Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Katepal K-MS 170/4000 Green

from

Katepal Oy

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): Construction products, 2019:14, version 1.3.3; UN CPC code 5453
PCR review was conducted by: The Technical Committee of the International EPD System. A full list of members available on www.environdec.com. The review panel may be contacted via info@environdec.com.
Life Cycle Assessment (LCA)
LCA accountability: Katarzyna Dziubanii, katarzyna.dziubanii@ramboll.se, Ramboll Sweden AB Yevgeniya Arushanyan, yevgeniya.arushanyan@ramboll.se, Ramboll Sweden AB Marjan Mousavi, marjan.mousavi@ramboll.se, Ramboll Sweden AB Agnes Rönnblom, agnes.ronnblom@ramboll.se, Ramboll Sweden AB Niclas Silfverstrand, niclas.silfverstrand@ramboll.se, Ramboll Sweden AB https://www.ramboll.com/sv-se/lca/lca-och-epd
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Håkan Stripple, IVL Swedish Environmental Research Institute *hakan.stripple@ivl.se*   Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Katepal Oy

Contact: Miia Kuhlman, miia.kuhlman@katepal.fi; www.katepal.fi

Description of the organisation: Katepal Oy is a Finnish family-owned company with a history dating back in 1949. Main product categories are bitumen membranes, bitumen shingles and liquid applied bitumen products.

Product-related or management system-related certifications: ISO 9001 Quality Management System

Name and location of production site(s):
Katepal Oy
Katepalintie 15
37500 Lempäälä
Finland

Product information

Product name: Katepal K-MS 170/4000 Green

Product identification: K-MS 170/4000 Green

Product description: Katepal K-MS 170/4000 Green is a bitumen membrane for roof waterproofing. It is used as an underlay sheet for multilayer applications for all kinds or roofs and buildings. Katepal K-MS 170/4000 Green is installed by fully torching with 10 cm overlapping of the product. Mechanical fasteners can also be used if needed. The product is made of SBS- modified bitumen and reinforced with a polyester nonwoven. Upper surface of the product is covered with sand excluding the torch on edge. Bottom surface is covered with torch-on bitumen and thermofusible film. Katepal Green line products are partially made with renewable and recycled raw materials, and carbon-free “green” electricity was used during the manufacturing process.

UN CPC code: 5453 - Roofing and waterproofing services

Geographical scope: Nordic countries (Denmark, Finland, Sweden, Norway).

Katepal K-MS 170/4000 Green	Amount	Unit
Declared unit	1	m^2
Weight	3,962	kg/m^2
Conversion factor to 1 kg	0,252	m^2/kg

LCA information

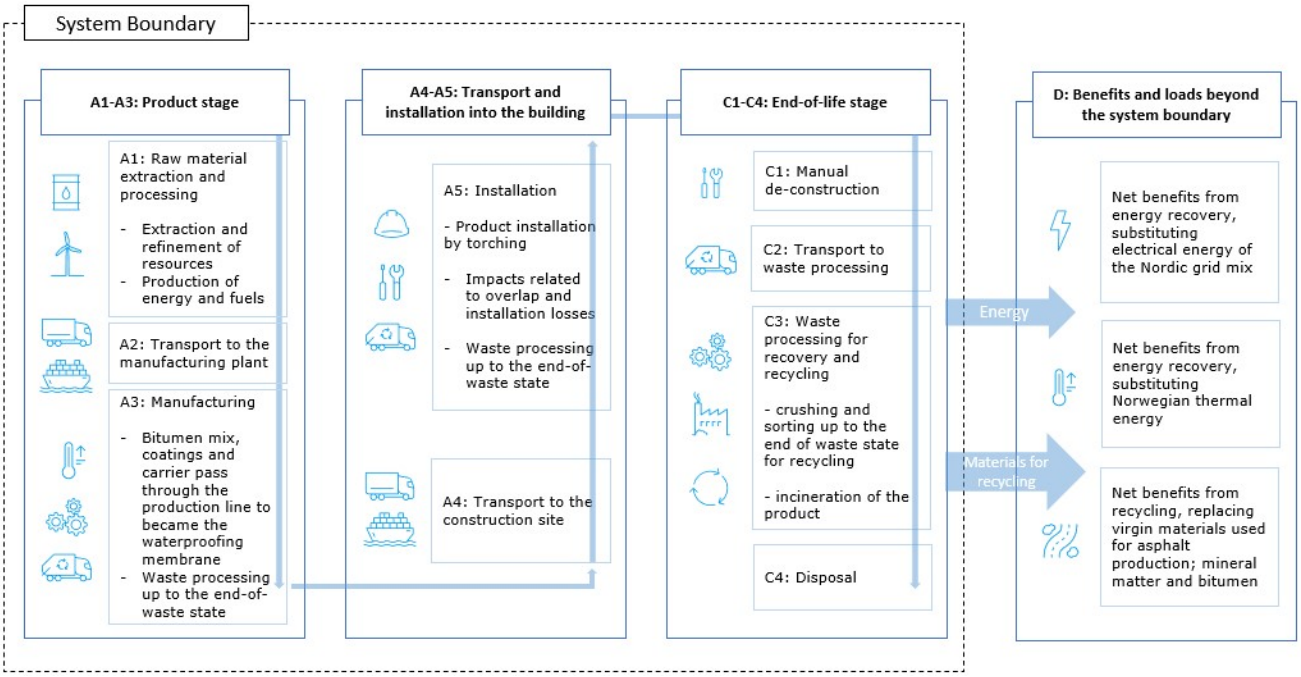
Functional unit (FU) / declared unit (DU): 1 m^2 of produced roof waterproofing at the factory gate.

Time representativeness: The data represents the year 2022.

Database(s) and LCA software used: Sphera Professional database 2023, Ecoinvent 3.9.1;
LCA for Experts, Version 10.7.1.28. The EN15804 reference package based on EF 3.1 has been used.

Description of system boundaries:
Cradle to gate with options, modules C1–C4, module D and with optional modules A4–A5.

System diagram:



The thousand separator and decimal mark in this EPD follow French version of SI style: 1 234,56 (number with six significant figures is shown for illustrative purpose only).

More information:

Cut-off rules:

No known inflows were left out of the study. Infrastructure and capital goods are included in chosen datasets from ecoinvent database 3.9.1 as a background data and they are not included in the datasets from Professional database 2023. Transportation of personnel to the plant, transportation of personnel within the plant and research and development activities is excluded.

Data quality:

The data for the A1-A3 module for the manufacturing of the product is specific data provided by Katepal Oy and is representative for the manufacturing site in Lempäälä, Finland. The selection of background data has been made to represent this specific site/region and the origin of the sourced materials. The data quality for foreground data and background data corresponds to the specifications of EN 15804.

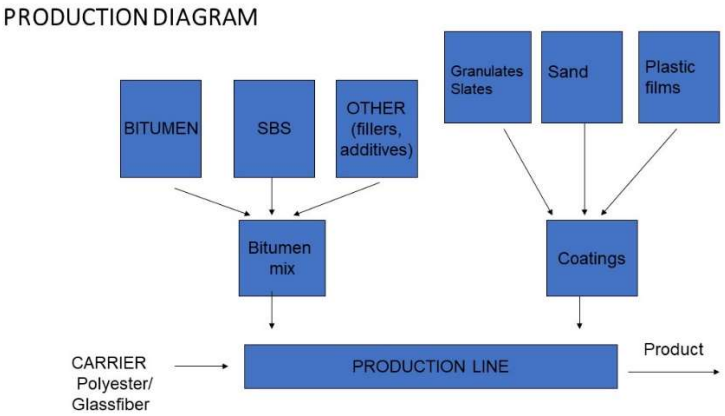
Allocation:

Allocation has been avoided when possible. For those cases where allocation is needed, allocation criteria is based on mass. The polluter pays and modularity principles have been followed.
Katepal K-MS 170/4000 Green is produced at the production site at Lempäälä, Finland, which has provided site specific data on energy and material use to produce Katepal K-MS 170/4000 Green. Materials inputs are taken from the product recipe. Allocation on energy, water usage and packaging has been performed based on mass.

Product stage, A1-A3:

The A1-A3 module includes the upstream processes of extraction and processing of raw materials and their packaging and the transportation of the input materials, including packaging, to the production site in Lempäälä, Finland. Furthermore, it includes the core processes in Lempäälä of manufacturing the Katepal K-MS 170/4000 Green, including the end-of-life treatment of waste generated from the manufacturing and packaging of the raw materials, as well as impacts from extraction and processing of fuels used, and their transportation to the production site. The module also includes the production of purchased electricity, natural gas, LPG and water used at the production site in the manufacturing. The purchased electricity consists of 100 % wind power certified with Guarantees of Origin.

The production scheme for Katepal K-MS 170/4000 Green:



Construction process stage, A4-A5:

The main market for the Katepal K-MS 170/4000 Green is in Nordic countries. The transportation of Katepal K-MS 170/4000 Green to the target markets is done by both ferry and truck. The distance to storage locations has been calculated based on internal statistics. A distance of 300 km has been added to the truck distance to cover the distance to the construction site.

A4 Transport

Scenario information	Unit	Quantity
Diesel	kg/DU	0,070
Heavy fuel oil	kg/DU	0,002
Distance, truck	km	673
Distance, ferry	km	199
Capacity utilisation	%	61
Bulk density of transported products	kg/m^3	1278
Volume capacity utilisation factor	Not applicable	1,00

Installation of Katepal K-MS 170/4000 Green is done by torching as the most common used practice. Torching is done by propane torch burner to attach the membrane to the roofing system. The installation requires an overlap between membrane sheets to ensure the waterproofing of whole roofing system. Installation losses equal to 0,5% of the product weight have been estimated based on the common practice of waterproofing membranes installation. Katepal K-MS 170/4000 Green is sent to the construction site in packaging consisting of wooden pallet, carboard roll, polypropylene tapes, bands and polyethylene shrink hood. Wooden pallet and installation losses are sent to incineration, while cardboard rolls and plastics (PE, PP) are sent to recycling.

A5 Construction installation

Scenario information	Unit	Quantity
Overlap	m^2/DU	0,1
Water use	m^3/DU	Unknown
Propane for torching	kg/DU	0,15
Energy use	MJ/DU	Unknown
Waste materials (product, packaging, installation losses)	kg/DU	0,32
Waste to incineration	kg/DU	0,28
Waste to recycling	kg/DU	0,05
Direct emissions to ambient air, soil and water	kg/DU	Unknown

End-of-life, C1-C4:
In module C1, the deconstruction of the waterproofing sheet was assumed to be done manually. Thus, no processes with environmental impacts are recorded in this module.

Module C2 includes the transport between the construction site and a waste management plant. A distance of 100 km was assumed both for transport to recycling and incineration plants. The transportation is done with a diesel driven truck.

Module C3 consists of waste processing steps until the waste product reach the end of waste state. In this EPD results for an additional scenario are included for waste treatment. Baseline consists of 70% recycling and 30% incineration, while the alternative scenario represents 100% recycling of the product at end-of-life. The burden from pre-recycling processes such as crushing and sorting is reported in module C3 as these processes are identified to occur before the product reach the end of waste state. The burden from the incineration process in the baseline scenario is included in module C3 as the incineration is carried with energy recovery. Benefits from electricity and heat generation are transferred to module D and declared there.

No environmental impact is reported in module C4 since none of the analysed products are deposited in a landfill.

End-of-life

Scenario information	Unit	Quantity
Collection specified by type	kg collected separately/DU	4,36E+00
	kg collected with mixed waste/DU	-
Recovery system specified by type	kg for re-use/DU	-
	kg for recycling, baseline scenario/DU	3,05E+00
	kg for recycling, alternative scenario/DU	4,36E+00
	kg for energy recovery/DU	1,31E+00
Disposal specified by type	kg for final deposition/DU	-
Assumptions for transportation	The distance of 100 km was assumed both for transport to recycling and incineration plants	

Resource recovery stage, D:
In general, module D includes reuse, recovery and/or recycling potential, expressed as net impact and benefits. In this case, the module D includes the benefits generated by avoiding usage of raw materials in asphalt production and credits from incineration with energy recovery.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End-of-life stage				Resource recovery stage
	Raw material supply	*Transport*	*Manufacturing*	*Transport*	*Construction installation*	*Use*	*Maintenance*	*Repair*	*Replacement*	*Refurbishment*	*Operational energy use*	*Operational water use*	*De-construction demolition*	*Transport*	*Waste processing*	*Disposal*	*Reuse-Recovery-Recycling-potential*
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	x
Geography	FI, SE, ES, TR, DE	FI, SE, ES, TR, DE	FI	FI, DK, NO, SE	FI, DK, NO, SE	-	-	-	-	-	-	-	FI, DK, NO, SE	FI, DK, NO, SE	FI, DK, NO, SE	FI, DK, NO, SE	FI, DK, NO, SE
Specific data used	42%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Confidential

Content information

Product components/DU	Weight, kg	Post consumer recycled material, weight-% of declared unit	Biogenic material, weight-% of declared unit	Biogenic material, kg C per declared unit
Bitumen mix	1,9	2%	2%	0,062
Minerals; fillers and coatings	1,9	0%	0%	0,000
Polyester reinforcement, polypropylene film	0,2	3%	0%	0,000
TOTAL	**4,0**	**3%**	**2%**	**0,062**

Packaging materials/DU	Weight, kg	Post consumer recycled material, weight-% of declared unit	Biogenic material, weight-% of declared unit	Biogenic material, kg C per declared unit
Polypropylene tapes and bands	0,0019	0%	0%	0,000
Polyethylene film	0,005	0%	0%	0,000
Wooden pallet	0,072	0%	20%	0,031
Cardboard rolls	0,03	28%	12%	0,013
TOTAL	**0,109**	**28%**	**32%**	**0,044**

The product does not, independent of site, contain any of the substances listed on the "Candidate List of Substances of Very High Concern (SVHC) for authorisation". (http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp).

Packaging

Distribution packaging: Wooden pallet, polyethylene shrink hood, polypropylene bands.
Consumer packaging: Cardboard roll inside the product roll, polypropylene taped around the roll.

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product:
77% of PET used in the reinforcement material is stated as 100% recycled.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Mandatory disclaimer: It is not advised to use the results of modules A1-A3 without considering the results of module C.

Mandatory impact category indicators according to EN 15804

Results per 1 m^2 K-MS 170/4000 Green									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	1,40E+00	2,53E-01	6,77E-01	0,00E+00	3,89E-02	2,10E+00	0,00E+00	-1,38E+00
GWP-fossil	kg CO_2 eq.	1,38E+00	2,50E-01	5,50E-01	0,00E+00	3,85E-02	1,92E+00	0,00E+00	-1,38E+00
GWP-biogenic	kg CO_2 eq.	-1,75E-01	5,61E-04	9,76E-02	0,00E+00	8,81E-05	1,77E-01	0,00E+00	-5,44E-03
GWP-luluc	kg CO_2 eq.	1,96E-01	2,27E-03	2,97E-02	0,00E+00	3,61E-04	5,79E-05	0,00E+00	-4,23E-04
ODP	kg CFC 11 eq.	6,37E-08	3,24E-14	1,12E-08	0,00E+00	5,07E-15	1,01E-08	0,00E+00	-3,79E-12
AP	mol H^+ eq.	6,90E-03	1,49E-03	1,50E-03	0,00E+00	2,07E-04	1,44E-03	0,00E+00	-3,21E-03
EP-freshwater	kg P eq.	2,11E-04	8,97E-07	3,50E-05	0,00E+00	1,42E-07	1,62E-05	0,00E+00	-1,92E-06
EP-marine	kg N eq.	3,03E-03	6,94E-04	6,31E-04	0,00E+00	9,97E-05	4,83E-04	0,00E+00	-7,66E-04
EP-terrestrial	mol N eq.	2,23E-02	7,71E-03	5,24E-03	0,00E+00	1,11E-03	4,71E-03	0,00E+00	-8,34E-03
POCP	kg NMVOC eq.	5,94E-03	1,42E-03	1,31E-03	0,00E+00	1,96E-04	1,32E-03	0,00E+00	-2,64E-03
ADP-minerals&metals*	kg Sb eq.	3,73E-07	1,63E-08	1,26E-07	0,00E+00	2,58E-09	2,57E-07	0,00E+00	-1,01E-07
ADP-fossil*	MJ	9,81E+01	3,43E+00	1,58E+01	0,00E+00	5,30E-01	1,32E+00	0,00E+00	-6,45E+01
WDP*	m^3	3,39E-01	2,97E-03	7,65E-02	0,00E+00	4,70E-04	7,18E-02	0,00E+00	-5,98E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per 1 m^2 K-MS 170/4000 Green									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO_2 eq.	1,58E+00	2,51E-01	5,80E-01	0,00E+00	3,86E-02	1,92E+00	0,00E+00	-1,38E+00

Resource use indicators

Results per 1 m^2 K-MS 170/4000 Green									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4,58E+00	2,43E-01	2,23E+00	0,00E+00	3,86E-02	5,90E+00	0,00E+00	-7,52E+00
PERM	MJ	6,60E+00	0,00E+00	-7,66E-01	0,00E+00	0,00E+00	-5,83E+00	0,00E+00	-4,08E+00
PERT	MJ	1,12E+01	2,43E-01	1,47E+00	0,00E+00	3,86E-02	6,86E-02	0,00E+00	-1,16E+01
PENRE	MJ	1,55E+01	3,45E+00	4,01E+00	0,00E+00	5,32E-01	9,01E+01	0,00E+00	-6,46E+01
PENRM	MJ	8,10E+01	0,00E+00	7,76E+00	0,00E+00	0,00E+00	-8,87E+01	0,00E+00	-6,21E+01
PENRT	MJ	9,65E+01	3,45E+00	1,18E+01	0,00E+00	5,32E-01	1,32E+00	0,00E+00	-1,27E+02
SM	kg	1,26E-01	0,00E+00	1,89E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
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
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
FW	m^3	5,87E-03	2,66E-04	1,51E-03	0,00E+00	4,23E-05	1,70E-03	0,00E+00	-6,76E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Waste indicators

Results per 1 m² K-MS 170/4000 Green									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,11E-02	1,07E-11	1,67E-03	0,00E+00	1,65E-12	-7,14E-12	0,00E+00	6,42E-10
Non-hazardous waste disposed	kg	9,54E-02	5,19E-04	1,69E-02	0,00E+00	8,12E-05	4,31E-05	0,00E+00	-2,04E-02
Radioactive waste disposed	kg	9,62E-04	6,38E-06	1,47E-04	0,00E+00	9,96E-07	7,41E-06	0,00E+00	-1,86E-03

Output flow indicators

Results per 1 m² K-MS 170/4000 Green									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	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
Material for recycling	kg	3,15E-02	0,00E+00	5,25E-02	0,00E+00	0,00E+00	3,05E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	2,23E-02	0,00E+00	2,79E-01	0,00E+00	0,00E+00	1,31E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	6,58E-02	0,00E+00	9,52E-01	0,00E+00	0,00E+00	5,06E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	5,09E-01	0,00E+00	1,88E+00	0,00E+00	0,00E+00	9,83E+00	0,00E+00	0,00E+00

Additional LCA results for the scenario 100% recycling

The additional LCA results are based on the same methods and principles as main LCA including geographical scope, declared unit, time representativeness, databases and LCA software used as well as assumptions behind cut-off and allocation. System boundaries and declared modules remains the same, the difference is the assumed waste treatment in module C3. The additional LCA results below present the results for alternative scenario of 100% recycling of the product at the end of life in module C3. The burden from pre-recycling processes such as crushing and sorting is reported in module C3 as these processes are identified to occur before the product reach the end of waste state.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Mandatory disclaimer: It is not advised to use the results of modules A1-A3 without considering the results of module C.

Mandatory impact category indicators according to EN 15804

Results per 1 m^2 K-MS GREEN 170 4000									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	1,40E+00	2,53E-01	6,77E-01	0,00E+00	3,89E-02	2,88E-01	0,00E+00	-7,95E-01
GWP-fossil	kg CO_2 eq.	1,38E+00	2,50E-01	5,50E-01	0,00E+00	3,85E-02	5,80E-02	0,00E+00	-7,89E-01
GWP-biogenic	kg CO_2 eq.	-1,75E-01	5,61E-04	9,76E-02	0,00E+00	8,81E-05	2,30E-01	0,00E+00	-5,30E-03
GWP-luluc	kg CO_2 eq.	1,96E-01	2,27E-03	2,97E-02	0,00E+00	3,61E-04	7,46E-06	0,00E+00	-5,23E-04
ODP	kg CFC 11 eq.	6,37E-08	3,24E-14	1,12E-08	0,00E+00	5,07E-15	1,18E-09	0,00E+00	-2,24E-12
AP	mol H^+ eq.	6,90E-03	1,49E-03	1,50E-03	0,00E+00	2,07E-04	5,04E-04	0,00E+00	-3,20E-03
EP-freshwater	kg P eq.	2,11E-04	8,97E-07	3,50E-05	0,00E+00	1,42E-07	2,70E-06	0,00E+00	-1,29E-06
EP-marine	kg N eq.	3,03E-03	6,94E-04	6,31E-04	0,00E+00	9,97E-05	2,33E-04	0,00E+00	-7,20E-04
EP-terrestrial	mol N eq.	2,23E-02	7,71E-03	5,24E-03	0,00E+00	1,11E-03	2,52E-03	0,00E+00	-7,93E-03
POCP	kg NMVOC eq.	5,94E-03	1,42E-03	1,31E-03	0,00E+00	1,96E-04	7,60E-04	0,00E+00	-2,72E-03
ADP-minerals&metals*	kg Sb eq.	2,76E-06	1,62E-08	4,82E-07	0,00E+00	2,56E-09	2,71E-08	0,00E+00	-7,36E-08
ADP-fossil*	MJ	9,81E+01	3,43E+00	1,58E+01	0,00E+00	5,30E-01	7,80E-01	0,00E+00	-6,82E+01
WDP*	m^3	3,39E-01	2,97E-03	7,65E-02	0,00E+00	4,70E-04	2,95E-03	0,00E+00	-4,06E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per 1 m² K-MS 170/4000 Green									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG[2]	kg CO_2 eq.	1,58E+00	2,51E-01	5,80E-01	0,00E+00	3,86E-02	5,80E-02	0,00E+00	-7,95E-01

Resource use indicators

Results per 1 m² K-MS 170/4000 Green									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4,58E+00	2,43E-01	2,23E+00	0,00E+00	3,86E-02	5,88E+00	0,00E+00	-1,61E+00
PERM	MJ	6,60E+00	0,00E+00	-7,66E-01	0,00E+00	0,00E+00	-5,83E+00	0,00E+00	-5,83E+00
PERT	MJ	1,12E+01	2,43E-01	1,47E+00	0,00E+00	3,86E-02	5,00E-02	0,00E+00	-7,44E+00
PENRE	MJ	1,55E+01	3,45E+00	4,01E+00	0,00E+00	5,32E-01	8,95E+01	0,00E+00	-6,83E+01
PENRM	MJ	8,10E+01	0,00E+00	7,76E+00	0,00E+00	0,00E+00	-8,87E+01	0,00E+00	-8,87E+01
PENRT	MJ	9,65E+01	3,45E+00	1,18E+01	0,00E+00	5,32E-01	7,80E-01	0,00E+00	-1,57E+02
SM	kg	1,26E-01	0,00E+00	1,89E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
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
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
FW	m^3	5,87E-03	2,66E-04	1,51E-03	0,00E+00	4,23E-05	1,01E-04	0,00E+00	-1,74E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

[2] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Waste indicators

Results per 1 m² K-MS 170/4000 Green									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,11E-02	1,07E-11	1,67E-03	0,00E+00	1,65E-12	-1,02E-11	0,00E+00	-2,86E-10
Non-hazardous waste disposed	kg	9,54E-02	5,19E-04	1,69E-02	0,00E+00	8,12E-05	6,16E-05	0,00E+00	-1,40E-02
Radioactive waste disposed	kg	9,62E-04	6,38E-06	1,47E-04	0,00E+00	9,96E-07	1,06E-05	0,00E+00	-4,39E-04

Output flow indicators

Results per 1 m² K-MS 170/4000 Green									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	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
Material for recycling	kg	3,15E-02	0,00E+00	5,25E-02	0,00E+00	0,00E+00	4,36E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	2,23E-02	0,00E+00	2,79E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	6,58E-02	0,00E+00	9,52E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	5,09E-01	0,00E+00	1,88E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Additional environmental information

Katepal's two-layer waterproofing system has a technical service life of 50 years. Technical service life is based on the studies and lifetime evaluations for SBS-modified bitumen membranes conducted by Finnish Roofing Association. The evaluations are based on visual inspection of the roofs, discussions with the owners of the buildings and laboratory tests made for specimens taken from the roofs. These evaluations have been implemented as group studies among different materials from different manufacturers. Katepal products have been investigated in these group studies for a long time, the first studies performed in 1988.

The technical service life is applicable in Northern Europe including Finland, Norway, Sweden, Denmark, and Baltic countries, which are located in the Northern temperate belt where studies and evaluations have been conducted. The Northern temperate belt includes temperate costal climate and temperate continental climate.

Electricity information

Type of information	Description
Location	Electricity production, wind power, technology mix onshore and offshore
Geographical representativeness	Finland
Reference year	2019
Source	Professional database 2023
GWP-GHG (kg CO2e/kWh)	0,01

References

- General Programme Instructions of the International EPD® System. Version 4.0.
- PCR 2019:14. Construction products and construction services, version 1.3.3.
- EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
- ISO 14025 on Type III Environmental declarations.
- ISO 14040 and ISO 14044 on Life Cycle Assessments (LCA).
- Arushanyan, Y., Dziubanii, K., Mousavi, M., Rönnblom, A., Silfverstrand, N. Underlying LCA for Environmental Product Declaration EPD® - Nine products for roof waterproofing. Top layer PF 5500 Grey and Black, Top layer K-PS 170/5000, Top layer K-PS 170/5000 Green, Underlay PF 3200, Underlay K-TMS 170/3300, Underlay K-TMS 170/3300 Green, Underlay K-MS 170/4000, Underlay K-MS 170/4000 Green, One Layer Tupla Green. Ramboll, 202