



Environmental Product Declaration

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

Katepal K-PS 170/5000

from

Katepal Oy

| | |
|---------------------------------|---|
| Programme: | The International EPD® System, www.environdec.com |
| Programme operator: | EPD International AB |
| EPD registration number: | S-P-02982 |
| Publication date: | 2024-05-07 |
| Valid until: | 2029-05-07 |

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.strippl@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-PS 170/5000

Product identification: K-PS 170/5000

Product description: K-PS 170/5000 is a bitumen membrane for roof waterproofing. It is used as a top sheet for multi-layer applications for all kinds of roofs and buildings. Katepal K-PS 170/5000 is installed by fully torching with 10 cm overlapping of the product. The product is made of SBS- modified bitumen and reinforced with a polyester non-woven. Upper surface of the product is covered with slate excluding the torch on edge. Bottom surface is covered with torch-on bitumen and thermofusible film. A 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-PS 170/5000 | Amount | Unit |
|---------------------------|--------|--------------------|
| Declared unit | 1 | m ² |
| Weight | 4,869 | kg/m ² |
| Conversion factor to 1 kg | 0,205 | m ² /kg |



LCA information

Functional unit (FU)/ declared unit (DU): 1 m² of produced roof waterproofing at the factory gate.

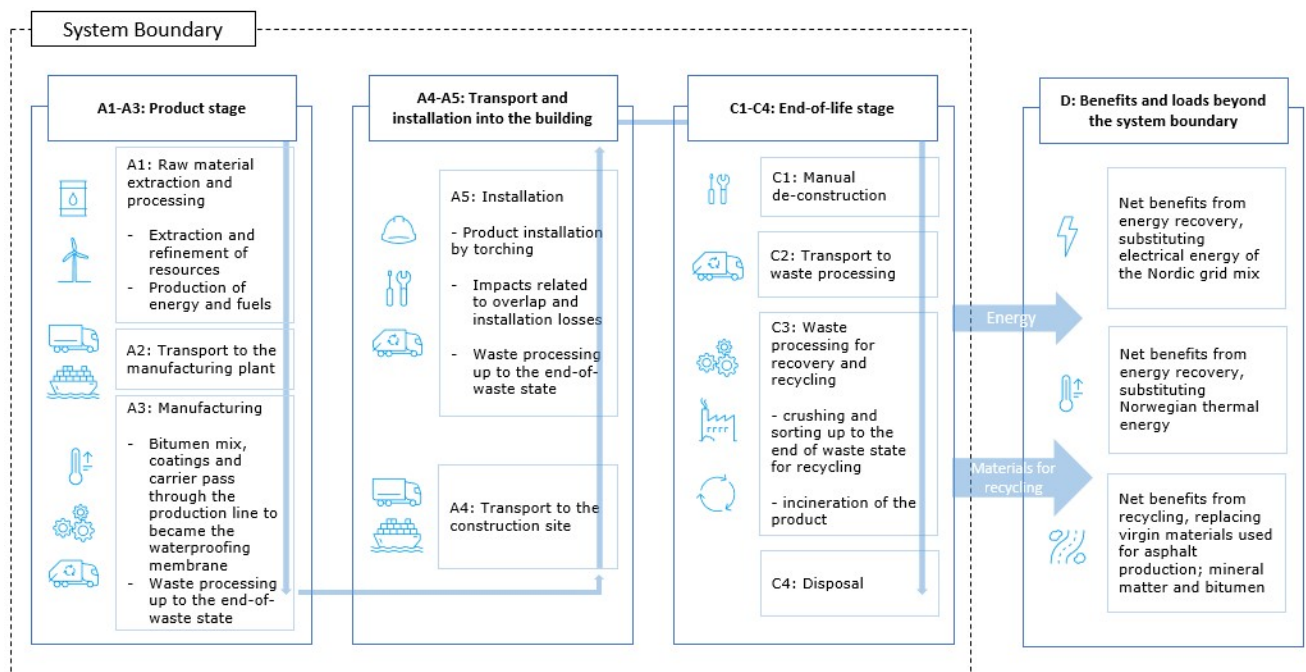
Time representativeness: The data represents the year 2022.

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.

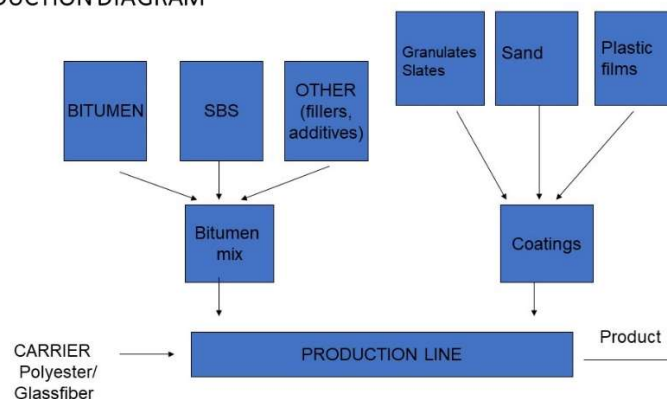
Katepal K-PS 170/5000 is produced at the production site at Lempäälä, Finland, which has provided site specific data on energy and material use to produce Katepal K-PS 170/5000. Materials inputs are taken from the product recipe. Allocation on energy, water usage and packaging has been performed based 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-PS 170/5000, 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-PS 170/5000:

PRODUCTION DIAGRAM



Construction process stage, A4-A5:

The main market for the Katepal K-PS 170/5000 is in Nordic countries. The transportation of Katepal K-PS 170/5000 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 | 0,086 |
| Heavy fuel oil | kg/DU | 0,003 |
| Distance, truck | km | 673 |
| Distance, ferry | km | 199 |
| Capacity utilisations | % | 61 |
| Bulk density of transported products | kg/m ³ | 1281 |
| Volume capacity utilisation factor | Not applicable | 1,00 |

Installation of Katepal K-PS 170/5000 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-PS 170/5000 is sent to the construction site in packaging consisting of wooden pallet, cardboard 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 | 0,41 |
| Waste to incineration | kg/DU | 0,35 |
| Waste to recycling | kg/DU | 0,06 |
| 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 products 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 products 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 | 5,36E+00 |
| | kg collected with mixed waste/DU | - |
| Recovery system specified by type | kg for re-use/DU | - |
| | kg for recycling, baseline scenario/DU | 3,75E+00 |
| | kg for recycling, alternative scenario/DU | 1,61E+00 |
| | kg for energy recovery/DU | 5,36E+00 |
| Disposal specified by type | kg for final deposition/DU | - |
| Assumptions for transportation | A 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 |
|----------------------|----------------------------|--------------------|----------------------|----------------------------|----------------------------------|------------|--------------------|---------------|--------------------|----------------------|-------------------------------|------------------------------|-----------------------------------|------------------|-------------------------|-----------------|---|
| | <i>Raw material supply</i> | <i>Transport</i> | <i>Manufacturing</i> | <i>Transport</i> | <i>Construction installation</i> | <i>Use</i> | <i>Maintenance</i> | <i>Repair</i> | <i>Replacement</i> | <i>Refurbishment</i> | <i>Operational energy use</i> | <i>Operational water use</i> | <i>De-construction demolition</i> | <i>Transport</i> | <i>Waste processing</i> | <i>Disposal</i> | <i>Reuse-Recovery-Recycling-potential</i> |
| 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 | 45% | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – products | 0% | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation – sites | 0% | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

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 | 0% | 0% | 0 |
| Minerals; fillers and coatings | 2,8 | 0% | 0% | 0 |
| Polyester reinforcement, polypropylene film | 0,2 | 2,5% | 0% | 0 |
| TOTAL | 4,9 | 2,5% | 0% | 0 |

| 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 | 0,002 | 0% | 0% | 0,000 |
| Polyethylene film | 0,006 | 0% | 0% | 0,000 |
| Wooden pallet | 0,1 | 0% | 28% | 0,044 |
| Cardboard rolls | 0,038 | 26% | 11% | 0,016 |
| TOTAL | 0,146 | 26% | 40% | 0,060 |

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-PS 170/5000 | | | | | | | | | |
|--|---|-----------|----------|----------|----------|----------|----------|----------|-----------|
| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| GWP-total | kg CO ₂ eq. | 1,59E+00 | 3,12E-01 | 8,55E-01 | 0,00E+00 | 4,78E-02 | 2,55E+00 | 0,00E+00 | -1,70E+00 |
| GWP-fossil | kg CO ₂ eq. | 1,56E+00 | 3,08E-01 | 6,81E-01 | 0,00E+00 | 4,73E-02 | 2,55E+00 | 0,00E+00 | -1,69E+00 |
| GWP-biogenic | kg CO ₂ eq. | -1,63E-01 | 6,91E-04 | 1,44E-01 | 0,00E+00 | 1,08E-04 | 1,13E-04 | 0,00E+00 | -6,69E-03 |
| GWP-luluc | kg CO ₂ eq. | 1,97E-01 | 2,79E-03 | 3,00E-02 | 0,00E+00 | 4,43E-04 | 7,11E-05 | 0,00E+00 | -5,20E-04 |
| ODP | kg CFC 11 eq. | 6,94E-08 | 3,99E-14 | 1,24E-08 | 0,00E+00 | 6,23E-15 | 1,24E-08 | 0,00E+00 | -4,65E-12 |
| AP | mol H ⁺ eq. | 7,54E-03 | 1,84E-03 | 1,69E-03 | 0,00E+00 | 2,55E-04 | 1,77E-03 | 0,00E+00 | -3,95E-03 |
| EP-freshwater | kg P eq. | 2,03E-04 | 1,10E-06 | 3,44E-05 | 0,00E+00 | 1,75E-07 | 1,99E-05 | 0,00E+00 | -2,36E-06 |
| EP-marine | kg N eq. | 3,54E-03 | 8,55E-04 | 7,48E-04 | 0,00E+00 | 1,23E-04 | 5,93E-04 | 0,00E+00 | -9,41E-04 |
| EP-terrestrial | mol N eq. | 2,53E-02 | 9,50E-03 | 6,12E-03 | 0,00E+00 | 1,36E-03 | 5,79E-03 | 0,00E+00 | -1,03E-02 |
| POCP | kg NMVOC eq. | 6,77E-03 | 1,75E-03 | 1,52E-03 | 0,00E+00 | 2,41E-04 | 1,62E-03 | 0,00E+00 | -3,24E-03 |
| ADP-minerals&metals* | kg Sb eq. | 3,17E-07 | 2,01E-08 | 1,27E-07 | 0,00E+00 | 3,17E-09 | 3,16E-07 | 0,00E+00 | -1,24E-07 |
| ADP-fossil* | MJ | 1,03E+02 | 4,23E+00 | 1,67E+01 | 0,00E+00 | 6,52E-01 | 1,62E+00 | 0,00E+00 | -7,93E+01 |
| WDP* | m ³ | 3,49E-01 | 3,66E-03 | 8,59E-02 | 0,00E+00 | 5,78E-04 | 8,83E-02 | 0,00E+00 | -7,34E-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-PS 170/5000 | | | | | | | | | |
|--|------------------------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| GWP-GHG ¹ | kg CO ₂ eq. | 1,75E+00 | 3,09E-01 | 7,11E-01 | 0,00E+00 | 4,74E-02 | 2,55E+00 | 0,00E+00 | -1,70E+00 |

Resource use indicators

| Results per 1 m ² K-PS 170/5000 | | | | | | | | | |
|--|---|----------|----------|-----------|----------|----------|-----------|----------|-----------|
| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| PERE | MJ | 3,80E+00 | 2,99E-01 | 2,71E+00 | 0,00E+00 | 4,74E-02 | 8,43E-02 | 0,00E+00 | -9,24E+00 |
| PERM | MJ | 1,80E+00 | 0,00E+00 | -1,80E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PERT | MJ | 5,60E+00 | 2,99E-01 | 9,09E-01 | 0,00E+00 | 4,74E-02 | 8,43E-02 | 0,00E+00 | -9,24E+00 |
| PENRE | MJ | 1,66E+01 | 4,25E+00 | 4,45E+00 | 0,00E+00 | 6,54E-01 | 9,30E+01 | 0,00E+00 | -7,94E+01 |
| PENRM | MJ | 8,34E+01 | 0,00E+00 | 7,95E+00 | 0,00E+00 | 0,00E+00 | -9,14E+01 | 0,00E+00 | -6,40E+01 |
| PENRT | MJ | 1,00E+02 | 4,25E+00 | 1,24E+01 | 0,00E+00 | 6,54E-01 | 1,62E+00 | 0,00E+00 | -1,43E+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 | 1,43E-06 | 0,00E+00 | 2,15E-07 | 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 | 6,89E-03 | 3,28E-04 | 1,86E-03 | 0,00E+00 | 5,19E-05 | 2,08E-03 | 0,00E+00 | -8,31E-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 resources; 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 CO₂ is set to zero.

Waste indicators

| Results per 1 m ² K-PS 170/5000 | | | | | | | | | |
|--|------|----------|----------|----------|----------|----------|-----------|----------|-----------|
| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| Hazardous waste disposed | kg | 1,18E-02 | 1,32E-11 | 1,77E-03 | 0,00E+00 | 2,03E-12 | -8,77E-12 | 0,00E+00 | 7,89E-10 |
| Non-hazardous waste disposed | kg | 9,59E-02 | 6,40E-04 | 1,79E-02 | 0,00E+00 | 9,97E-05 | 5,30E-05 | 0,00E+00 | -2,51E-02 |
| Radioactive waste disposed | kg | 1,01E-03 | 7,86E-06 | 1,55E-04 | 0,00E+00 | 1,22E-06 | 9,10E-06 | 0,00E+00 | -2,29E-03 |

Output flow indicators

| Results per 1 m ² K-PS 170/5000 | | | | | | | | | |
|--|------|----------|----------|----------|----------|----------|----------|----------|----------|
| 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 | 5,63E-02 | 0,00E+00 | 6,91E-02 | 0,00E+00 | 0,00E+00 | 3,75E+00 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg | 2,13E-02 | 0,00E+00 | 3,54E-01 | 0,00E+00 | 0,00E+00 | 1,61E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, electricity | MJ | 6,43E-02 | 0,00E+00 | 1,19E+00 | 0,00E+00 | 0,00E+00 | 6,22E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, thermal | MJ | 4,82E-01 | 0,00E+00 | 2,34E+00 | 0,00E+00 | 0,00E+00 | 1,21E+01 | 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-PS 170/5000 | | | | | | | | | |
|--|---|-----------|----------|----------|----------|----------|----------|----------|-----------|
| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| GWP-total | kg CO ₂ eq. | 1,59E+00 | 3,12E-01 | 8,55E-01 | 0,00E+00 | 4,78E-02 | 7,13E-02 | 0,00E+00 | -9,77E-01 |
| GWP-fossil | kg CO ₂ eq. | 1,56E+00 | 3,08E-01 | 6,81E-01 | 0,00E+00 | 4,73E-02 | 7,12E-02 | 0,00E+00 | -9,70E-01 |
| GWP-biogenic | kg CO ₂ eq. | -1,63E-01 | 6,91E-04 | 1,44E-01 | 0,00E+00 | 1,08E-04 | 4,53E-05 | 0,00E+00 | -6,51E-03 |
| GWP-luluc | kg CO ₂ eq. | 1,97E-01 | 2,79E-03 | 3,00E-02 | 0,00E+00 | 4,43E-04 | 9,17E-06 | 0,00E+00 | -6,43E-04 |
| ODP | kg CFC 11 eq. | 6,94E-08 | 3,99E-14 | 1,24E-08 | 0,00E+00 | 6,23E-15 | 1,45E-09 | 0,00E+00 | -2,75E-12 |
| AP | mol H ⁺ eq. | 7,54E-03 | 1,84E-03 | 1,69E-03 | 0,00E+00 | 2,55E-04 | 6,19E-04 | 0,00E+00 | -3,94E-03 |
| EP-freshwater | kg P eq. | 2,03E-04 | 1,10E-06 | 3,44E-05 | 0,00E+00 | 1,75E-07 | 3,32E-06 | 0,00E+00 | -1,59E-06 |
| EP-marine | kg N eq. | 3,54E-03 | 8,55E-04 | 7,48E-04 | 0,00E+00 | 1,23E-04 | 2,86E-04 | 0,00E+00 | -8,85E-04 |
| EP-terrestrial | mol N eq. | 2,53E-02 | 9,50E-03 | 6,12E-03 | 0,00E+00 | 1,36E-03 | 3,10E-03 | 0,00E+00 | -9,75E-03 |
| POCP | kg NMVOC eq. | 6,77E-03 | 1,75E-03 | 1,52E-03 | 0,00E+00 | 2,41E-04 | 9,34E-04 | 0,00E+00 | -3,34E-03 |
| ADP-minerals&metals* | kg Sb eq. | 2,79E-06 | 1,99E-08 | 4,96E-07 | 0,00E+00 | 3,15E-09 | 3,33E-08 | 0,00E+00 | -9,04E-08 |
| ADP-fossil* | MJ | 1,03E+02 | 4,23E+00 | 1,67E+01 | 0,00E+00 | 6,52E-01 | 9,58E-01 | 0,00E+00 | -8,38E+01 |
| WDP* | m ³ | 3,49E-01 | 3,66E-03 | 8,59E-02 | 0,00E+00 | 5,78E-04 | 3,62E-03 | 0,00E+00 | -4,99E-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-PS 170/5000 | | | | | | | | | |
|--|------------------------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| GWP-GHG ² | kg CO ₂ eq. | 1,75E+00 | 3,09E-01 | 7,11E-01 | 0,00E+00 | 4,74E-02 | 7,13E-02 | 0,00E+00 | -9,77E-01 |

Resource use indicators

| Results per 1 m ² K-PS 170/5000 | | | | | | | | | |
|--|--|----------|----------|-----------|----------|----------|-----------|----------|-----------|
| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| PERE | MJ | 3,80E+00 | 2,99E-01 | 2,71E+00 | 0,00E+00 | 4,74E-02 | 6,14E-02 | 0,00E+00 | -1,98E+00 |
| PERM | MJ | 1,80E+00 | 0,00E+00 | -1,80E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| PERT | MJ | 5,60E+00 | 2,99E-01 | 9,09E-01 | 0,00E+00 | 4,74E-02 | 6,14E-02 | 0,00E+00 | -1,98E+00 |
| PENRE | MJ | 1,66E+01 | 4,25E+00 | 4,45E+00 | 0,00E+00 | 6,54E-01 | 9,23E+01 | 0,00E+00 | -8,40E+01 |
| PENRM | MJ | 8,34E+01 | 0,00E+00 | 7,95E+00 | 0,00E+00 | 0,00E+00 | -9,14E+01 | 0,00E+00 | -9,14E+01 |
| PENRT | MJ | 1,00E+02 | 4,25E+00 | 1,24E+01 | 0,00E+00 | 6,54E-01 | 9,59E-01 | 0,00E+00 | -1,75E+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 | 1,43E-06 | 0,00E+00 | 2,15E-07 | 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 | 6,89E-03 | 3,28E-04 | 1,86E-03 | 0,00E+00 | 5,19E-05 | 1,24E-04 | 0,00E+00 | -2,14E-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 CO₂ is set to zero.

Waste indicators

| Results per 1 m ² K-PS 170/5000 | | | | | | | | | |
|--|------|----------|----------|----------|----------|----------|-----------|----------|-----------|
| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
| Hazardous waste disposed | kg | 1,18E-02 | 1,32E-11 | 1,77E-03 | 0,00E+00 | 2,03E-12 | -1,25E-11 | 0,00E+00 | -3,52E-10 |
| Non-hazardous waste disposed | kg | 9,59E-02 | 6,40E-04 | 1,79E-02 | 0,00E+00 | 9,97E-05 | 7,56E-05 | 0,00E+00 | -1,72E-02 |
| Radioactive waste disposed | kg | 1,01E-03 | 7,86E-06 | 1,55E-04 | 0,00E+00 | 1,22E-06 | 1,30E-05 | 0,00E+00 | -5,40E-04 |

Output flow indicators

| Results per 1 m ² K-PS 170/5000 | | | | | | | | | |
|--|------|----------|----------|----------|----------|----------|----------|----------|----------|
| 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 | 5,63E-02 | 0,00E+00 | 6,91E-02 | 0,00E+00 | 0,00E+00 | 5,36E+00 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg | 2,13E-02 | 0,00E+00 | 3,54E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, electricity | MJ | 6,43E-02 | 0,00E+00 | 1,19E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, thermal | MJ | 4,82E-01 | 0,00E+00 | 2,34E+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 coastal climate and temperate continental climate.

The technical service life of 50 years applies for following SBS-modified two-layer systems with Katepal K-PS 170/5000 as a top layer:

Katepal K-PS 170/5000 + Katepal K-TMS 170/4000
Katepal K-PS 170/5000 + Katepal K-TMS 170/3300
Katepal K-PS 170/5000 + Katepal PF 3200
Katepal K-PS 170/5000 + Katepal K-TMS 170/3000

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 CO ₂ e/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, 2024.