KRAFT PAINTS
DRIVEN BY INNOVATION

BUILDING INNOVATION
BIOCLIMA®
Advanced Energy Building Systems

# ENVIRONMENTAL PRODUCT DECLARATION

According to ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021



# Waterproofing Slurries & Mortars (2K)

DRUCKFARBEN GROUP

Owner of the Declaration: **DRUCKFARBEN HELLAS S.A.**
Programme: The International EPD® System
www.environdec.com
Programme operator: EPD International AB

| | |
|---|---|
| Registration number | S-P-03098 |
| Issue date | 24.07.2023 |
| Revision date | 17.06.2024 |
| Valid to | 23.07.2028 |
| Geographical scope | Europe |

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ECO PLATFORM EPD VERIFIED

kraftpaints.com
bioclima.gr

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# Company Description

## Druckfarben Group S.A.

- Produces inks for flexography and rotogravure printing.
- In the coatings and mortars division, decorative and architectural products and cementitious putties are commercialized under the KRAFT Paints brand.
- Energy saving / external thermal insulation products are commercialized under the BIOCLIMA brand.

**DRUCKFARBEN Group** comprises of a group of companies with worldwide activities catering to the ink, coating, and energy saving sectors.

More specifically, **DF Hellas S.A.** produces inks for flexography and rotogravure printing under the **DRUCKFARBEN** brand name using sub-brands for the various applications in the food packaging, plastic bags, cartons, and related products.

In the coatings division it commercializes its decorative and architectural paints products under the **KRAFT PAINTS** brand and in the energy saving/external thermal insulation products under the **BIOCLIMA®** brand. The Group has an important and increasing international presence in Eastern and Central Europe through subsidiaries in Bulgaria, Romania, Serbia, and through representatives in Malta, Turkey, Tunisia, Lebanon, Hungary, Slovenia, Croatia, Albania and Western and North Africa, Israel, and the Gulf countries. In West Africa, the company operates in Nigeria through its own subsidiary and the neighboring countries of the Economic Community of West African States (ECOWAS). The company's strategy includes expanding its export activities to new countries supported by a strong network of local partners.

**DRUCKFARBEN** holds a significant position in the area of architectural paints, varnishes and mortars related to construction activities under the **KRAFT PAINTS** brand. Also, under the **BIOCLIMA®** brand, the company offers a wide range of certified thermal insulation systems for energy upgrading and aesthetic renovation of new and existing buildings.



**CERTIFIED SYSTEMS**
ISO 9001 ISO 140001 ISO 50001 ISO 45001

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## General information Programme information

| | |
|---|---|
| **Programme:** | The International EPD® System |
| **Address:** | EPD International AB<br>Box 210 60<br>SE-100 31 Stockholm<br>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): PCR 2019:14 Construction products, version 1.11

PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat info@environdec.com

**Life cycle assessment (LCA)**

LCA accountability: Dr. Frank Werner

**Third-party verification**

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

[X] EPD verification by accredited certification body

Third-party verifier:

Business Quality Verification P.C

Approved certification body accountable for the third-party verification.

The certification body is accredited by:
Hellenic Accreditation System with accreditation number 1218.

Procedure for follow-up of data during EPD validity involves third-party verifier.

[X] Yes [ ] No

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## Comparability:

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to EN 15804+A2 and the building context, respectively the product-specific characteristics of performance, are taken into account.

## Additional information:

“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.

The EPD owner has the sole ownership, liability, and responsibility for the EPD.
Additional information can be obtained under: https://**kraftpaints.com**

## Gontact person

**Loukas Angelis / R&D Manager**
laggelis@druckfarbengroup.com

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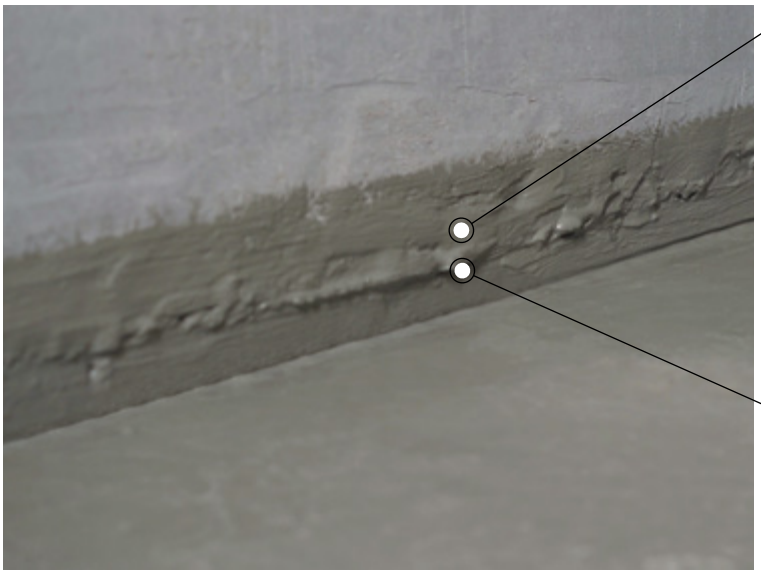
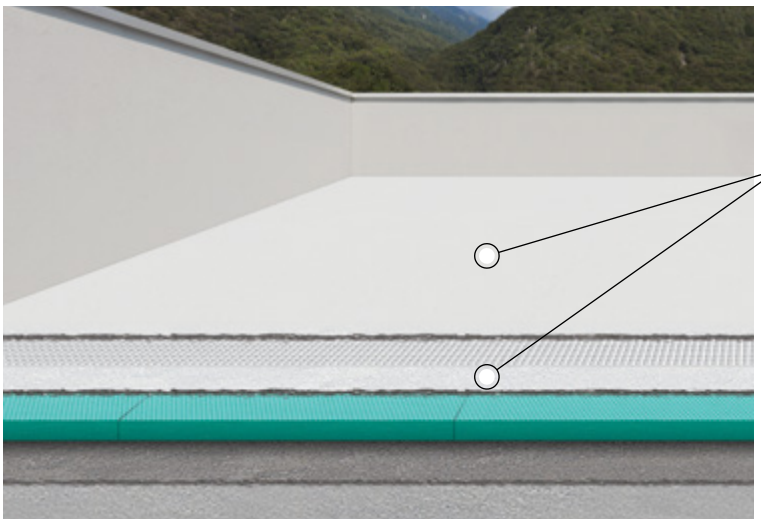
## Specification of the products

The multiple products are 2-component waterproofing slurries, declared as surface protection systems for concrete according to EN 1504-2, and as 2-component, liquid applied, water impermeable product for use beneath ceramic tiling bonded with adhesives, CM-P according to EN 14891, by DRUCKFARBEN HELLAS S.A. that are marketed under the brand KRAFT Paints or Bioclima. They are suitable for indoor and outdoor usage.



1. Waterproofing (2K) mortar Hydroguard Flex System (Hydroguard One 40 + Hydroguard Flex Resin)


2. Waterproofing (2K) mortar Hydroguard Elastic System (Hydroguard One 40 + Hydroguard Elastic Resin)

3. Waterproofing (2K) mortar ClimaRoof KF-2 System (ClimaRoof KF-2 + ClimaRoof KF-2 Resin)


UN CPC code: 375

Geographical scope: **Europe**

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## 1. Hydroguard Flex System:


**Hydroguard Flex System (Hydroguard One 40 + Hydroguard Flex Resin)** by KRAFT Paints is a flexible, polymer-modified, cementitious, 2-component waterproofing slurry. It is enriched with new generation of hydrophobic polymers and selected quartz aggregates, with provide enriched extra flexibility, water insulation protection, surface mechanical strength and excellent adhesion to structural substrates.

It is classified as coating for surface protection of concrete according to Standards **EN 1504-2** & **EN 1504-9:2008** (**Principle MC** - moisture control - Method 2.3, **Principle IR** - increasing resistivity by limiting moisture content - Method 8.3).

**TECHNICAL DATA**
(Measurement conditions 20°C and 50% Relative humidity)

| | |
|---|---|
| Color | Component A: Grey, White<br>Component B: White liquid |
| Mixing Ratio | 8,5kg Hydroguard Flex Resin in<br>25Kg Hydroguard One 40 |
| Maximum grain size | 600μm |
| Bulk Density of dry mortar | 1,35±0,05kg/Lt |
| Bulk Density of fresh mortar | 2,05±0,05kg/Lt |
| Temperature application | From +5°C to +30°C |
| Minimum / maximum thickness per coat | 1 mm thickness per coat |
| Pot life | 60 min |
| Time for apply the second coat | 6-24 hours after the first coat |
| Set to light foot traffic | 8 hours after the second coat |
| Consumption | 1,2-1,4kg/m² per mm coat |

**PRODUCT PERFORMANCES**

| | |
|---|---|
| Permeability to water vapour, EN ISO 7783-2 | $s_D$ ≤ 1m : Class I, permeable (grey, white) |
| Capillary absorption and permeability to water, EN 1062-3 | w ≤ 0,03kg/m²h $^{0,5}$, (grey, white) |
| Adhesion to concrete (Pull - off test), EN 1542 | ≥ 1,30 N/mm², (grey, white) |
| Reaction to fire after application,<br>EN 13501-1 | C - s1, d0 (grey)<br>B2 - s1, d0 (white) |

WATERPROOFING TECHNOLOGY

CE
EN 1504-2
PI / MC / IR

## 2. Hydroguard Elastic System:


**Hydroguard Elastic System (Hydroguard One 40 + Hydroguard Elastic Resin)** by KRAFT Paints is a highly flexible, polymer-modified, cementitious, 2-component waterproofing slurry. It is highly enriched with new generation of hydrophobic polymers and selected quartz aggregates, which provide enriched extra highly flexibility, water insulation protection, surface mechanical strength and excellent adhesion to structural substrates.

It is classified as coating for surface protection of concrete according to Standards **EN 1504-2** & **EN 1504-9:2008** (**Principle PI** - protection against ingress - Method 1.3, **Principle MC** - moisture control - Method 2.3, **Principle IR** - increasing resistivity by limiting moisture content - Method 8.3).

It is also classified as 2-component, liquid applied, water impermeable product for use beneath ceramic tiling bonded with adhesives, CM-P according to **EN 14891** [refers to combination: Hydroguard Elastic System Grey (Hydroguard One 40 Grey + Hydroguard Elastic Resin)].

**TECHNICAL DATA**
(Measurement conditions 20°C and 50% Relative humidity)

| | |
|---|---|
| Color | Component A: Grey, White<br>Component B: White liquid |
| Mixing Ratio | 10,5kg Hydroguard Elastic Resin in 25Kg Hydroguard One 40 |
| Maximum grain size | 600μm |
| Bulk Density of dry mortar | 1,35±0,05kg/Lt |
| Bulk Density of fresh mortar | 2,05±0,05kg/Lt |
| Temperature application | From +5°C to +30°C |
| Minimum / maximum thickness per coat | 1 mm thickness per coat |
| Pot life | 60 min |
| Time for apply the second coat | 6-24 hours after the first coat |
| Set to light foot traffic | 8 hours after the second coat |
| Consumption | 1,2-1,4kg/m² per mm coat |

WATERPROOFING TECHNOLOGY
CE EN 1504-2 PI / MC / IR
CE EN 14891 CM-P

**PRODUCT PERFORMANCES**

| | |
|---|---|
| Permeability CO2, EN 1062-6 | $s_D$ >150m (grey, white) |
| Permeability to water vapour, EN ISO 7783-2 | $s_D$ < 5m : Class I, permeable (grey, white) |
| Capillary absorption and permeability to water, EN 1062-3 | w ≤ 0,03kg/m²h $^{0,5}$ (grey)<br>w ≤ 0,05kg/m²h $^{0,5}$ (white) |
| Adhesion to concrete (Pull - off test), EN 1542 | ≥ 1.30 N/mm² (grey)<br>≥ 1.00 N/mm² (white) |
| Reaction to fire after application, EN 13501-1 | C - s1, d0 (grey, white) |

**Hydroguard Elastic Grey, EN 14891**

| | |
|---|---|
| Initial tensile adhesion strength, A.6.2 | 1,7 N/mm² |
| Tensile adhesion strength after water contact , A.6.4 | 0,8 N/mm² |
| Tensile adhesion strength after heat ageing, A.6.5 | 1,5 N/mm² |
| Tensile adhesion strength after freeze–thaw cycles, A.6.6 | 0,7 N/mm² |
| Tensile adhesion strength after contact with lime water, A.6.9 | 1,2 N/mm² |
| Waterproofing, A.7 | No penetration |
| Crack bridging ability under standard conditions, A.8.2 | 0,77 mm |
| Tensile adhesion strength after contact with chlorinated water, A 6.8 | 0,70 N/mm² |

WATERPROOFING TECHNOLOGY
CE EN 1504-2 PI / MC / IR
CE EN 14891 CM-P

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## 3. ClimaRoof KF-2 System:


**ClimaRoof® KF-2 System (ClimaRoof KF-2 + ClimaRoof KF-Resin)** by BIOCLIMA is a waterproofing, flexible, leveling 2-component cementitious mortar with advanced formulation that contains a complex of new generation resins specially designed to react with selected elastomeric and hydrophobic polymers, as well as with high quality quartz aggregates. It shows high adhesion to various types of substrates while providing excellent protection against moisture penetration and resistance to surface abrasion.

It is classified as coating for surface protection of concrete according to **EN 1504-2** & **EN 1504-9:2008** (**Principle PI** protection against moisture penetration - Method 1.3, **Principle MC** -moisture control - Method 2.3, **Principle PR** - surface protection - Method 5.1, **Principle IR** - durability increase - Method 8.3).

**TECHNICAL DATA**
(Measurement conditions 20°C and 50% Relative humidity)

| | |
|---|---|
| Color | ClimaRoof KF-2: white mortar<br>ClimaRoof KF-2 Resin: white resin |
| Mixing Ratio | 6,0kg ClimaRoof KF-2 Resin in 25kg ClimaRoof KF- 2 |
| Maximum grain size of mortar | 1mm |
| Bulk Density of dry mortar | 1,60±0,05 kg/Lt |
| Bulk density of resin | 1,00 ±0,05 kg/Lt |
| Bulk Density of fresh mortar | 2,20±0,05 kg/Lt |
| Application temperature | From +10°C up to +30°C |
| Min/max layer thickness | 1-2mm per layer |
| Pot life | 45 min |
| Time for the 2nd layer of application | 6-24 hours after the first layer |
| Mild walkability | 6 hours after completed the application |
| Consumption | 1,0-1,5kg/m$^2$ per/mm |

**PRODUCT PERFORMANCES**

| | |
|---|---|
| Permeability to CO2, EN 1062-6 | $s_D$ = 250m |
| Permeability to water vapor, EN ISO 7783-2 | $s_D$ = 1,9m (Class I, permeable to water vapour) |
| Capillary absorption & permeability to water, EN 1062-3 | w ≤ 0,04 kg/m$^2$ . h $^{0,5}$ |
| Pull-off test, EN 1542 | ≥1,60 N/mm$^2$ |
| Adhesion to XPS, EN 13494 | ≥0,580 N/mm$^2$ |
| Abrasion resistance, EN ISO 54070-1 | ≤ 50 mg/1000cycles |
| Impact resistance, EN ISO 6272-1 | ≥ 9 Nm (Class I) |
| Reaction to fire after application, EN 13501-1 | B - s1, d0 |

WATERPROOFING TECHNOLOGY

CE EN 1504-2 (PI-MC-PR-IR)

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## Application of the product

The multiple products are 2-component waterproofing slurries, declared as surface protection systems for concrete and as 2-component liquid applied, water impermeable product for use beneath ceramic tiling bonded with adhesives. They are suitable for indoor and outdoor usage.




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## 1. Hydroguard Flex System

### FIELD OF APPLICATION:

Hydroguard Flex System (Hydroguard One 40 + Hydroguard Flex Resin) by KRAFT Paints is suitable for waterproofing horizontal or vertical surfaces subject to partial or continuous moisture, basement surfaces indoor and outdoor (before backfilling), wet spaces (bathrooms), walls, concrete, renderings and other structural elements. Provides protection against carbonation of concrete. Suitable for positive and negative humidity pressures.

It is ideal for waterproofing surfaces that are subject to expansion-contraction, vibration and appear (or are about to appear) capillary cracks such as indicatively: roofs, inverted roofs, balconies, garnets, tanks, surfaces which will be covered with decorative tiles, high sealing zones in ETICS systems, dry building constructions, etc.

### SUBSTRATE - PREPARATION:

To ensure good adhesion substrate should be sound, clean, free of dust, oil, lime, tar and loose elements. On absorbent substrates light soaking with water before use.

On substrates with high absorbency (eg brick, aerated concrete, old plasters, etc.) it is recommended to apply Eco Dur Aqua by KRAFT PAINTS diluted 1:1 to 1:2 with water. Caution! The primer must properly be diluted in order to be completely absorbed and avoid film formation to the substrate surface.

On non-absorbent substrates, it is recommended to use Epoxy Aqua Floor Primer by KRAFT PAINTS with simultaneous application of quartz sand. Caution! The application of the waterproofing layer must be carried out between 24 – 48 hours after priming. This is not recommended when negative humidity pressures exist.

For necessary repairs before application (e.g. smoothing, leveling, grooves formations at wall-floor junctions, etc.) the appropriate repairing mortars from KRAFT PAINTS are selected.

### MIXING:

In a clean container that contains Hydroguard Flex Resin gradually empty the package content of Hydroguard One 40 while stirring constantly with a low-speed electric mixer (8,5 Kg Hydroguard Flex Resin per 25Kg Hydroguard One 40 or 1,7 Kg Hydroguard Flex Resin per 5Kg Hydroguard One 40).

Mixing must be done carefully so that no amount of product remains on the walls or bottom of the container. The product is ready for use when the mixture becomes homogeneous without lumps.

### APPLICATION:

Application of Hydroguard Flex System (Hydroguard One 40 + Hydroguard Flex Resin) is carried out using a roller, brush or metal spatula, in 2 layers (at least, depending on water load) of 1mm/per layer maximum thickness. Each subsequent layer is applied crosswise after the previous one has dried sufficiently. If 24 hours pass after the last layer, light soaking with water is recommended before application of the next one.

On “demanding” substrates that are subject to intense stress and micro-cracks already exist - or may occur - (e.g. roofs, swimming pools, balconies, tanks, etc.) it is recommended, while the 1st waterproofing layer is still fresh, to reinforce with anti-alkaline fiber mesh (Hydroguard Net 75 by KRAFT PAINTS). The mesh strips overlap each other by 10cm. Subsequent waterproofing layers must completely overlap the grid mesh.

At any case, in critical areas of application (e.g. construction junctions, grooves, wall-floor joints, gutters etc.) it is also recommended to reinforce the waterproofing layers locally by using fiber mesh or polyester fleece.

## Composition of the product

The declared product consists of the following components:

| | | kg/kg | % |
|---|---|---|---|
| PRODUCT | Binders | 0,224 | 21,9% |
| | Fillers | 0,4898 | 48,98% |
| | Additives | 0,0209 | 2,04% |
| | Rheology modifier | 0,0002 | 0,02% |
| | Resin | 0,158 | 15,8% |
| | Water | 0,0953 | 9,53% |
| PACKAGING | Paper | 0,0035 | 0,03% |
| | Cardboard | 0,004 | 0,3% |
| | PE film-LDPE | 0,003 | 0% |
| | HDPE vessel | 0,0174 | 1,74% |

## 2. Hydroguard Elastic System

### FIELD OF APPLICATION:

Hydroguard Elastic System (Hydroguard One 40 + Hydroguard Elastic Resin) by KRAFT Paints is suitable for waterproofing horizontal or vertical surfaces subject to partial or continuous moisture, basement surfaces indoor and outdoor (before backfilling), wet spaces (bathrooms), walls, concrete, renderings and other structural elements. Provides protection against carbonation of concrete. Suitable for positive and negative humidity pressures.

It is ideal when increased elasticity and adhesion is required and when waterproofing surfaces are subject to expansion-contraction, vibration and appear (or are about to appear) capillary cracks such as indicatively: roofs, inverted roofs, swimming pools, above-ground tanks, exposed surfaces (flat roofs etc.), industrial application, bridges, balconies, garnets, tanks, surfaces which will be covered with decorative tiles, high sealing zones in ETICS systems, dry building constructions, etc.

### SUBSTRATE - PREPARATION:

To ensure good adhesion substrate should be sound, clean, free of dust, oil, lime, tar and loose elements. On absorbent substrates light soaking with water before use. On substrates with high absorbency (eg brick, aerated concrete, old plasters, etc.) it is recommended to apply Eco Dur Aqua by KRAFT PAINTS diluted 1:1 to 1:2 with water. Caution! The primer must properly be diluted in order to be completely absorbed and avoid film formation to the substrate surface.

On non-absorbent substrates, it is recommended to use Epoxy Aqua Floor Primer by

KRAFT PAINTS with simultaneous application of quartz sand. Caution! The application of the waterproofing layer must be carried out between 24 - 48 hours after priming and care must be taken so that any negative moisture pressure does not come into contact with the primer.

For necessary repairs before application (e.g. smoothing, leveling, grooves formations at wall-floor junctions, etc.) the appropriate repairing mortars from KRAFT PAINTS are selected.

**MIXING:**

In a clean container that contains Hydroguard Elastic Resin gradually empty the package content of Hydroguard One 40 while stirring constantly with a low-speed electric mixer (10,5 Kg Hydroguard Elastic Resin per 25Kg Hydroguard One 40 or 2,1 Kg Hydroguard Elastic Resin per 5Kg Hydroguard One 40).

Mixing must be done carefully so that no amount of product remains on the walls or bottom of the container. The product is ready for use when the mixture becomes homogeneous without lumps.

**APPLICATION:**

Application of Hydroguard Elastic System (Hydroguard One 40 + Hydroguard Elastic Resin) is carried out using a roller, brush or metal spatula, in 2 layers (at least, depending on water load) of 1mm/per layer maximum thickness. Each subsequent layer is applied crosswise after the previous one has dried sufficiently. If 24 hours pass after the last layer, light soaking with water is recommended before application of the next one.

On “demanding” substrates that are subject to intense stress and micro-cracks already exist - or may occur - (e.g. roofs, swimming pools, balconies, tanks, etc.) it is recommended, while the 1st waterproofing layer is still fresh, to reinforce with anti-alkaline fiber mesh (Hydroguard Net 75 by KRAFT PAINTS). The mesh strips overlap each other by 10cm. Subsequent waterproofing layers must completely overlap the grid mesh.

It is also recommended to reinforce the waterproofing layers locally in critical areas of application (e.g. construction junctions, grooves, wall-floor joints, gutters etc.) by using fiber mesh or polyester fleece.

## Composition of the product

The declared product consists of the following components:

| | | kg/kg | % |
|---|---|---|---|
| PRODUCT | Binders | 0,212 | 20,95% |
| | Fillers | 0,472 | 46,64% |
| | Additives | 0,0197 | 1,95% |
| | Rheology modifier | 0,00014 | 0,01% |
| | Resin | 0,207 | 20,46% |
| | Water | 0,0883 | 8,20% |
| PACKAGING | Paper | 0,0035 | 0,03% |
| | Cardboard | 0,0036 | 0% |
| | PE film-LDPE | 0,003 | 0% |
| | HDPE vessel | 0,0174 | 1,74% |

## 3. ClimaRoof KF-2 System

### FIELD OF APPLICATION:

ClimaRoof® KF-2 (ClimaRoof KF-2 + ClimaRoof KF-Resin) by BIOCLIMA is used as part of Lightweight Thermal & Water Insulation System ClimaRoof® by BIOCLIMA®, as final layer, waterproofing and protection material of ClimaRoof® KF-XPS, XPS Etics GF or ClimaRoof® KF-XPS Incline extruded polystyrene thermal insulation boards. It offers a final layer of high surface strength and weather resistance.

Also, it could be used as final layer, waterproofing material on flat roofs (terraces) and horizontal surfaces, reinforced with alkali resistant glass fiber mesh ClimaRoof® KFNet. It ensures protection against moisture penetration and provides better surface walkability than other liquid waterproofing membranes.

### SUBSTRATE - PREPARATION:

To ensure better adhesion, the surface is required to be flat, solid, dry, clean and free of dust, oils, salts, rust, loose paint and residues, swollen paints, etc. ClimaRoof® KF-2 has very good adhesion to standard structural surfaces (eg concrete, cement mortar, brick, cement board). Light soaking with water before use is recommended. It also has very good adhesion to substrates of acrylic waterproofing and decorative tiles, which are well anchored and without surface damage.

On highly absorbent surfaces priming is recommended, using micromolecular acrylic primer Eco Dur Aqua by KRAFT PAINTS. On demanding substrates like: asphalt sealants, polyurethane liquid membranes, decorative tiles, etc... which are well anchored and without surface alteration, priming is recommended with Epoxy Aqua Floor Primer by KRAFT PAINTS with simultaneous application of quartz aggregates.

### MIXING:

In a clean container add 6Kg of ClimaRoof® KF-2 Resin and gradually empty the contents of a 25Kg bag of ClimaRoof® KF-2 product. Stirring constantly with a low speed mixer so that a homogeneous paste is obtained. Allow the mixture to rest for about 5 minutes and repeat stirring for a while.

The mixture is ready for use for the next 45 minutes (at 25°C). It is forbidden to add extra resin to correct the workability of the mortar. This will reduce workability and increase shrinkage.

### APPLICATION:

Application as part of ClimaRoof® System: ClimaRoof® KF-2 is spread on the surface of the extruded polystyrene thermal insulation boards ClimaRoof® KF-XPS, XPS Etics GF or ClimaRoof® KF-XPS Incline covering the entire surface without gaps, using a metal spatula (with pole or without). Application is completed in 2 layers crosswise. During first layer, reinforcement with anti-alkaline glass mesh ClimaRoof® KF-Net is obligatory, taking care that strips of the mesh must overlap by 10cm. After drying, a second layer of ClimaRoof® KF-2 is applied. Application thickness

is 1-2mm per layer and maximum total thickness of the layers should not exceed 4mm.

Application as waterproofing material: Apply ClimaRoof® KF-2 on the entire selected substrate without gaps, using a metal spatula (with pole or without). Application is completed in 2 layers crosswise. During first layer, reinforcement with anti-alkaline glass mesh ClimaRoof® KF-Net is obligatory, taking care that strips of the mesh must overlap by 10cm.

After drying, a second layer of ClimaRoof® KF-2 is applied. Application thickness is 1-2mm per layer and maximum total thickness of the layers should not exceed 4mm.

## Composition of the product

The declared product consists of the following components:

| | | kg/kg | % |
|---|---|---|---|
| PRODUCT | Binders | 0,1574 | 15,74% |
| | Fillers | 0,6267 | 61,31% |
| | Additives | 0,0185 | 1,81% |
| | Resin | 0,135 | 13,2% |
| | Water | 0,0576 | 5,63% |
| PACKAGING | Paper | 0,003 | 0,3% |
| | Cardboard | 0,0004 | 0,3% |
| | PE film-LDPE | 0,002 | 0,2% |
| | HDPE vessel | 0,015 | 1,5% |

## Content of substances of very high concern

The product does not contain any substances on the candidate list for substances of very high concern (SVHC) according to REACH (Annex XIV) (list accessed 26.02.2023).

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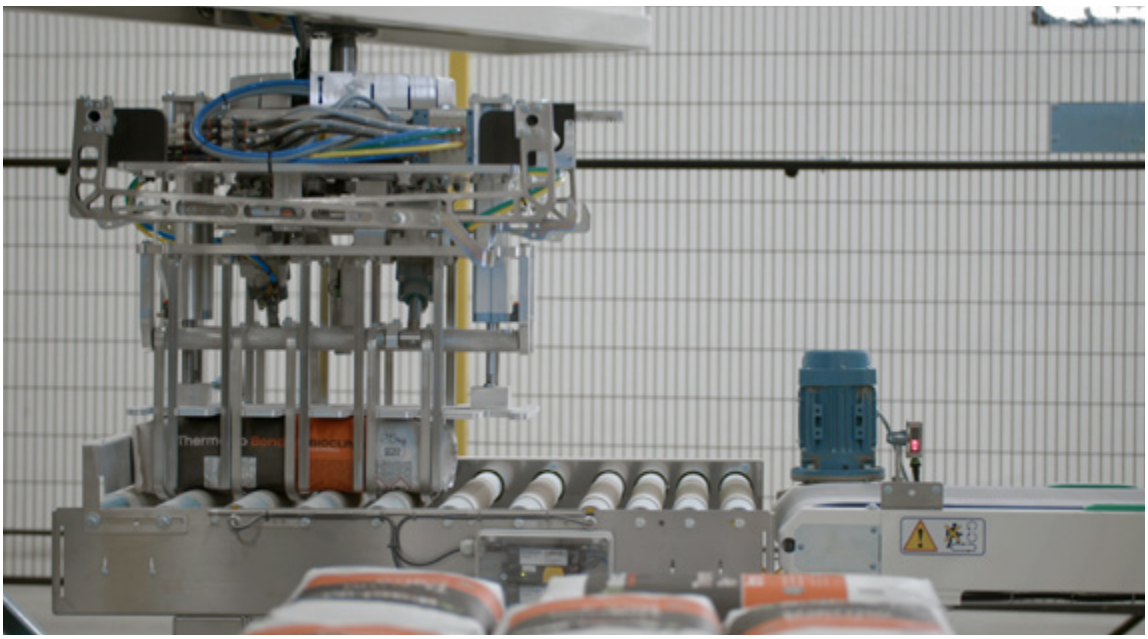
## Production Stages



1. Weighing binders and other raw materials
2. Mixing 60-120 sec
3. Packaging

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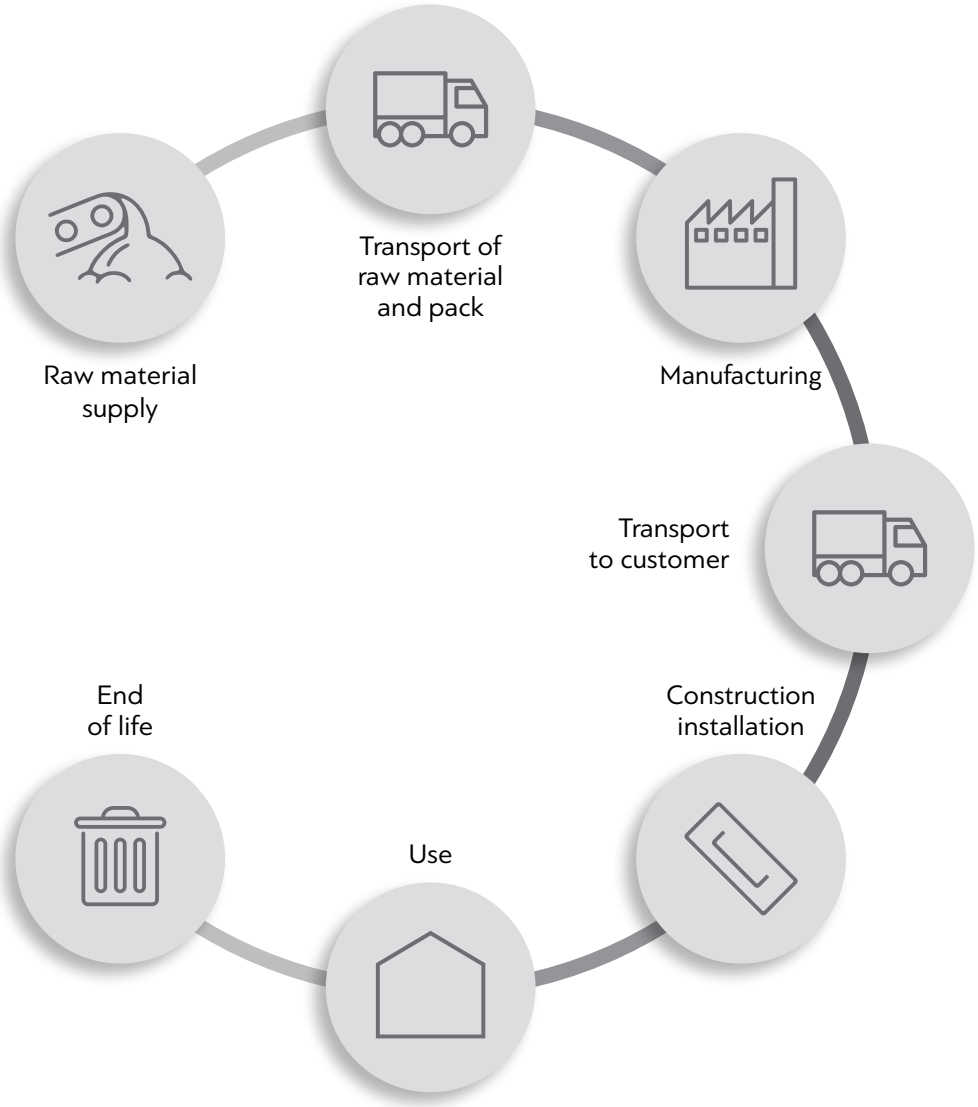
## LCA: Calculation rules




**Declared unit:** The declared unit is 1kg and the declared values represent each product based on the annual production in 2022.
**Type of EPD:** Cradle to gate with options, modules C1-C4, and module D (A1-A3, C, D, and additional modules A4 and A5).
**Data base: The LCA was calculated in the latest version of the LCA sofrware SimaPro (version 9.4)**

## Scenarios and additional technical information

The product does not contain significant quantities of biogenic carbon. The carbon content of multi-use pallets used for transport packaging and paper bats is disregarded.

| **Information describing the biogenic carbon content at the factory gate** | | |
|---|---|---|
| **Name** | **Value** | **Unit** |
| Biogenic Carbon Content in product | 0 | kg C |
| Biogenic Carbon Content in accompanying packaging | 0 | kg C |

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment.

**Transport to the construction site (A4):** Module A4 contains the average transport scenario from the production site to the construction site. An average transport distance of 500 km is assumed.

| **Parameter** | **Parameter unit expressed per functional/declared unit** |
|---|---|
| Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat etc. | Used dataset: Transport, freight, lorry >32 metric ton, EURO5 {RER}\| transport, freight, lorry >32 metric ton, EURO5 \| Cut-off, U |
| Distance | 500 km |
| Capacity utilisation (including empty returns) | as in ecoinvent 3.7.1 database |
| Weight of transported products | **ClimaRoof KF-2+ClimaRoof KF-2 Resin:** 1 kg (packaging: 0.01872 kg/kg)<br>**Hydroguard One 40 Grey+Hydroguard Flex Resin:** 1 kg (packaging: 0.0176 kg/kg)<br>**Hydroguard One 40 White+Hydroguard Flex Resin:** 1 kg (packaging: 0.0176 kg/kg)<br>**Hydroguard One 40 Grey+Hydroguard Elastic Resin:** 1 kg (packaging: 0.0166 kg/kg)<br>**Hydroguard One 40 White+Hydroguard Elastic Resin:** 1 kg (packaging: 0.0166 kg/kg) |
| Volume capacity utilisation factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products) | Not applicable |

## Installation in the building (A5)

The products are delivered to the construction site. There, water is added to dilute slurries to make it ready for use.

Manual application is assumed, eventual further inputs (e.g., electricity consumption for the mixing), are disregarded.

No losses of putties during application are taken into account.

The packaging material (paper bags, cardboard underlayer, PE-foil and wooden pallet) is as sumed to be transported 50 km with a lorry 16-32 metric ton, EURO5 to a landfill.

For the multi-way pallets, a reuse rate of 20 times is taken into account in the disposal scenario.

| **Parameter** | **Parameter unit expressed per functional / declared unit** |
|---|---|
| Ancillary materials for installation (specified by material); | No water is added (see below) |
| Water use | **ClimaRoof KF-2+ ClimaRoof KF-2 Resin:** 0<br>**Hydroguard One 40 Grey+ Hydroguard Flex Resin:** 0<br>**Hydroguard One 40 White+ Hydroguard Flex Resin:** 0<br>**Hydroguard One 40 Grey+ Hydroguard Elastic Resin:** 0<br>**Hydroguard One 40 White+ Hydroguard Elastic Resin:** 0 |
| Other resource use | 0 kg |
| Quantitative description of energy type (regional mix) and consumption during the installation process | 0 kWh<br>(manual installation) |
| Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type) | kg |

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| Parameter | Parameter unit expressed per functional / declared unit |
|---|---|
| Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route) | **Climaroof KF-2 + Climaroof KF-2 Resin:**<br>Graphical paper to landifill: 0.00290kg/kg<br>Cardboard to landfill: 0.00030 kg/kg<br>PE-foil to landifill: 0.00718 kg/kg<br>Wooden pallet to landfill: 0.00140 kg/kg<br><br>**Hydroguard One 40 Grey + Hydroguard Flex Resin:**<br>Graphical paper to landifill: 0.00268 kg/kg<br>Cardboard to landfill: 0.00028 kg/kg<br>PE-foil to landifill: 0.00675 kg/kg<br>Wooden pallet to landfill: 0.00130 kg/kg<br><br>**Hydroguard One 40 White + Hydroguard Flex Resin:**<br>Graphical paper to landifill: 0.00268 kg/kg<br>Cardboard to landfill: 0.0028 kg/kg<br>PE-foil to landifill: 0.00675 kg/kg<br>Wooden pallet to landfill: 0.00130 kg/kg<br><br>**Hydroguard One 40 Grey + Hydroguard Elastic Resin:**<br>Graphical paper to landifill: 0.00253 kg/kg<br>Cardboard to landfill: 0.00027 kg/kg<br>PE-foil to landifill: 0.00637 kg/kg<br>Wooden pallet to landfill: 0.00123 kg/kg<br><br>**Hydroguard One 40 White + Hydroguard Elastic Resin:**<br>Graphical paper to landifill: 0.00253 kg/kg<br>Cardboard to landfill: 0.00027 kg/kg<br>PE-foil to landifill: 0.00637 kg/kg<br>Wooden pallet to landfill: 0.00123 kg/kg |
| Direct emissions to ambient air, soil and water | **Not relevant** |



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## End-of-life (C1 - C4)

Putties are not removed from the wall material during de-construction. Thus, no environmental impacts are declared in module C1.

A landfilling scenario is assumed for Greece, similar to a disposal scenario for bricks or concrete. A default distance of 50 km is assumed between the de-construction site and the landfill.

| **Processes** | **Parameter unit expressed per functional / declared unit of components, products or materials (specified by type of material)** |
|---|---|
| Collection process specified by type | **ClimaRoof KF-2 + ClimaRoof KF-2 Resin:** 1.24 kg/kg collected separately<br>**Hydroguard One 40 Grey + Hydroguard Flex Resin:** 1.34 kg/kg collected separately<br>**Hydroguard One 40 White + Hydroguard Flex Resin:** 1.34 kg/kg collected separately<br>**Hydroguard One 40 Grey + Hydroguard Elastic Resin:** 1.42 kg/kg collected separately<br>**Hydroguard One 40 White + Hydroguard Elastic Resin:** 1.42 kg/kg collected separately |
| | 0 kg/m$^2$ collected with mixed construction waste |
| Recovery system specified by type | 0 kg for re-use |
| | 0 kg for recycling |
| | 0 kg for energy recovery |
| Disposal specified by type | **ClimaRoof KF-2 + ClimaRoof KF-2 Resin:** 1.24 kg/kg going to landfill<br>**Hydroguard One 40 Grey + Hydroguard Flex Resin:** 1.34 kg/kg going to landfill<br>**Hydroguard One 40 White + Hydroguard Flex Resin:** 1.34 kg/kg going to landfill<br>**Hydroguard One 40 Grey + Hydroguard Elastic Resin:** 1.42 kg/kg going to landfill<br>**Hydroguard One 40 White + Hydroguard Elastic Resin:** 1.42 kg/kg going to landfill |
| Assumptions for scenario development, (e.g. transportation) | see above |

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## Reuse, recovery and recycling potential (D)

Not relevant for the declared product

## Results for Waterproofing Slurries & Mortars (2K)

**DESCRIPTION OF THE SYSTEM BOUNDARY**
**(X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED)**

| | PRODUCT STAGE | | | CONSTRUCTION PROCESS STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | 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 | **GR** | | | **South-East Europe** | | | | | | | | | **South-East Europe** | | | | - |
| Specific data used | **> 90%** | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation products | - | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation sites | - | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACTS according to EN 15804+A2: 1kg of ClimaRoof KF-2 + ClimaRoof KF-2 Resin

| Core Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| GWP total | kg $CO_2$ eq | 4.58E-01 | 4.78E-02 | 4.57E-03 | 0 | 8.35E-03 | 0 | 7.72E-03 | 0 |
| GWP fossil | kg $CO_2$ eq | 4.61E-01 | 4.78E-02 | 1.58E-03 | 0 | 8.35E-03 | 0 | 7.72E-03 | 0 |
| GWP biogenic | kg $CO_2$ eq | -3.00E-03 | 0.00E+00 | 3.00E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| GWP luluc | kg $CO_2$ eq | 2.63E-04 | 1.72E-05 | 2.50E-07 | 0 | 3.28E-06 | 0 | 2.42E-06 | 0 |
| GWP-GHG | kg $CO_2$ eq | 4,61E-01 | 4,78E-02 | 1,58E-03 | 0 | 8,35E-03 | 0 | 7,72E-03 | 0 |
| ODP | kg CFC11 eq | 3.61E-08 | 1.14E-08 | 7.32E-11 | 0 | 1.93E-09 | 0 | 2.91E-09 | 0 |
| AP | mol $H^+$ eq | 2.01E-03 | 1.99E-04 | 2.16E-06 | 0 | 3.39E-05 | 0 | 6.15E-05 | 0 |
| EP freshwater | kg P eq | 1.38E-05 | 3.27E-07 | 6.48E-09 | 0 | 5.85E-08 | 0 | 5.38E-08 | 0 |
| EP-marine | kg N eq | 3.87E-04 | 6.03E-05 | 6.73E-06 | 0 | 1.01E-05 | 0 | 2.28E-05 | 0 |
| EP terrestrial | mol N eq | 4.31E-03 | 6.65E-04 | 6.93E-06 | 0 | 1.12E-04 | 0 | 2.51E-04 | 0 |
| POCP | kg NMVOC eq | 1.42E-03 | 2.14E-04 | 3.64E-06 | 0 | 3.42E-05 | 0 | 7.19E-05 | 0 |
| ADPE | kg Sb eq | 4.19E-06 | 1.10E-07 | 1.03E-09 | 0 | 2.90E-08 | 0 | 2.04E-08 | 0 |
| ADPF | MJ | 7.54E+00 | 7.45E-01 | 5.66E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| WDP | $m^3$ depriv. | 2.97E-01 | 2.56E-03 | 1.45E-04 | 0 | 3.78E-04 | 0 | 6.23E-04 | 0 |
| Caption | GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non- fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential | | | | | | | | |

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACTS according to EN 15804+A2: 1kg of Hydroguard One 40 Grey + Hydroguard Flex Resin

| Core Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| GWP total | kg $CO_2$ eq | 5.10E-01 | 4.70E-02 | 3.66E-03 | 0 | 8.31E-03 | 0 | 7.68E-03 | 0 |
| GWP fossil | kg $CO_2$ eq | 5.12E-01 | 4.70E-02 | 1.08E-03 | 0 | 8.31E-03 | 0 | 7.68E-03 | 0 |
| GWP biogenic | kg $CO_2$ eq | -2.58E-03 | 0.00E+00 | 2.58E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| GWP luluc | kg $CO_2$ eq | 2.94E-04 | 1.69E-05 | 1.89E-07 | 0 | 3.26E-06 | 0 | 2.41E-06 | 0 |
| GWP-GHG | kg $CO_2$ eq | 5,12E-01 | 4,70E-02 | 1,08E-03 | 0 | 8,31E-03 | 0 | 8,31E-03 | 0 |
| ODP | kg CFC11 eq | 4.50E-08 | 1.12E-08 | 5.28E-11 | 0 | 1.92E-09 | 0 | 2.90E-09 | 0 |
| AP | mol $H^+$ eq | 2.07E-03 | 1.96E-04 | 1.62E-06 | 0 | 3.37E-05 | 0 | 6.12E-05 | 0 |
| EP freshwater | kg P eq | 1.53E-05 | 3.21E-07 | 5.12E-09 | 0 | 5.83E-08 | 0 | 5.35E-08 | 0 |
| EP-marine | kg N eq | 3.72E-04 | 5.92E-05 | 5.65E-06 | 0 | 1.01E-05 | 0 | 2.27E-05 | 0 |
| EP terrestrial | mol N eq | 4.24E-03 | 6.54E-04 | 5.08E-06 | 0 | 1.11E-04 | 0 | 2.50E-04 | 0 |
| POCP | kg NMVOC eq | 1.45E-03 | 2.10E-04 | 2.81E-06 | 0 | 3.40E-05 | 0 | 7.15E-05 | 0 |
| ADPE | kg Sb eq | 4.92E-06 | 1.08E-07 | 7.62E-10 | 0 | 2.89E-08 | 0 | 2.03E-08 | 0 |
| ADPF | MJ | 8.67E+00 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| WDP | $m^3$ depriv. | 3.09E-01 | 2.52E-03 | 1.05E-04 | 0 | 3.76E-04 | 0 | 6.21E-04 | 0 |
| Caption | GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non- fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential | | | | | | | | |

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACTS according to EN 15804+A2: 1kg of Hydroguard One 40 White + Hydroguard Flex Resin

| Core Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| GWP total | kg $CO_2$ eq | 5.68E-01 | 4.70E-02 | 3.66E-03 | 0 | 8.31E-03 | 0 | 7.68E-03 | 0 |
| GWP fossil | kg $CO_2$ eq | 5.71E-01 | 4.70E-02 | 1.08E-03 | 0 | 8.31E-03 | 0 | 7.68E-03 | 0 |
| GWP biogenic | kg $CO_2$ eq | -2.58E-03 | 0.00E+00 | 2.58E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| GWP luluc | kg $CO_2$ eq | 3.11E-04 | 1.69E-05 | 1.89E-07 | 0 | 3.26E-06 | 0 | 2.41E-06 | 0 |
| GWP-GHG | kg $CO_2$ eq | 5,71E-01 | 4,70E-02 | 1,08E-03 | 0 | 8,31E-03 | 0 | 7,68E-03 | 0 |
| ODP | kg CFC11 eq | 4.36E-08 | 1.12E-08 | 5.28E-11 | 0 | 1.92E-09 | 0 | 2.90E-09 | 0 |
| AP | mol $H^+$ eq | 2.28E-03 | 1.96E-04 | 1.62E-06 | 0 | 3.37E-05 | 0 | 6.12E-05 | 0 |
| EP freshwater | kg P eq | 1.64E-05 | 3.21E-07 | 5.12E-09 | 0 | 5.83E-08 | 0 | 5.35E-08 | 0 |
| EP-marine | kg N eq | 4.81E-04 | 5.92E-05 | 5.65E-06 | 0 | 1.01E-05 | 0 | 2.27E-05 | 0 |
| EP terrestrial | mol N eq | 5.44E-03 | 6.54E-04 | 5.08E-06 | 0 | 1.11E-04 | 0 | 2.50E-04 | 0 |
| POCP | kg NMVOC eq | 1.72E-03 | 2.10E-04 | 2.81E-06 | 0 | 3.40E-05 | 0 | 7.15E-05 | 0 |
| ADPE | kg Sb eq | 4.94E-06 | 1.08E-07 | 7.62E-10 | 0 | 2.89E-08 | 0 | 2.03E-08 | 0 |
| ADPF | MJ | 8.74E+00 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| WDP | $m^3$ depriv. | 3.26E-01 | 2.52E-03 | 1.05E-04 | 0 | 3.76E-04 | 0 | 6.21E-04 | 0 |
| Caption | GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non- fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential | | | | | | | | |

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACTS according to EN 15804+A2: 1kg of Hydroguard One 40 Grey + Hydroguard Elastic Resin

| Core Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| GWP total | kg $CO_2$ eq | 5.65E-01 | 4.70E-02 | 3.66E-03 | 0 | 8.31E-03 | 0 | 7.68E-03 | 0 |
| GWP fossil | kg $CO_2$ eq | 5.67E-01 | 4.70E-02 | 1.08E-03 | 0 | 8.31E-03 | 0 | 7.68E-03 | 0 |
| GWP biogenic | kg $CO_2$ eq | -2.58E-03 | 0.00E+00 | 2.58E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| GWP luluc | kg $CO_2$ eq | 3.51E-04 | 1.69E-05 | 1.89E-07 | 0 | 3.26E-06 | 0 | 2.41E-06 | 0 |
| GWP-GHG | kg $CO_2$ eq | 5,67E-01 | 4,70E-02 | 1,08E-03 | 0 | 8,31E-03 | 0 | 7,68E-03 | 0 |
| ODP | kg CFC11 eq | 5.25E-08 | 1.12E-08 | 5.28E-11 | 0 | 1.92E-09 | 0 | 2.90E-09 | 0 |
| AP | mol $H^+$ eq | 2.38E-03 | 1.96E-04 | 1.62E-06 | 0 | 3.37E-05 | 0 | 6.12E-05 | 0 |
| EP freshwater | kg P eq | 1.77E-05 | 3.21E-07 | 5.12E-09 | 0 | 5.83E-08 | 0 | 5.35E-08 | 0 |
| EP-marine | kg N eq | 4.16E-04 | 5.92E-05 | 5.65E-06 | 0 | 1.01E-05 | 0 | 2.27E-05 | 0 |
| EP terrestrial | mol N eq | 4.73E-03 | 6.54E-04 | 5.08E-06 | 0 | 1.11E-04 | 0 | 2.50E-04 | 0 |
| POCP | kg NMVOC eq | 1.66E-03 | 2.10E-04 | 2.81E-06 | 0 | 3.40E-05 | 0 | 7.15E-05 | 0 |
| ADPE | kg Sb eq | 6.09E-06 | 1.08E-07 | 7.62E-10 | 0 | 2.89E-08 | 0 | 2.03E-08 | 0 |
| ADPF | MJ | 1.02E+01 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| WDP | $m^3$ depriv. | 3.67E-01 | 2.52E-03 | 1.05E-04 | 0 | 3.76E-04 | 0 | 6.21E-04 | 0 |
| Caption | GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non- fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential | | | | | | | | |

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACTS according to EN 15804+A2: 1kg of Hydroguard One 40 White + Hydroguard Elastic Resin

| Core Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| GWP total | kg $CO_2$ eq | 6.20E-01 | 4.70E-02 | 3.66E-03 | 0 | 8.31E-03 | 0 | 7.68E-03 | 0 |
| GWP fossil | kg $CO_2$ eq | 6.22E-01 | 4.70E-02 | 1.08E-03 | 0 | 8.31E-03 | 0 | 7.68E-03 | 0 |
| GWP biogenic | kg $CO_2$ eq | -2.58E-03 | 0.00E+00 | 2.58E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| GWP luluc | kg $CO_2$ eq | 3.67E-04 | 1.69E-05 | 1.89E-07 | 0 | 3.26E-06 | 0 | 2.41E-06 | 0 |
| GWP-GHG | kg $CO_2$ eq | 6,23E-01 | 4,70E-02 | 1,08E-03 | 0 | 8,31E-03 | 0 | 7,68E-03 | 0 |
| ODP | kg CFC11 eq | 5.13E-08 | 1.12E-08 | 5.28E-11 | 0 | 1.92E-09 | 0 | 2.90E-09 | 0 |
| AP | mol $H^+$ eq | 2.59E-03 | 1.96E-04 | 1.62E-06 | 0 | 3.37E-05 | 0 | 6.12E-05 | 0 |
| EP freshwater | kg P eq | 1.87E-05 | 3.21E-07 | 5.12E-09 | 0 | 5.83E-08 | 0 | 5.35E-08 | 0 |
| EP-marine | kg N eq | 5.20E-04 | 5.92E-05 | 5.65E-06 | 0 | 1.01E-05 | 0 | 2.27E-05 | 0 |
| EP terrestrial | mol N eq | 5.87E-03 | 6.54E-04 | 5.08E-06 | 0 | 1.11E-04 | 0 | 2.50E-04 | 0 |
| POCP | kg NMVOC eq | 1.92E-03 | 2.10E-04 | 2.81E-06 | 0 | 3.40E-05 | 0 | 7.15E-05 | 0 |
| ADPE | kg Sb eq | 6.10E-06 | 1.08E-07 | 7.62E-10 | 0 | 2.89E-08 | 0 | 2.03E-08 | 0 |
| ADPF | MJ | 1.03E+01 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| WDP | $m^3$ depriv. | 3.83E-01 | 2.52E-03 | 1.05E-04 | 0 | 3.76E-04 | 0 | 6.21E-04 | 0 |
| Caption | GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non- fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential | | | | | | | | |

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## RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1kg of ClimaRoof KF-2 + ClimaRoof KF-2 Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ (Hu) | 4.40E-01 | 9.34E-03 | 1.52E-04 | 0 | 1.75E-03 | 0 | 4.65E-03 | 0 |
| PERM | MJ (Hu) | 3.21E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ (Hu) | 4.72E-01 | 9.34E-03 | 1.52E-04 | 0 | 1.75E-03 | 0 | 4.65E-03 | 0 |
| PENRE | MJ (Hu) | 3.91E+00 | 7.45E-01 | 5.66E-03 | 0 | 1.26E-01 | 0 | 1.92E-01 | 0 |
| PENRM | MJ (Hu) | 3.64E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ (Hu) | 7.56E+00 | 7.45E-01 | 5.66E-03 | 0 | 1.26E-01 | 0 | 1.92E-01 | 0 |
| SM | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NRSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FW | $m^3$ | 5.32E-03 | 7.81E-05 | 8.94E-07 | 0 | 1.32E-05 | 0 | 2.23E-05 | 0 |

| | |
|---|---|
| Caption | 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 |

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## RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1kg of Hydroguard One 40 Grey + Hydroguard Flex Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ (Hu) | 4.83E-01 | 9.18E-03 | 1.16E-04 | 0 | 1.74E-03 | 0 | 4.63E-03 | 0 |
| PERM | MJ (Hu) | 2.76E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ (Hu) | 5.10E-01 | 9.18E-03 | 1.16E-04 | 0 | 1.74E-03 | 0 | 4.63E-03 | 0 |
| PENRE | MJ (Hu) | 5.18E+00 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| PENRM | MJ (Hu) | 3.50E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ (Hu) | 8.68E+00 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| SM | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NRSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FW | $m^3$ | 6.40E-03 | 7.67E-05 | 6.71E-07 | 0 | 1.32E-05 | 0 | 2.22E-05 | 0 |

| | |
|---|---|
| Caption | 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 |

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## RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1kg of Hydroguard One 40 White + Hydroguard Flex Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ (Hu) | 5.05E-01 | 9.18E-03 | 1.16E-04 | 0 | 1.74E-03 | 0 | 4.63E-03 | 0 |
| PERM | MJ (Hu) | 2.76E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ (Hu) | 5.33E-01 | 9.18E-03 | 1.16E-04 | 0 | 1.74E-03 | 0 | 4.63E-03 | 0 |
| PENRE | MJ (Hu) | 5.26E+00 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| PENRM | MJ (Hu) | 3.50E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ (Hu) | 8.76E+00 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| SM | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NRSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FW | $m^3$ | 6.42E-03 | 7.67E-05 | 6.71E-07 | 0 | 1.32E-05 | 0 | 2.22E-05 | 0 |

| | |
|---|---|
| Caption | 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 |

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## RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1kg of Hydroguard One 40 Grey + Hydroguard Elastic Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ (Hu) | 5.52E-01 | 9.18E-03 | 1.16E-04 | 0 | 1.74E-03 | 0 | 4.63E-03 | 0 |
| PERM | MJ (Hu) | 2.76E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ (Hu) | 5.79E-01 | 9.18E-03 | 1.16E-04 | 0 | 1.74E-03 | 0 | 4.63E-03 | 0 |
| PENRE | MJ (Hu) | 5.63E+00 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| PENRM | MJ (Hu) | 4.58E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ (Hu) | 1.02E+01 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| SM | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NRSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FW | $m^3$ | 7.64E-03 | 7.67E-05 | 6.71E-07 | 0 | 1.32E-05 | 0 | 2.22E-05 | 0 |

| | |
|---|---|
| Caption | 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 |

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## RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1kg of Hydroguard One 40 White + Hydroguard Elastic Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ (Hu) | 5.73E-01 | 9.18E-03 | 1.16E-04 | 0 | 1.74E-03 | 0 | 4.63E-03 | 0 |
| PERM | MJ (Hu) | 2.76E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ (Hu) | 6.00E-01 | 9.18E-03 | 1.16E-04 | 0 | 1.74E-03 | 0 | 4.63E-03 | 0 |
| PENRE | MJ (Hu) | 5.70E+00 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| PENRM | MJ (Hu) | 4.58E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ (Hu) | 1.03E+01 | 7.32E-01 | 4.13E-03 | 0 | 1.26E-01 | 0 | 1.91E-01 | 0 |
| SM | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NRSF | MJ (Hu) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FW | $m^3$ | 7.67E-03 | 7.67E-05 | 6.71E-07 | 0 | 1.32E-05 | 0 | 2.22E-05 | 0 |

| | |
|---|---|
| Caption | 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 |

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## RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: ClimaRoof KF-2 + ClimaRoof KF-2 Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 4.51E-06 | 1.80E-06 | 1.03E-08 | 0 | 3.30E-07 | 0 | 2.88E-07 | 0 |
| NHWD | kg | 5.92E-02 | 6.99E-02 | 1.42E-02 | 0 | 6.53E-03 | 0 | 1.01E+00 | 0 |
| RWD | kg | 3.40E-05 | 1.08E-05 | 7.26E-08 | 0 | 1.83E-06 | 0 | 2.77E-06 | 0 |
| CRU | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MFR | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MER | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EEE | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EET | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| Caption | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy |

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## RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: Hydroguard One 40 Grey + Hydroguard Flex Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 5.02E-06 | 1.77E-06 | 7.46E-09 | 0 | 3.28E-07 | 0 | 2.87E-07 | 0 |
| NHWD | kg | 4.85E-02 | 6.87E-02 | 1.02E-02 | 0 | 6.50E-03 | 0 | 1.00E+00 | 0 |
| RWD | kg | 4.01E-05 | 1.06E-05 | 5.25E-08 | 0 | 1.82E-06 | 0 | 2.76E-06 | 0 |
| CRU | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MFR | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MER | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EEE | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EET | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| Caption | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy |

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## RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: Hydroguard One 40 White + Hydroguard Flex Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 5.25E-06 | 1.77E-06 | 7.46E-09 | 0 | 3.28E-07 | 0 | 2.87E-07 | 0 |
| NHWD | kg | 6.15E-02 | 6.87E-02 | 1.02E-02 | 0 | 6.50E-03 | 0 | 1.00E+00 | 0 |
| RWD | kg | 4.03E-05 | 1.06E-05 | 5.25E-08 | 0 | 1.82E-06 | 0 | 2.76E-06 | 0 |
| CRU | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MFR | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MER | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EEE | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EET | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| Caption | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy |

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## RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: Hydroguard One 40 Grey + Hydroguard Elastic Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 5.95E-06 | 1.77E-06 | 7.46E-09 | 0 | 3.28E-07 | 0 | 2.87E-07 | 0 |
| NHWD | kg | 5.63E-02 | 6.87E-02 | 1.02E-02 | 0 | 6.50E-03 | 0 | 1.00E+00 | 0 |
| RWD | kg | 4.71E-05 | 1.06E-05 | 5.25E-08 | 0 | 1.82E-06 | 0 | 2.76E-06 | 0 |
| CRU | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MFR | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MER | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EEE | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EET | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| Caption | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy |

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## RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: Hydroguard One 40 White + Hydroguard Elastic Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 6.17E-06 | 1.77E-06 | 7.46E-09 | 0 | 3.28E-07 | 0 | 2.87E-07 | 0 |
| NHWD | kg | 6.86E-02 | 6.87E-02 | 1.02E-02 | 0 | 6.50E-03 | 0 | 1.00E+00 | 0 |
| RWD | kg | 4.74E-05 | 1.06E-05 | 5.25E-08 | 0 | 1.82E-06 | 0 | 2.76E-06 | 0 |
| CRU | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MFR | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MER | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EEE | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EET | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| Caption | HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy |

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## RESULTS OF THE LCA - additional impact categories according to EN 15804+A2-optional: 1kg of ClimaRoof KF-2 + ClimaRoof KF-2 Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PM | Desease incidences | 1.50E-08 | 5.61E-09 | 3.67E-11 | 0 | 7.18E-10 | 0 | 1.31E-09 | 0 |
| IR | kBq U-235 eq | 1.63E-02 | 3.23E-03 | 2.35E-05 | 0 | 5.48E-04 | 0 | 8.31E-04 | 0 |
| ETP-fw | CTUe | 5.63E+00 | 5.82E-01 | 2.71E-02 | 0 | 9.85E-02 | 0 | 1.19E-01 | 0 |
| HTP-c | CTUh | 2.06E-10 | 1.61E-11 | 1.90E-13 | 0 | 3.19E-12 | 0 | 3.56E-12 | 0 |
| HTP-nc | CTUh | 5.60E-09 | 6.37E-10 | 1.17E-11 | 0 | 1.03E-10 | 0 | 8.52E-11 | 0 |
| SQP | - | 2.11E+00 | 8.52E-01 | 9.63E-03 | 0 | 8.67E-02 | 0 | 3.53E-01 | 0 |

| | |
|---|---|
| Caption | PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index |

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## RESULTS OF THE LCA - additional impact categories according to EN 15804+A2-optional: 1kg of Hydroguard One 40 Grey + Hydroguard Flex Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PM | Desease incidences | 1.62E-08 | 5.51E-09 | 2.66E-11 | 0 | 7.15E-10 | 0 | 1.30E-09 | 0 |
| IR | kBq U-235 eq | 1.88E-02 | 3.17E-03 | 1.71E-05 | 0 | 5.45E-04 | 0 | 8.27E-04 | 0 |
| ETP-fw | CTUe | 7.07E+00 | 5.72E-01 | 2.26E-02 | 0 | 9.81E-02 | 0 | 1.19E-01 | 0 |
| HTP-c | CTUh | 2.55E-10 | 1.58E-11 | 1.42E-13 | 0 | 3.18E-12 | 0 | 3.54E-12 | 0 |
| HTP-nc | CTUh | 6.43E-09 | 6.26E-10 | 9.51E-12 | 0 | 1.03E-10 | 0 | 8.48E-11 | 0 |
| SQP | - | 2.13E+00 | 8.37E-01 | 6.94E-03 | 0 | 8.63E-02 | 0 | 3.51E-01 | 0 |

| | |
|---|---|
| Caption | PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index |

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## RESULTS OF THE LCA - additional impact categories according to EN 15804+A2-optional: 1kg of Hydroguard One 40 White + Hydroguard Flex Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PM | Desease incidences | 1.76E-08 | 5.51E-09 | 2.66E-11 | 0 | 7.15E-10 | 0 | 1.30E-09 | 0 |
| IR | kBq U-235 eq | 1.96E-02 | 3.17E-03 | 1.71E-05 | 0 | 5.45E-04 | 0 | 8.27E-04 | 0 |
| ETP-fw | CTUe | 7.24E+00 | 5.72E-01 | 2.26E-02 | 0 | 9.81E-02 | 0 | 1.19E-01 | 0 |
| HTP-c | CTUh | 2.59E-10 | 1.58E-11 | 1.42E-13 | 0 | 3.18E-12 | 0 | 3.54E-12 | 0 |
| HTP-nc | CTUh | 6.63E-09 | 6.26E-10 | 9.51E-12 | 0 | 1.03E-10 | 0 | 8.48E-11 | 0 |
| SQP | - | 2.28E+00 | 8.37E-01 | 6.94E-03 | 0 | 8.63E-02 | 0 | 3.51E-01 | 0 |

| | |
|---|---|
| Caption | PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index |

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## RESULTS OF THE LCA - additional impact categories according to EN 15804+A2-optional: 1kg of Hydroguard One 40 Grey + Hydroguard Elastic Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PM | Desease incidences | 1.88E-08 | 5.51E-09 | 2.66E-11 | 0 | 7.15E-10 | 0 | 1.30E-09 | 0 |
| IR | kBq U-235 eq | 2.22E-02 | 3.17E-03 | 1.71E-05 | 0 | 5.45E-04 | 0 | 8.27E-04 | 0 |
| ETP-fw | CTUe | 8.21E+00 | 5.72E-01 | 2.26E-02 | 0 | 9.81E-02 | 0 | 1.19E-01 | 0 |
| HTP-c | CTUh | 2.93E-10 | 1.58E-11 | 1.42E-13 | 0 | 3.18E-12 | 0 | 3.54E-12 | 0 |
| HTP-nc | CTUh | 7.49E-09 | 6.26E-10 | 9.51E-12 | 0 | 1.03E-10 | 0 | 8.48E-11 | 0 |
| SQP | - | 2.35E+00 | 8.37E-01 | 6.94E-03 | 0 | 8.63E-02 | 0 | 3.51E-01 | 0 |

| | |
|---|---|
| Caption | PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index |

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## RESULTS OF THE LCA - additional impact categories according to EN 15804+A2-optional: 1kg of Hydroguard One 40 White + Hydroguard Elastic Resin

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| PM | Desease incidences | 2.01E-08 | 5.51E-09 | 2.66E-11 | 0 | 7.15E-10 | 0 | 1.30E-09 | 0 |
| IR | kBq U-235 eq | 2.29E-02 | 3.17E-03 | 1.71E-05 | 0 | 5.45E-04 | 0 | 8.27E-04 | 0 |
| ETP-fw | CTUe | 8.37E+00 | 5.72E-01 | 2.26E-02 | 0 | 9.81E-02 | 0 | 1.19E-01 | 0 |
| HTP-c | CTUh | 2.97E-10 | 1.58E-11 | 1.42E-13 | 0 | 3.18E-12 | 0 | 3.54E-12 | 0 |
| HTP-nc | CTUh | 7.69E-09 | 6.26E-10 | 9.51E-12 | 0 | 1.03E-10 | 0 | 8.48E-11 | 0 |
| SQP | - | 2.49E+00 | 8.37E-01 | 6.94E-03 | 0 | 8.63E-02 | 0 | 3.51E-01 | 0 |

| | |
|---|---|
| Caption | PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index |

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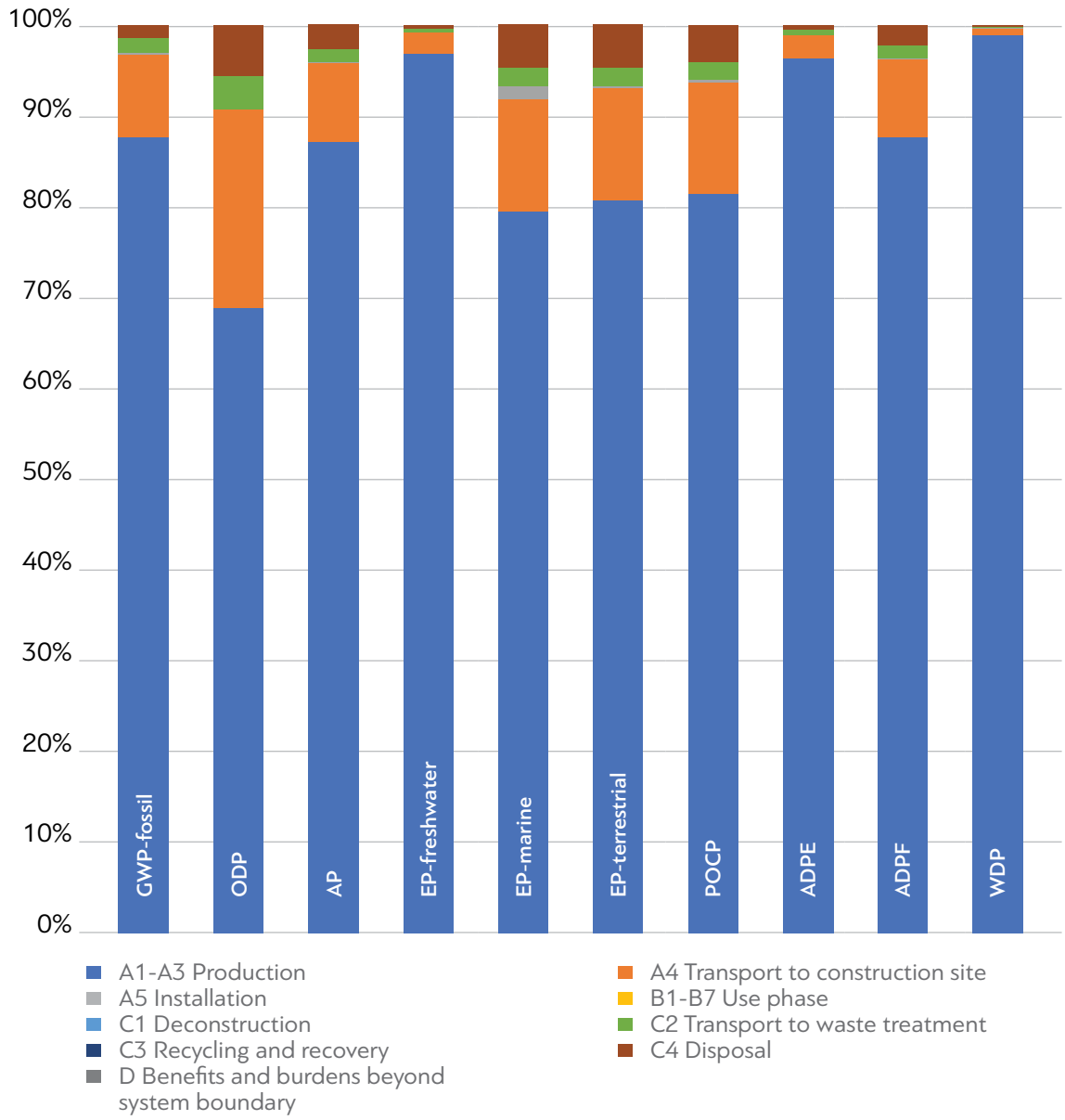
## Relative contributions to the life cycle impacts of: ClimaRoof KF-2 + ClimaRoof KF-2 Resin



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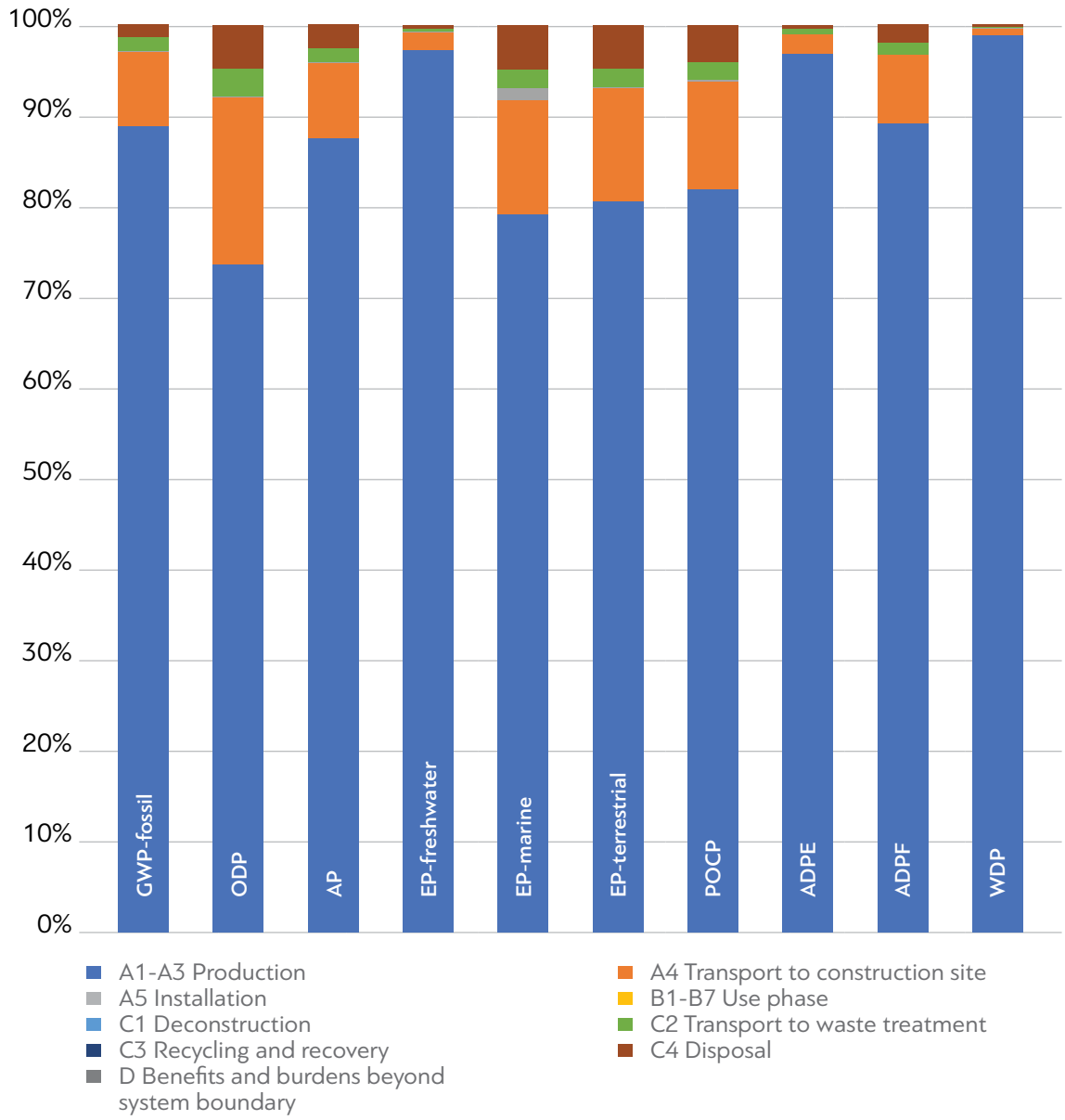
## Relative contributions to the life cycle impacts of: Hydroguard One 40 Grey + Hydroguard Flex Resin



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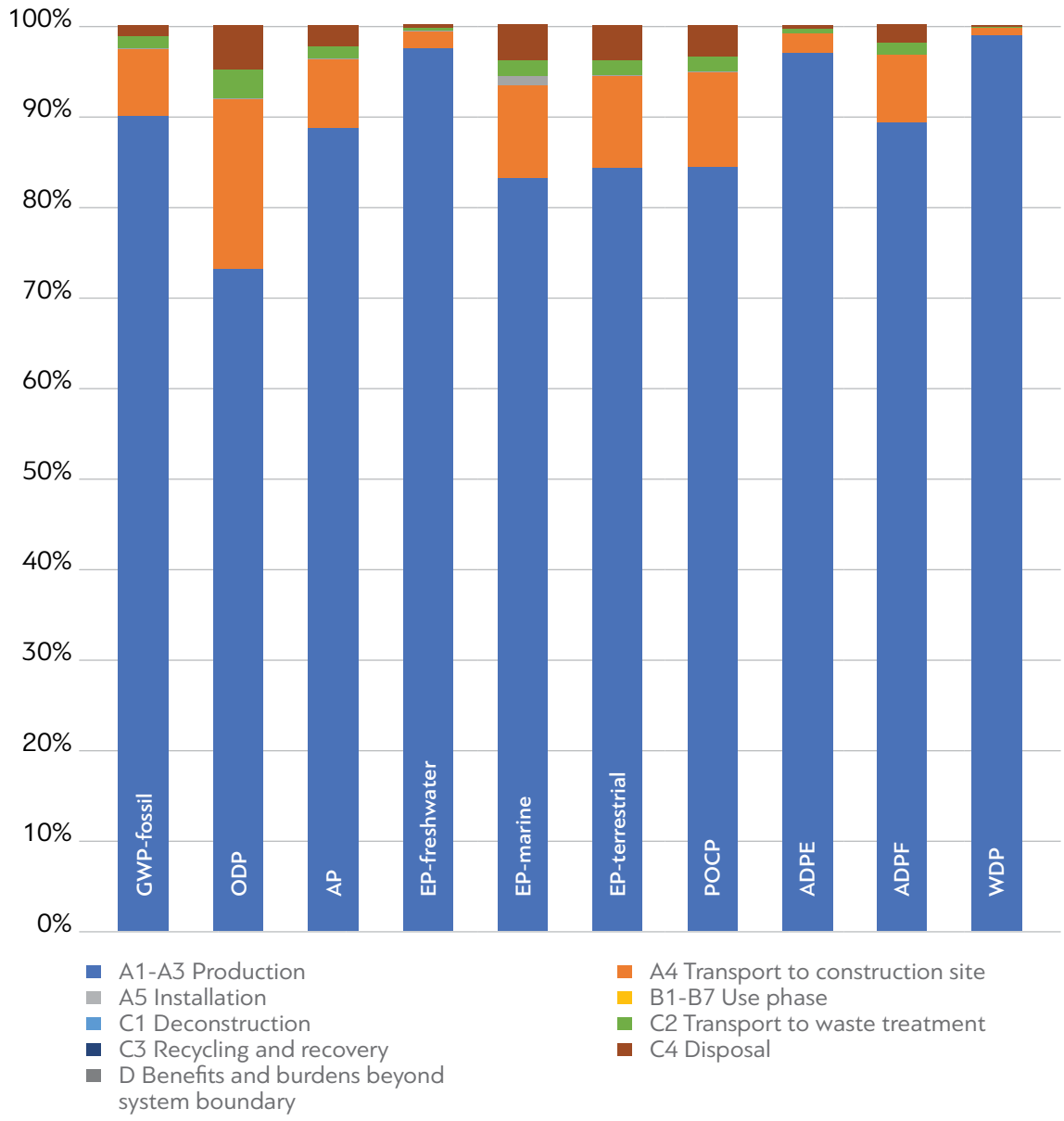
## Relative contributions to the life cycle impacts of: Hydroguard One 40 White + Hydroguard Flex Resin



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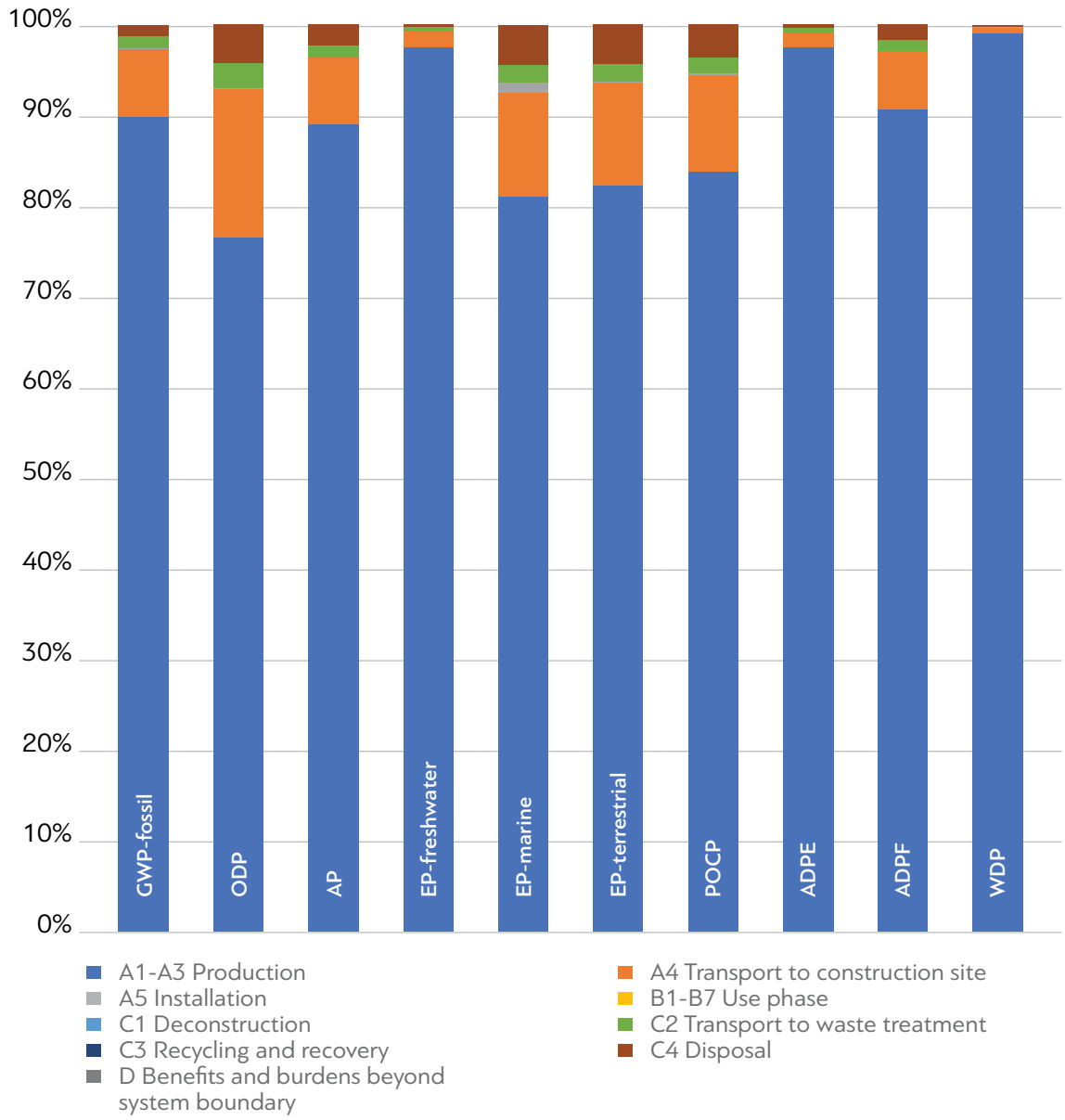
## Relative contributions to the life cycle impacts of: Hydroguard One 40 Grey + Hydroguard Elastic Resin



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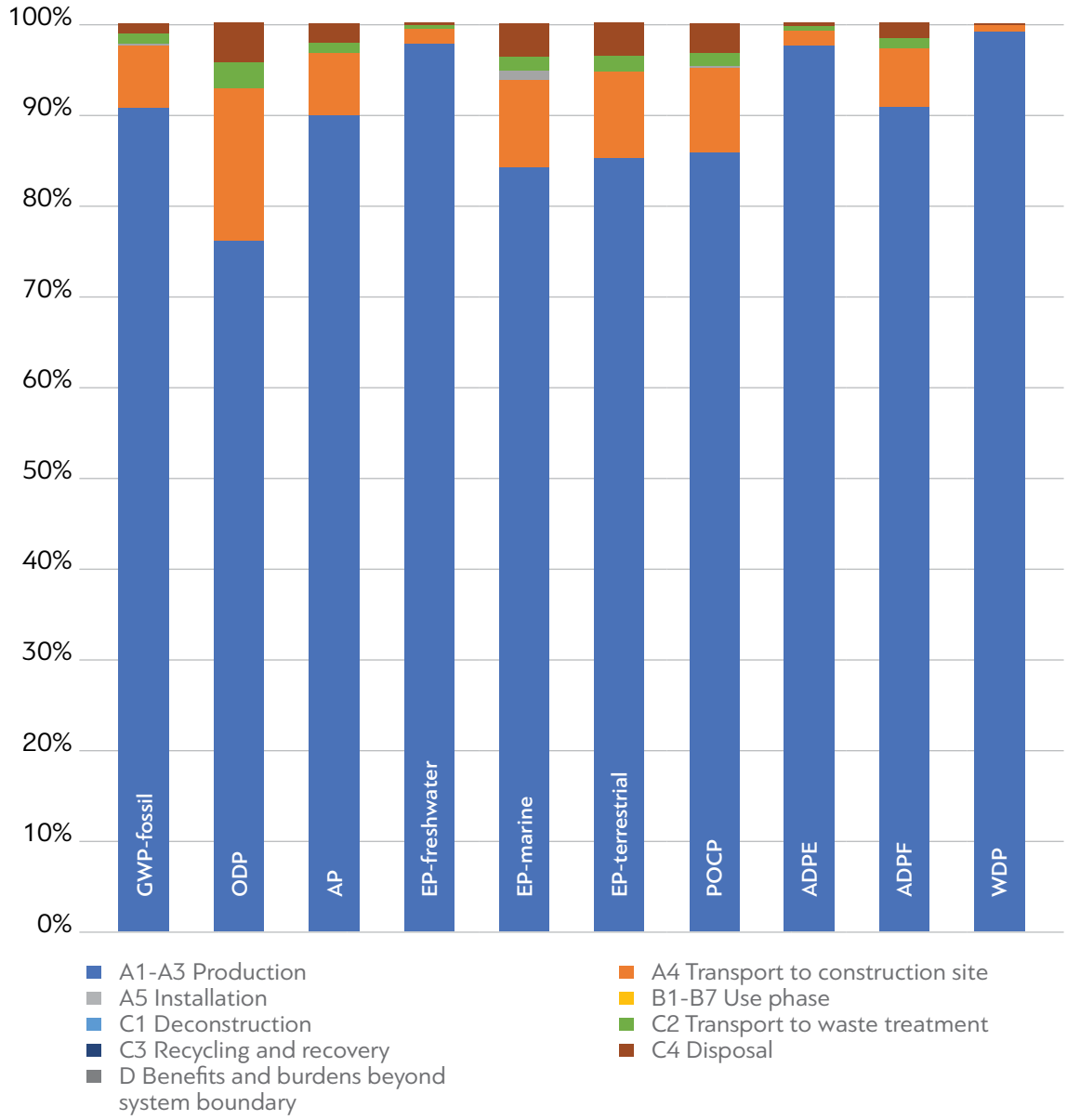
## Relative contributions to the life cycle impacts of: Hydroguard One 40 White + Hydroguard Elastic Resin



**Disclaimer 1: for the indicator IR**

This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

**Disclaimer 2: for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP**

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.

**Revision Details: Addition of GWP-GHG indicators and new product certificates**

## References

**EN 15804: 2012+A2: 2019:** Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

**ISO 14025: 2006:** Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

**ISO 15686-(several parts):** Buildings and constructed assets - Service life planning.

**ISO 14020:2000:** Environmental labels and declarations - General principles.

**ISO 14040:2006:** Environmental management - Life cycle assessment - Principles and framework.

**ISO 14044:2006:** Environmental management - Life cycle assessment - Requirements and guidelines.

**Waste Framework Directive:** COUNCIL REGULATION (EU) No 333/2011 of 31 March 2011 establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2008/98/EC of the European Parliament and of the Council.

**ECHA:** The Candidate List of substances of very high concern, available via https://echa.europa.eu/nl/-/four-newsubstances-added-to-the-candidate-list.

**EPD International:** PCR 2019:14 Construction products, version 1.11, dated 2021-02-25. ww.environdec.com

**EPD International:** General Programme Instructions of the International EPD® System. Version 3.01, dated 2019-09-18. www.environdec.com

**Weidema et al. (2013):** Weidema, B., C. Bauer, R. Hischier, C. Mutel, T. Nemecek, J. Reinhard, C.O. Vadenbo, G. Wernet (2013): Overview and methodology, Data quality guideline for the ecoinvent database version 3. ecoinvent report no. 1 (v3), St. Gallen, Schweiz.

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# ENVIRONMENTAL PRODUCT DECLARATION

According to ISO 14025 and EN 15804+A2

| | |
|---|---|
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