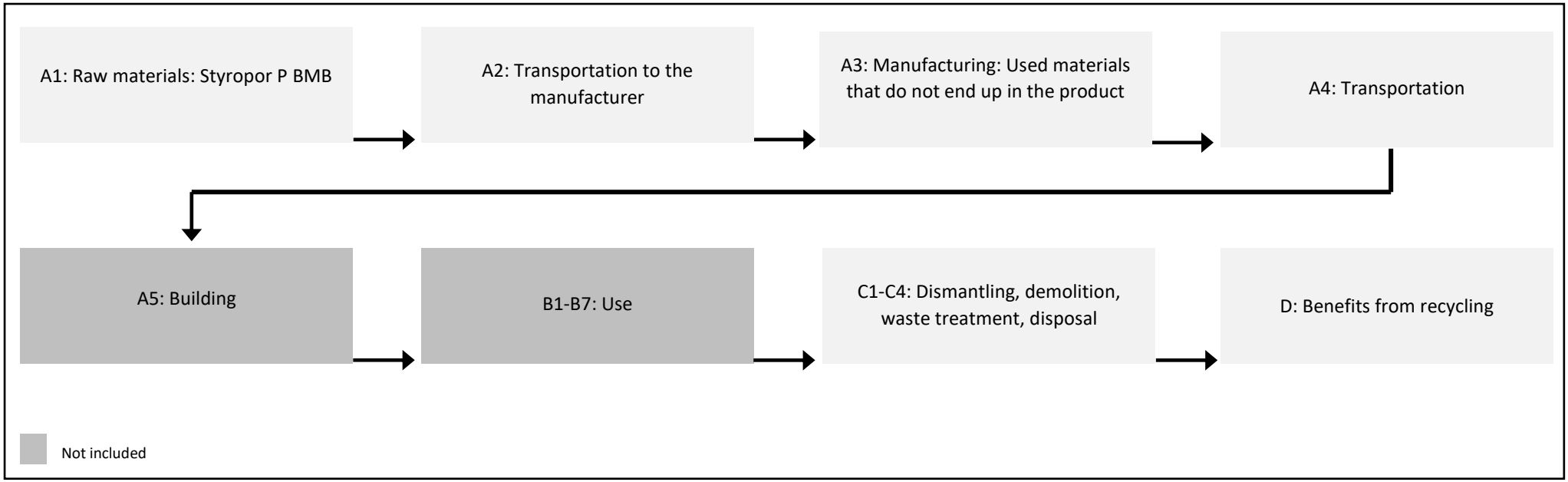
TRANSPORT (A4-A5)

It is assumed in the conservative transport scenario that all units are transported from the manufacturer to Helsinki metropolitan area.

PRODUCT END OF LIFE (C1-C4, D)

In C1 the product is disassembled, and diesel is burned in the building machine. In C2 the disassembled product is transported to treatment where 50 km is assumed. In C3 it is assumed that 100 % of product is collected at the demolition site and sent directly to recycling facilities. After sorting 100 % of product is incinerated. It is assumed that 0 % goes to landfills. It has been assumed that there are no benefits generated in module C3.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	Year 2021

DECLARED AND FUNCTIONAL UNIT

Declared unit	m3
Mass per declared unit	18 kg

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C/m^3	15,85
Biogenic carbon content in packaging, kg C	0

SYSTEM BOUNDARY

This analysis takes into account all mandatory modules and processes in the Standards and RTS Methodological Manual. The processes and modules considered are shown in the table below. PRE-EPD-type is cradle-to-gate with options. It is a Pre-EPD because the product does not yet meet the minimum production requirement of one year

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	Deconstruction	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

X = Modules declared. Modules not declared = MND.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied 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, for which data is available for, are included in the calculation. There is no neglected unit process more than 1 % of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5 % of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

This is a Pre-EPD, so the production volume used in allocation is an estimate of the future normal production volume. The production process does not change with the change in raw materials.

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order:

1. Allocation should be avoided.

2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.

3. Allocation should be based on economic values.

Allocation was necessary for the inputs that describes waste emissions since the data was available only at factory level. Allocation method used was mass based.

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology ‘allocation, cut-off by classification’. This methodology is in line with the requirements of the EN 15804 -standard.

A private data point has been created in the calculation software to describe the environmental effects of the main raw material (Styropor P BMB). An unpublished but critical panel-approved life cycle assessment of the raw material has been used. LCA of the raw material corresponds to the cradle-to-gate definition in linear product systems

ENVIRONMENTAL IMPACT DATA

The effects are presented per declared unit, per 1 m^3 of product (e.g., 1 kg CO2e / 1 m^3 of product). Mass per declared unit is 18 kg/m^3. The results are presented in a scientific format. Data interpretation example: 1.22E-2 = 1.22*10-2 = 0.0122.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	-1,22E1	4,29E0	7,87E-1	-7,11E0	7,46E-1	MND	MND	MND	MND	MND	MND	MND	MND	2,97E-2	8,19E-2	6,32E1	0E0	0E0
GWP – fossil	kg CO_2e	4,57E1	4,29E0	7,13E-1	5,07E1	7,52E-1	MND	MND	MND	MND	MND	MND	MND	MND	2,97E-2	8,18E-2	6,33E1	0E0	0E0
GWP – biogenic	kg CO_2e	-5,8E1	2,94E-3	7,32E-2	-5,79E1	5,46E-4	MND	MND	MND	MND	MND	MND	MND	MND	8,25E-6	5,94E-5	-2,37E-2	0E0	0E0
GWP – LULUC	kg CO_2e	4,79E-2	1,35E-3	5,65E-4	4,98E-2	2,26E-4	MND	MND	MND	MND	MND	MND	MND	MND	2,51E-6	2,46E-5	3,96E-3	0E0	0E0
Ozone depletion pot.	kg CFC_{-11}e	3,18E-8	1E-6	2,43E-8	1,06E-6	1,77E-7	MND	MND	MND	MND	MND	MND	MND	MND	6,41E-9	1,92E-8	5,23E-7	0E0	0E0
Acidification potential	mol H^+e	1,31E-1	2,31E-2	3,04E-3	1,57E-1	3,16E-3	MND	MND	MND	MND	MND	MND	MND	MND	3,1E-4	3,44E-4	2,55E-2	0E0	0E0
EP-freshwater	kg Pe	3,31E-4	3,42E-5	2,42E-5	3,9E-4	6,12E-6	MND	MND	MND	MND	MND	MND	MND	MND	1,2E-7	6,65E-7	1,16E-4	0E0	0E0
EP-marine	kg Ne	4,47E-2	6,67E-3	5,67E-4	5,19E-2	9,52E-4	MND	MND	MND	MND	MND	MND	MND	MND	1,37E-4	1,04E-4	8,23E-3	0E0	0E0
EP-terrestrial	mol Ne	4,86E-1	7,37E-2	6,31E-3	5,66E-1	1,05E-2	MND	MND	MND	MND	MND	MND	MND	MND	1,5E-3	1,14E-3	9,09E-2	0E0	0E0
POCP (“smog”)	kg NMVOCe	1,35E-1	2,27E-2	9,03E-1	1,06E0	3,38E-3	MND	MND	MND	MND	MND	MND	MND	MND	4,13E-4	3,68E-4	2,75E-2	0E0	0E0
ADP-minerals & metals	kg Sbe	1,36E-5	7,13E-5	6,54E-6	9,14E-5	1,28E-5	MND	MND	MND	MND	MND	MND	MND	MND	4,53E-8	1,4E-6	8,38E-5	0E0	0E0
ADP-fossil resources	MJ	5,66E2	6,62E1	1,89E1	6,51E2	1,17E1	MND	MND	MND	MND	MND	MND	MND	MND	4,08E-1	1,27E0	6,77E1	0E0	0E0
Water use	m^3e depr.	1,23E0	2,42E-1	1,69E0	3,16E0	4,35E-2	MND	MND	MND	MND	MND	MND	MND	MND	7,62E-4	4,73E-3	1,49E0	0E0	0E0

GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO_4e.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy	MJ	1,69E3	8,18E-1	8,57E-1	1,69E3	1,47E-1	MND	MND	MND	MND	MND	MND	MND	MND	2,21E-3	1,6E-2	3,36E0	0E0	0E0
Renew. PER as material	MJ	9,34E2	0E0	0E0	9,34E2	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	2,63E3	8,18E-1	8,57E-1	2,63E3	1,47E-1	MND	MND	MND	MND	MND	MND	MND	MND	2,21E-3	1,6E-2	3,36E0	0E0	0E0
Non-re. PER as energy	MJ	5,68E2	6,62E1	8,47E0	6,42E2	1,17E1	MND	MND	MND	MND	MND	MND	MND	MND	4,08E-1	1,27E0	6,77E1	0E0	0E0
Non-re. PER as material	MJ	0E0	0E0	1,04E1	1,04E1	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

Total use of non-re. PER	MJ	5,68E2	6,62E1	1,89E1	6,53E2	1,17E1	MND	MND	MND	MND	MND	MND	MND	MND	4,08E-1	1,27E0	6,77E1	0E0	0E0
Secondary materials	kg	2,79E-5	0E0	3,41E-3	3,43E-3	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Renew. secondary fuels	MJ	7,7E-16	0E0	0E0	7,7E-16	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	1,05E-14	0E0	0E0	1,05E-14	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	1,7E-1	1,35E-2	5,94E-2	2,43E-1	2,44E-3	MND	MND	MND	MND	MND	MND	MND	MND	3,61E-5	2,65E-4	3,96E-2	0E0	0E0

PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	2,23E-4	6,45E-2	3,59E-2	1,01E-1	1,14E-2	MND	MND	MND	MND	MND	MND	MND	MND	4,39E-4	1,24E-3	0E0	0E0	0E0
Non-hazardous waste	kg	2,74E-1	6,9E0	1,11E0	8,28E0	1,26E0	MND	MND	MND	MND	MND	MND	MND	MND	4,7E-3	1,37E-1	0E0	0E0	0E0
Radioactive waste	kg	1,76E-2	4,55E-4	2E-5	1,81E-2	8,03E-5	MND	MND	MND	MND	MND	MND	MND	MND	2,86E-6	8,73E-6	0E0	0E0	0E0

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

KEY INFORMATION TABLE – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	-1,22E1	4,29E0	7,87E-1	-7,11E0	7,46E-1	MND	MND	MND	MND	MND	MND	MND	MND	2,97E-2	8,19E-2	6,32E1	0E0	0E0
ADP-minerals & metals	kg Sbe	1,36E-5	7,13E-5	6,54E-6	9,14E-5	1,28E-5	MND	MND	MND	MND	MND	MND	MND	MND	4,53E-8	1,4E-6	8,38E-5	0E0	0E0
ADP-fossil	MJ	5,66E2	6,62E1	1,89E1	6,51E2	1,17E1	MND	MND	MND	MND	MND	MND	MND	MND	4,08E-1	1,27E0	6,77E1	0E0	0E0
Water use	m^3e depr.	1,23E0	2,42E-1	1,69E0	3,16E0	4,35E-2	MND	MND	MND	MND	MND	MND	MND	MND	7,62E-4	4,73E-3	1,49E0	0E0	0E0
Secondary materials	kg	2,79E-5	0E0	3,41E-3	3,43E-3	0E0	MND	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Biog. C in product	kg C	15,85	0E0	0E0	15,85	0E0	MND	MND	MND	MND	MND	MND	MND	MND	N/A	N/A	N/A	N/A	N/A

Biog. C in packaging	kg C	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	MND	N/A	N/A	N/A	N/A	N/A

MND=Modules Not declared, N/A=Not applied, Biog. C in product = Biogenic carbon content in product

SCENARIO DOCUMENTATION

Energy

Scenario parameter	Value
Electricity data source and quality	Electricity production, hydro, reservoir, non-alpine region (Reference product: electricity, high voltage), Finland, Ecoinvent 3.6, 2019
Electricity CO2e / kWh	0,0487
Steam data source and quality	Steam production, in chemical industry (Reference product: steam, in chemical industry), Europe, Ecoinvent 3.6, 2019
Steam kg CO2e / kg	0.28
Liquefied petroleum gas data source and quality	Market for liquefied petroleum gas (Reference product: liquefied petroleum gas), Europe, Ecoinvent 3.6, 2019
Liquefied petroleum gas kg CO2e / kg	0.63

Transport

Scenario parameter	Value		
Specific transport CO2e emissions, kg CO2e / tkm (Lorry)	0.0901	Market for transport, freight,	ecoinvent 3.6
Average transport distance, km	460	Average distance	
Capacity utilization (including empty return) %	100	Average distance	
Bulk density of transported products	<32 t		
Volume capacity utilization factor	1		

End of life

Scenario parameter	Value
Collection process – kg collected separately	18
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling / sorting	18
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	0
Scenario assumptions e.g., transportation	50 km

BIBLIOGRAPHY

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