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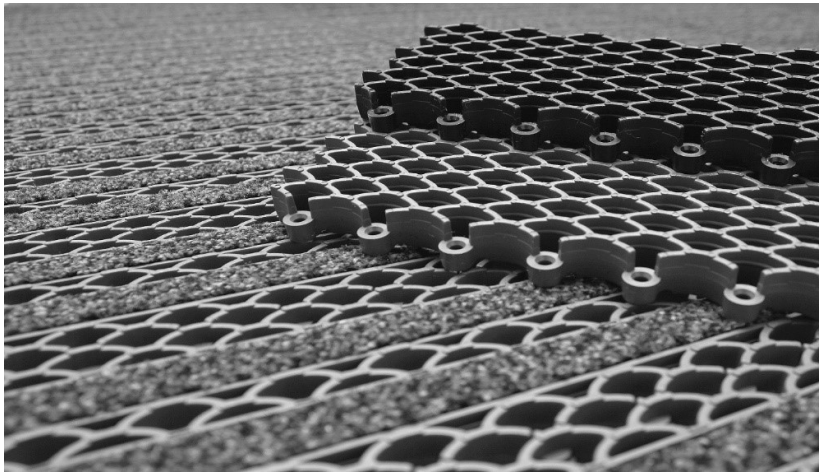

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012 + A2:2019 for:

PLASTIC ENTRANCE MATS

MUOVIHAKA

Programme:	RTS EPD
Programme operator:	The Finnish Building Information Foundation RTS https://cer.rts.fi/epd-ymparistoseloste/
EPD registration number:	xxxxx
Publication date:	2023-xx-xx
Valid until:	2028-xx-xx

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1. General information

Company information

Owner of the EPD

Muovihaka Oy
Kuusimäentie 12,
01900 Nurmijärvi
Finland

Description of the organization

Muovihaka Oy is a Finnish entrance mat and matting system company founded in 1988, located in Nurmijärvi, Finland. The company manufactures entrance matting systems, wet area mats and door mats for a diverse customer base.

Additional information

pasi.nurmentaus@muovihaka.com
+358 50 5430041
https://www.muovihaka.com

Product information

Product name

Jaguar entrance mat made of plastic.

Place of production

Nurmijärvi, Finland

Programme information

Program operator, publisher

The Finnish Building Information Foundation RTS https://cer.rts.fi/epd-ymparistoseloste/

Program information

Rakennustieto Oy
PL 1004, 00101 Helsinki

Standards and Product Category Rules

The declaration has been prepared in accordance with standards ISO 14025 and EN 15804:2012+A2:2019 and the additional requirements stated in the RTS PCR method guideline (8/26/2020).

Author of the life cycle assessment and declaration

Ramboll Finland Oy, Itsehallintokuja 3, 02601 Espoo, Finland.
Practitioner environmental consultant:
Nea Ferin

Date of publication and validity

Declaration issue date 01.06.2023. The declaration is valid 5 years, 01.06.2023 – 01.06.2028.

Verification

The environmental declaration has been verified in accordance with the standard EN 15804+A2 and the RTS PCR method guidelines (8/26/2020) by an independent third party. The verification was performed by Heini Koutonen (Nordic Offset Oy). The verification was completed on 25/05/2023.

In principle, the requirements of European standard EN 15804:2012 + A2:2019 (product category rules) have been observed.	
In accordance with the international standard EN ISO 14025:2010, the independent verifying organization is	
☐ **Internal**	☒ **External**
Third-party verification has been performed by: *Heini Koutonen* *Signature of the verifier*	

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

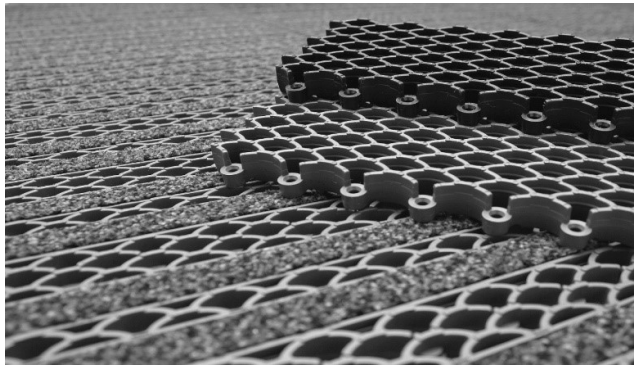
2. Product information

Products included in the EPD

This EPD concerns two different variants of Jaguar entrance mats: a black entrance mat and a dark grey entrance mat. The entrance mats are modelled as a one product, because the difference of environmental impacts of these mats is negligible. More information on the products is available at https://www.muovihaka.com/tuulikaappimatot/jaguar-tuulikaappimatto

Description of product and its use

Jaguar is durable interlocking tile mat for both internal and external applications. It has exceptional performance for heavy foot and trolley traffic and can be used for example, at airports, subway stations, shopping centres and public buildings.



Product standards

No product standard.

3. Content declaration

Raw materials of the product

The main material of the products is plastic (100 weight-%).

Information about recycled materials

Only primary plastics are used.

Information about packaging

Plastic and wood are used as packaging materials.

List of EU Chemicals Agency (ECHA) REACH SVHC substances contained in the product

The products do not contain substances which exceed the limits for registration with the European Chemicals Agency regarding the "Candidate List of Substances of Very High Concern for Authorisation"

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Key environmental information reported per square meter

Jaguar (black/dark grey)												
Indicators	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Climate Change - total	kg CO2 eq.	1,73E+01	5,05E-01	3,19E+00	2,10E+01	3,05E-02	8,63E-02	0,00E+00	5,88E-02	2,23E+01	0,00E+00	-1,34E+01
Resource use, mineral and metals	kg Sb eq.	2,75E-07	3,85E-08	1,53E-07	4,67E-07	2,31E-09	1,18E-10	0,00E+00	4,89E-09	7,20E-07	0,00E+00	-4,37E-08
Resource use, fossils	MJ, net calorific value	4,53E+02	6,73E+00	4,66E+01	5,07E+02	4,07E-01	1,79E-02	0,00E+00	7,82E-01	4,13E+01	0,00E+00	-1,02E+02
Water use	m3 world eq. Deprived	2,63E+01	3,91E-03	3,27E-01	2,67E+01	2,35E-04	8,23E-03	0,00E+00	5,25E-04	1,67E+00	0,00E+00	-2,37E-02
Use of secondary material	kg/kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Biogenic carbon content

Biogenic carbon content	Jaguar, black/dark grey (kg/declared unit)
The amount of biogenic carbon in the product	0 kg
Amount of biogenic carbon in packaging	0.00855 kg
Mass of the packaging	0.033 kg

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4. LCA information

Declared unit

The declared unit is set to 1 square meter (1 m^2) of finished plastic product. Finished product weights 8.236 kg per square meter.

Time representativeness

The data used to model product manufacturing corresponds to year 2022. The data from generic databases are from 2013 - 2021, mainly 2018 - 2021.

Geographical scope

This EPD is site specific (products produced only in Nurmijärvi, Finland).

Database(s) and LCA software used

The LCA was modelled using the LCA software GaBi 10 Professional and the life cycle inventory datasets provided by Sphera.

Cut-off criteria

No flows had to be excluded from this assessment due to lack of detailed data.

Allocation

In this study, the input data on raw materials and packaging material supply (A1), electricity, production process and production waste (A3) were collected directly from the manufacturer concerning different material consumption in kg per declared unit. Electricity consumption was known in plant level and thus, allocation was needed in phase A3. The products are transported to several countries (A4), and the weight of product transported is allocated based on market shares.

Data quality

Site-specific production data have been collected for 2022 from the production site. The upstream and downstream processes have been modelled based on environmental data from generic database (Sphera). The collected data were reviewed in terms of consistency, and it is estimated as good quality.

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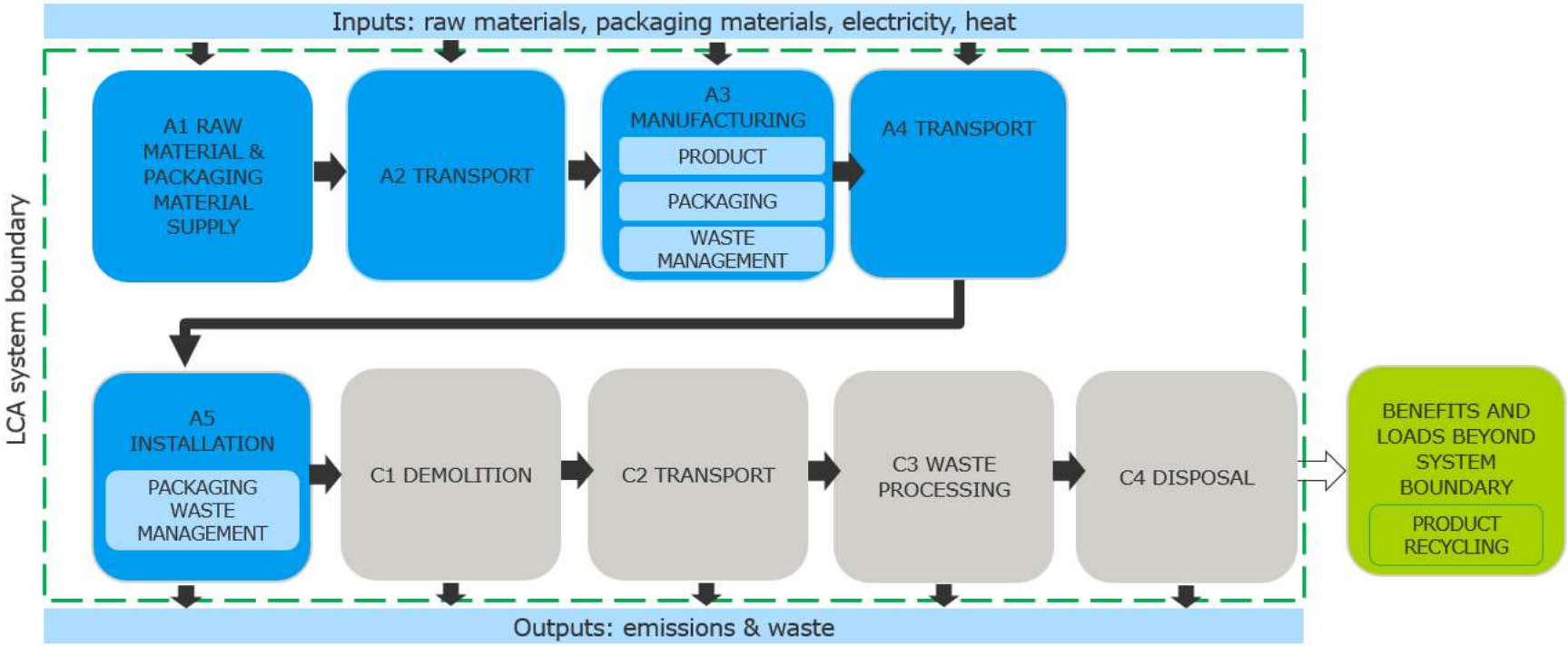
System diagram

The product system to be studied consists of the whole life cycle for the plastic products and the system boundary was set as cradle to gate with options. The assessment covers the product stage (A1-A3), distribution (A4), packaging waste management from the installation stage (A5), the end-of-life stage (C1-C4) and benefits and loads beyond the system boundary (D). Modules B1-B7 are considered not relevant. Machines and facilities (capital goods) required for and during production are excluded, as is employees' commuting.



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Product life cycle

Production (A1-A3)

The entrance mats are manufactured by injection moulding. The injection moulding machine melts the PVC granulates and compress them in a mould. After compressing, the product is cooled down and removed from the mould. Lastly, the finished product is packed in polyethylene wrapper and placed on wooden pallet before sending out to Muovihaka's customers. The product stage takes into account the manufacturing of raw materials, their transport to the production plant and the stages of the product manufacturing process.

A1: The production of raw materials includes the environmental impacts arising from the procurement, processing, and manufacture of all raw materials used in the products.
A2: Transportation of the raw materials to the production facility of Muovihaka in Nurmijärvi, Finland. Specific transportation modes (truck or ferry) and actual distances are taken into account.
A3: Production process, including electricity and heat consumption, and the transport and management of production waste. Electricity used in the production is modelled according to the information provided by the external service provider.

Transportation (A4)

Transportation of the finished products from the production facility. Transportation is allocated based on the geographical market shares of the products. Real distances between the production facility and destinations are used.

Installation (A5)

In the installation phase, the recycling of packaging material is included in the assessment.

End of life cycle (C1-C4)

C1: Module C1 emissions are assumed to be negligible, as a separate deconstruction of the entrance mat is not needed.
C2: Transportation of the used product for waste processing was assessed based on average waste transportation distance in Finland.
C3: Product is sent to energy recovery and assessed accordingly.
C4: As product is sent to energy recovery, no product will end up in landfill after demolition phase.

Benefits and loads beyond the system boundary (D)

As the products are sent to energy recovery, there are benefits and loads beyond the system boundary. Also, packaging materials are sent to energy recovery (A5) and included module D. Steam from energy recovery is assumed to replace thermal energy form peat and electricity to replace electricity from Finnish grid.

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System boundaries

The system boundary was set at cradle to gate with options, including modules A1-A3, A4, A5, and module C1-C4 and the benefits and loads beyond the system boundary (D). The life cycle stages included are described in the table below:

	Product stage			Construction stage		Use stage							End-of-life stage				Non-life cycle impacts		
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
Modules declared	☒	☒	☒	☒	☒	ND	ND	ND	ND	ND	ND	ND	☒	☒	☒	☒	☒	☒	☒
Module	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement of parts	Extensive repairs	Use of energy	Use of water	Demolition	Transport	Waste processing	Waste disposal	Reuse	Recovery	Recycling

X = Module declared ND = Not declared

	Mandatory modules
	Mandatory in accordance with the provisions of section 6.2.1 of the RTS EPD protocol
	Optional modules based on scenarios

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5. Environmental and resource use indicators

In the following tables the potential environmental impacts are reported per the declared unit and per life cycle stage. The impact categories presented here are consistent with the reference PCR.

The results are presented in scientific form. Data interpretation example: $1.31E^{-2} = 1.31*10^{-2} = 0.0131$

According to the EN 15804 standard, environmental declarations for construction products may not be comparable if they have not been prepared in accordance with that standard or if a different notified unit has been used.

5.1 Jaguar entrance mat, black/dark grey

Environmental impact category	Unit	A1	A2	A3	A1-A3 total	A4	A5	C1	C2	C3	C4	D
Global warming potential (GWP) – fossil	kg CO_2 eq.	1,72E+01	5,03E-01	3,18E+00	2,09E+01	3,04E-02	7,26E-02	0,00E+00	5,86E-02	2,22E+01	0,00E+00	-1,35E+01
Global warming potential (GWP) – biogenic	kg CO_2 eq.	1,46E-01	-4,64E-04	1,09E-02	1,57E-01	-2,75E-05	1,37E-02	0,00E+00	-8,08E-05	5,73E-03	0,00E+00	9,58E-03
Global warming potential (GWP) – luluc	kg CO_2 eq.	4,15E-04	2,34E-03	2,66E-04	3,02E-03	1,40E-04	1,46E-06	0,00E+00	3,26E-04	2,07E-03	0,00E+00	-1,28E-03
Global warming potential (GWP) – total	kg CO_2 eq.	1,73E+01	5,05E-01	3,19E+00	2,10E+01	3,05E-02	8,63E-02	0,00E+00	5,88E-02	2,23E+01	0,00E+00	-1,34E+01
Ozone depletion (ODP)	kg CFC11 eq.	2,18E-08	3,03E-14	6,27E-13	2,19E-08	1,83E-15	2,16E-15	0,00E+00	3,50E-15	3,05E-11	0,00E+00	-1,95E-13
Acidification (AP)	mol H^+ eq.	4,38E-02	1,96E-03	5,16E-03	5,09E-02	1,23E-04	1,57E-05	0,00E+00	5,38E-05	6,98E-03	0,00E+00	-2,87E-02
Eutrophication (EP) – freshwater	kg PO_4 eq.	5,52E-04	1,27E-06	4,97E-07	5,54E-04	7,59E-08	1,71E-09	0,00E+00	1,75E-07	7,42E-06	0,00E+00	-9,98E-07
Eutrophication (EP) – marine	kg N eq.	9,84E-03	9,16E-04	1,13E-03	1,19E-02	5,80E-05	3,35E-06	0,00E+00	1,65E-05	2,19E-03	0,00E+00	-4,22E-03

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Environmental impact category	Unit	A1	A2	A3	A1-A3 total	A4	A5	C1	C2	C3	C4		D
Eutrophication (EP) – terrestrial	mol N eq.	1,05E-01	1,02E-02	1,34E-02	1,28E-01	6,43E-04	7,00E-05	0,00E+00	1,99E-04	2,87E-02	0,00E+00		-4,62E-02
Photochemical ozone formation (POCP)	kg NMVOC eq.	3,91E-02	2,48E-03	3,23E-03	4,48E-02	1,57E-04	9,07E-06	0,00E+00	4,68E-05	6,39E-03	0,00E+00		-1,23E-02
Depletion of abiotic resources (ADP) – minerals & metals*	kg Sb eq.	2,75E-07	3,85E-08	1,53E-07	4,67E-07	2,31E-09	1,18E-10	0,00E+00	4,89E-09	7,20E-07	0,00E+00		-4,37E-08
Depletion of abiotic resources (ADP) – fossil fuels*	MJ	4,53E+02	6,73E+00	4,66E+01	5,07E+02	4,07E-01	1,79E-02	0,00E+00	7,82E-01	4,13E+01	0,00E+00		-1,02E+02
Water deprivation potential (WDP)*	m^3e depr.	2,63E+01	3,91E-03	3,27E-01	2,67E+01	2,35E-04	8,23E-03	0,00E+00	5,25E-04	1,67E+00	0,00E+00		-2,37E-02

**Disclaimer: 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.*

Resource use

Resource use indicators	Unit	A1	A2	A3	A1-A3 total	A4	A5	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ	3,14E+01	3,23E-01	2,50E+01	5,68E+01	1,93E-02	3,21E-03	0,00E+00	4,44E-02	1,50E+01	0,00E+00	-2,61E+00
Use of renewable primary energy resources used as raw materials (PERM)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ	3,14E+01	3,23E-01	2,50E+01	5,68E+01	1,93E-02	3,21E-03	0,00E+00	4,44E-02	1,50E+01	0,00E+00	-2,61E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ	4,53E+02	6,75E+00	4,66E+01	5,07E+02	4,08E-01	1,79E-02	0,00E+00	7,84E-01	4,14E+01	0,00E+00	-1,02E+02
Use of non-renewable primary energy resources used as raw materials (PENRM)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ	4,53E+02	6,75E+00	4,66E+01	5,07E+02	4,08E-01	1,79E-02	0,00E+00	7,84E-01	4,14E+01	0,00E+00	-1,02E+02
Use of secondary material (SM)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels (RSF)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels (NRSF)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water (FW)	m^3	6,15E-01	3,67E-04	2,45E-02	6,40E-01	2,19E-05	1,94E-04	0,00E+00	5,03E-05	4,54E-02	0,00E+00	-6,86E-03

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Waste categories

Waste category	Unit	A1	A2	A3	A1-A3 total	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	8,55E-10	3,06E-11	2,84E-10	1,17E-09	1,85E-12	1,65E-12	0,00E+00	3,75E-12	3,29E-09	0,00E+00	-5,66E-10
Non-hazardous waste disposed (NHWD)	kg	3,56E-03	9,11E-04	4,48E-01	4,52E-01	5,49E-05	7,61E-04	0,00E+00	1,12E-04	1,33E+01	0,00E+00	-6,95E-02
Radioactive waste disposed (RWD)	kg	6,06E-05	8,16E-06	1,18E-02	1,19E-02	4,93E-07	9,34E-07	0,00E+00	9,65E-07	1,78E-03	0,00E+00	-9,58E-04

Environmental information describing output flows

Indicator	Unit	A1	A2	A3	A1-A3 total	A4	A5	C1	C2	C3	C4	D
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for energy recovery (MER)	kg	0,00E+00	0,00E+00	6,82E-02	0,00E+00	0,00E+00	3,26E-02	0,00E+00	0,00E+00	8,24E+00	0,00E+00	0,00E+00
Exported energy, electricity (EE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,58E+00
Exported energy, thermal (EET)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,57E+01

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Additional environmental indicators

Indicator	Unit	A1	A2	A3	A1-A3 total	A4	A5	C1	C2	C3	C4	D
Particulate matter	Disease incidences	3,95E-07	2,89E-08	4,22E-08	4,66E-07	1,83E-09	9,86E-11	0,00E+00	3,29E-10	1,55E-07	0,00E+00	-2,02E-07
Ionising radiation. human health	kBq U235 eq.	1,10E+00	1,19E-03	1,17E+00	2,27E+00	7,22E-05	9,39E-05	0,00E+00	1,41E-04	1,76E-01	0,00E+00	-9,67E-02
Ecotoxicity. freshwater	CTUe	1,94E+02	4,68E+00	1,86E+01	2,17E+02	2,83E-01	8,50E-03	0,00E+00	5,43E-01	1,44E+01	0,00E+00	-8,64E+00
Human toxicity. cancer	CTUh	5,75E-09	9,29E-11	3,39E-10	6,18E-09	5,62E-12	7,70E-13	0,00E+00	1,09E-11	1,24E-09	0,00E+00	-4,32E-10
Human toxicity. non-cancer	CTUh	3,48E-07	4,72E-09	1,85E-08	3,71E-07	2,85E-10	4,38E-11	0,00E+00	5,66E-10	1,31E-07	0,00E+00	-3,11E-08
Land Use	Pt	1,60E+01	1,93E+00	1,35E+00	1,93E+01	1,15E-01	5,38E-03	0,00E+00	2,69E-01	1,24E+01	0,00E+00	-1,22E+01

Biogenic carbon content

Biogenic carbon content	Amount per declared unit
The amount of biogenic carbon in the product	0 kg
Amount of biogenic carbon in packaging	0.00855 kg
Mass of the packaging	0.033 kg

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6. Scenarios and additional technical information

Additional technical information, energy use in manufacturing (A3)

Variable	
Quality of electricity information	Assumptions based on supplier specific data.
CO_2 emission factor for electricity	0.365 kg CO_2 eq. /kWh
Quality of heating data	Electric heating, based on supplier specific data.
CO_2 emission factor for heating	0.365 kg CO_2 eq. /kWh

Additional technical information, distribution (A4)

Variable	Amount	Data quality
Fuel type and consumption of the vehicle used	diesel 0.0082 kg/tonne*km	Truck, Euro 6, 28 - 32t gross weight / 22t payload capacity
	light fuel oil 0.0164 kg/tonne*km	Ro-ro-ship, 1,200 to 10,000 dwt payload capacity
Transportation distance	547 km	weighted average per declared unit
Specific emission values	0.0529 kg CO_2 eq./1 tonne*km	Truck, Euro 6, 28 - 32t gross weight / 22t payload capacity
	0.0264 kg CO_2 eq./1 tonne*km	Ro-ro-ship, 1,200 to 10,000 dwt payload capacity
Capacity utilization rate	Truck: 85 % Ship: 70 %	
Bulk density of transported products	411.8 kg/m^3	average bulk density of the Jaguar entrance mats
Volume capacity utilization factor (factor = 1 or <1 or ≥1 for compressed or nested packaged products)	1	Product cannot be nested for transportation

Additional technical information, installation (A5)

Variable	Amount per declared unit
Ancillary materials for installation	-
Water use	0 m^3
Other resource use	-
Quantitative description of energy type and consumption during the installation process	0 kWh/MJ
Waste materials on the building site before waste processing	0.024 kg plastic waste 0.0086 kg wood waste
Output materials as result of waste processing at the building site	0.0086 kg to recycling 0.024 kg to energy recovery 0 kg to disposal
Direct emissions to ambient air, soil and water	0 kg

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End of life

Process description	Unit	Value
Demolition process for the product and the resulting construction waste amount, broken down as follows:	kg collected as sorted	8.236
	kg collected as mixed construction waste	0
Construction waste recovery process and generated construction waste broken down as follows:	kg components for re-use (same use)	0
	kg for material recycling	0
	kg for energy recovery	8.236
Construction waste disposal process and waste for final deposition amount	kg of product or material for final deposition	0
Assumptions for scenario development, e.g. transportation	units as appropriate	Transportation distance 121 km. Truck, Euro 6, 28 - 32t gross weight / 22t payload capacity, capacity utilization 85 %

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7. References

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EPD VERIFICATION REPORT

EPD: Plastic entrance mats

OWNER OF THE EPD: Muovihaka Oy

AUTHOR OF THE LCA AND DECLARATION: Nea Ferin, Ramboll Finland Oy

Verified according to the requirements of EN 15804:2019 and RTS PCR 2020			
Independent verification of the declaration, according to ISO14025:2010			
☐	Internal	☒	External
Third party verifier:  Heini Koutonen Senior Consultant, Nordic Offset Oy 25.5.2023			