Environmental product declaration for:

# H40 No Limits

Standard setting, multipurpose gel-adhesive, structural, flexible, thixo & fluid. For tiles and stone of all types and formats.

**Programme: The International EPD® System, www.environdec.com**

**Programme operator: EPD International AB**

**EPD registration number: S-P-01073**

**Publication date: 2017-08-10**

**Revision date: 2023-07-25**

**Valid until: 2027-06-24**

**CPC Code: 375-Articles of concrete, cement and plaster**

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

**→ Cradle to Gate scope**

**→ Multiple products**

kerakoll

*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*

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## 1. ABOUT THIS EPD

What is an EPD?
Environmental Product Declaration (EPD) is label that provide a transparent, multi-faceted overview of the environmental performance of a product during its life cycle.
Our intention in providing this EPD is to present the potential environmental impacts for our products.
They are presented in single EPDs such that they can be combined to calculate the impacts of a more complex building system. Target audiences of the study are customers and other parties interested in the environmental impacts of our products.

**Declaration owner and LCA Author**

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**CEN standard EN 15804:2019 served as the core PCR**

| | |
|---|---|
| PCR | EN 15804:2012+A2:2019 as the core PCR,<br>International EPD System PCR 2019:14 "Construction products", v1.11, 2021-02-05 |
| PCR committee | IVL Swedish Environmental Research Institute Secretariat of the International EPD® System |
| 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 www.environdec.com/contact. |
| Independent third-party verification of the declaration and data according to ISO 14025:2006 | ☒ EPD Process Certification*<br>☐ EPD verification by accredited certification body<br>☐ EPD verification by individual verifier |

*For EPD Process Certification, an accredited certification body certifies and reviews the management process and verifies EPDs published on a regular basis. For details about third-party verification procedure of the EPDs, see GPI v.4, Section 7.5.

**Third party verifier**

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Accredited by Accredia - accreditation number: 006H

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

## 2. ABOUT KERAKOLL

Kerakoll - The GreenBuilding Company
From the outset, the pillar of the Kerakoll vision has always been to make the difference through sustainable innovation. This belief led to the launch of Biocalce and Healthy Building in April 2005, i.e. the new take on sustainable building in which the focus is to safeguard health and improve the quality of life.
Kerakoll became The GreenBuilding Company, the leading manufacturer of green solutions for designing, building and living in harmony with the environment and in healthy spaces: the company earned certification for the GreenBuilding Rating from the Societé Générale de Sourveillance (SGS) and get the EPD Process Certification, meaning that our internal processes to produce EPDs have been quality assured by an external certification body.

**Mission & Vision**
To represent GreenBuilding, the new low environmental impact approach to building that safeguards the health and wellbeing of people. We think, develop and produce innovative solutions that focus on the environment and on improving both health and quality of life by using building materials that avoid the most common illnesses caused by indoor pollution. Our vision is to interpret GreenBuilding as a new way of building that is kind on the environment, promoting higher quality homes around the world and helping people to live better.
Products, services and specific know-how formed the basis of Kerakoll's rise to become the GreenBuilding Company, the only company to provide a global GreenBuilding solution that aims at designing, building, and living in harmony with the environment and in healthy spaces.

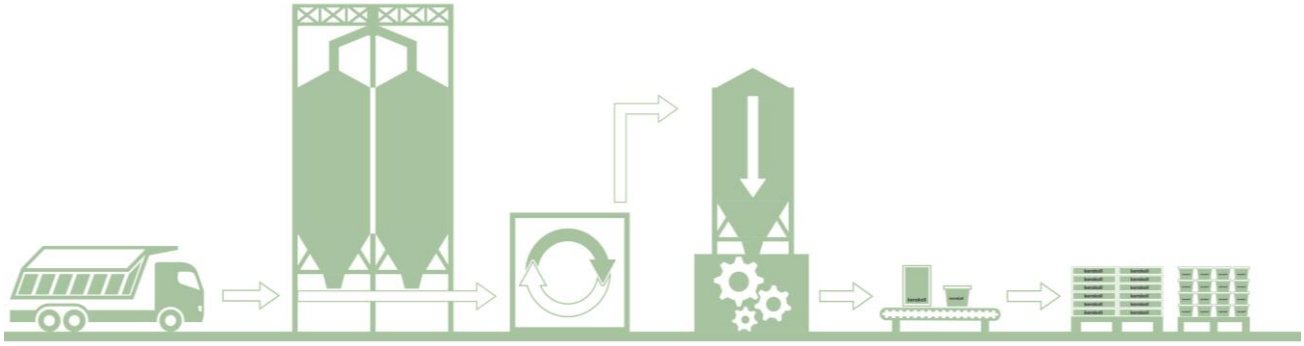
**Values**
The Kerakoll business culture to create value over time.
Kerakoll is determined to improve its performance in all ways, firm in the belief that to create value over time you have to first create a firm business culture.
Business culture in Kerakoll means being committed to recognizing and reclaiming the value of key experiences and practices of the past, and at the same time being constantly willing to go out on a limb.
Research and innovation only make sense in such a context, where progress goes hand-in-hand with restoration, preservation and reclaiming the heritage of the company's past.
The Kerakoll mission is to meet the needs of its consumers with a constant supply of new and original ideas, remaining ever faithful to a business culture always ready to consider the ideas of all its members.
When it comes to knowledge assets, people are a key resource for Kerakoll along with the values, expectations, hopes, ideas and originality they bring with them.
This belief is the cornerstone of the Kerakoll business ethos, and the five pillars of this approach represent our modus operandi in both life and work.

**Integrated policy for total quality, wellbeing and protection of the environment**
We pride ourselves on our quality, we are guided by our commitment to society and the health of people, and tireless in our promotion of environmental sustainability.
Focus on the environmental sustainability of a home as it relates to the health of its inhabitants: this is the core philosophy that underlies Kerakoll GreenBuilding. The pillars of healthy housing are indoor air quality, advanced environmental and energy standards, and healthy spaces that exist in harmony with nature. Kerakoll's personal approach aims to integrate the many aspects of GreenBuilding into everyday life, in keeping with the growing environmental sensibility of every individual.
We believe that our mission is to make technology more sustainable and to develop an associated model of development: the true aim of any business should be to develop projects of low environment impact but of huge technological innovation.
Kerakoll's commitment in this direction can be seen in everyday things, in business, and in our awareness of consumer needs in order to satisfy current requirements without jeopardizing the wellbeing of future generations. This is not just an economic mission, but also one of corporate social responsibility which guides and unites everyone here at Kerakoll.
That's why at Kerakoll we see business and social responsibility as going hand in hand, which means we make it our business to improve the quality of life of people and the environment they live in.

**Taking "Made in Italy" excellence around the world**
In its 40 years in the industry, Kerakoll has been so successful that it has gone from being top of the domestic market to a top Italian-based business in Europe, before also becoming a leading European group (and Italian at heart) bound for the international arena. International expansion and an ever more global approach have certainly not eroded the longstanding Kerakoll identity. The company has remained faithful to the values that saw it rise to 1st place in the production of GreenBuilding solutions around the world with more than 1,700 items.
Innovation, respect for the environment, concern for health and living comfort, and a pure wholesome approach are the defining tenets of Kerakoll.

## 3. MANUFACTURING

The manufacturing process starts from raw materials purchased from suppliers and stored in the plant.
Bulk raw materials are stored in specific silos and added mostly automatically in the production mixer, according to the formula of the products. Other raw materials, supplied in bags or big bags, are stored in their warehouse and added automatically or manually in the mixer.
The production is a discontinuous process, in which all the components are mechanically mixed in batches.
The semi-finished products are then packaged in bags, put on wooden pallets, covered by stretched hoods and stored in the Finished Products' warehouse. The quality of final products is controlled before the sale.



## 4. PRODUCTS

**Description and use of the products**
These products are manufactured by Kerakoll S.p.A. in the production plants located in Sassuolo (MO - Italy) and Rubiera (RE - Italy) and are supplied in 25 - 5 - 2 kg paper bags. Geo-binder based, structural flexible multi-purpose gel-adhesives for bonding all types of material, on all substrates, and for all use, even in extreme conditions. H40 No Limits (grey and white) is an improved and high performance (2), cementitious adhesive (C) with extended open time (E) and no vertical slip (T), for ceramic tiles and large stone slabs, characterized by very low emission of volatile organic compounds.
Category: inorganic mineral products
Class: Gel-adhesives for ceramic tiles and natural stone
Coverage per mm thickness: 1,25 kg/m2

**Products standard**
The product is designed, produced and CE marked according to EN 12004 (Adhesives for tiles. Requirements, evaluation of conformity, classification and designation).
It is classified as C2TE according to EN 12004-1:2017 for interior and exterior bonding of ceramic tiles, porcelain, natural stone and mosaics on floors and walls.

**Physical characteristics**
The product is supplied from production in dry form, premixed in respect of all contents but water. Water is added at the building site in the construction/ installation stage, in a defined amount and technique, in order to produce a cementitious adhesive of high performance. For specific physical properties, we refer to the CE declaration or Declaration of Performance available on demand or to the technical datasheet on www.kerakoll.com/it.

**Content declaration**
The main components of the involved product (for both the variants) are the following:

| Component | Weight (kg) | Post-consumer recycled material (%) | Biogenic material, weight - % and kg C/kg |
|---|---|---|---|
| Aggregates and fillers | 0,5 - 0,7 | - | - |
| Binders | 0,25 - 0,5 | - | |
| Others (additives, etc.) | < 0,1 | - | |

Product is free from substances of very high concern (SVHC) on the REACH Candidate List published by the European Chemicals Agency in a concentration more than 0,1% (by unit weight). Related to specific components, the table above shows only hazardous ones within the meaning of the CLP regulation and their related classification as stated into product Safety Data Sheet.

The primary packaging is a printed kraft paper bag coated on the inside with PE film. The most representative one, in terms of market supply, is the 25 kg format. Therefore the 25 kg format is the one considered for this study. The main characteristics are shown in the table below.

| Primary packaging | Weight (kg) | Weight (%), finished product |
|---|---|---|
| Paper bag coated on the inside with PE film | 0,1 | 0,4% |

## 5. LCA INFORMATION

**Declared Unit**

The Declared Unit (DU) is 1 kg of product. Packaging is included since it is proportioned to 1 kg of product, accounting for 0,4% w/w in respect to the packaging format of 25 kg.

**Scope**

CEN developed the EN 15804:2012+A2:2019, a core set of rules for the development of EPD applicable to construction products. This standard is developed with a modular structure, described below. This EPD is of the "Cradle to Gate" type, including EN 15804 modules from A1 to A3. Modules not accounted in the LCA since they are not assessed are marked as "ND", Not Declared

| | Upstream - Core | | | Downstream | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | |
| | Raw material supply | Transports (raw materials - pack) | Manufacturing | Transport to customer | Construction installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction demolition | Transport to waste | Waste processing | Disposal |
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 |
| Modules declared | X | X | X | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Geography | IT - EU 27 | IT - EU 27 | IT - EU 27 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Specific data used | >90% | | | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation - products | <10% | | | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation - sites | Not relevant | | | - | - | - | - | - | - | - | - | - | - | - | - | - |

System boundaries and processes included in the LCA (X included, ND: Not Declared)

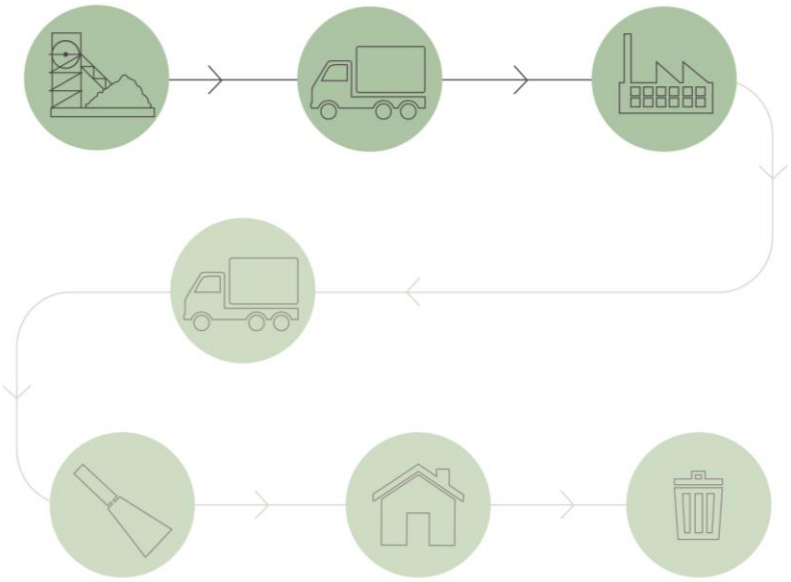
The “Cradle to Gate” type adopted is justified since:

- the product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life, and
- the product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process, and
- the product or material does not contain biogenic carbon

According to the system boundary of this EPD, a RSL has not been provided.

The EPD is a Group type. Two alternatives are available for the single product analysed: the White and Grey one. Therefore, a sensitivity analysis has been performed between these two alternatives and the results show that a variation of GWP-GHG indicator for A1-A3 is not larger than ± 0,7% between them. Average results are reported as environmental performances. Therefore the study includes both White and Grey variants.
The EPD is based on two manufacturing sites. However, none average data have been used, since both the manufacturing sites with their specific data have been considered, following allocation rules based on percentage of production during the reference year. See "Allocations" paragraph.

**Product (A1-A3)**



- A1-A2: extraction, supply and transport of raw materials and packaging to Kerakoll and manufacturing process energy consumption.
- A3: manufacturing process of product and its packaging and waste management from the same process.

It covers dosage and mixing of selected and measured raw materials and additives to ensure that the product meets desired properties and packaging material consumption.
Packaging product materials consist of wooden pallet, cardboard and LDPE used as wrapping material and they include both distribution and consumer packaging, as follows.

| Material | Distribution packaging | Consumer packaging |
|---|---|---|
| Wooden pallet | x | |
| Plastic and LDPE film (e.g. for wrapping material) | x | |
| Plastic bucket | | x |

**Data quality**

For the background data the Ecoinvent v.3.8 database is used. Raw materials and packaging, energy and water consumption and waste data are collected from Kerakoll. The most relevant considered data are European or specific from supplier. Generic and producer specific data are not more than 10 and 5 years old respectively (according to EN 15804 6.3.8.2. “Data quality requirements”).

**Period under review**

All primary data collected from Kerakoll are representative for the year 2021.

**Allocations**

There are no co-products in the production of paints manufactured by Kerakoll. Hence, there is no need for co-product allocation. The Company sources raw materials from different locations across Europe and other parts of the world and by different means of transport. For this reason, transport is allocated according to raw material quantities.
Kerakoll manufactures various products with specifications for different applications in its different manufacturing plants. Raw materials, transport, energy consumption during manufacturing, packaging and waste data are allocated using data from Kerakoll involved plants.

**Cut-off rules**

The consumption of auxiliary materials and waste related to extraordinary activities (A3), having a periodicity exceeding 3 years, are excluded. Quantified contribution from those process: less than 0,5% by mass of products.

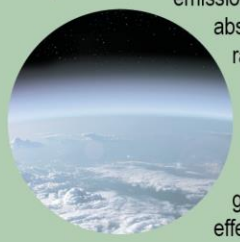
## 6. ENVIRONMENTAL INDICATORS

An introduction to each environmental indicator is provided below. 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. The actual impacts on the environment typically depend upon local, regional and/or global conditions.

**Abiotic Depletion Potential (ADP)**
The consumption of non-renewable resources leads to a decrease in the future availability of the functions supplied by these resources. Depletion of mineral resource elements (ADPE) and non-renewable fossil energy resources (ADPF) are reported separately.

**Acidification Potential (AP)**
A measure of emissions that cause acidifying effects to the environment. Acidification potential is a measure of a molecule's capacity to increase the hydrogen ion (H+) concentration in the presence of water, thus decreasing the pH value. Potential effects include forest decline and the deterioration of building materials.

**Ozone Depletion Potential (ODP)**
A measure of greenhouse gas emissions, such as carbon dioxide and methane. These emissions increase absorption of radiation emitted by the earth, intensifying the natural greenhouse effect.



**Eutrophication Potential (EP)**
A measure of nutrient enrichment that may cause an undesirable shift in species composition and elevated biomass production in both terrestrial and aquatic ecosystems. It includes potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen and phosphorus.

**Water Deprivation Potential (WDP)**
It represents the relative available water remaining per area in a watershed, after the demand of humans and aquatic ecosystems has been met. It assesses the potential of water deprivation, to either humans or ecosystems, building on the assumption that the less water remaining available per area, the more likely another user will be deprived.

**Global Warming Potential (GWP)**
A measure of greenhouse gas emissions, such as carbon dioxide and methane. These emissions increase absorption of radiation emitted by the earth, intensifying the natural greenhouse effect.

**Photochemical Ozone Creation Potential (POCP)**
A measure of emissions of precursors that contribute to ground level smog formation (mainly ozone O3), produced by the reaction of volatile organic compounds (VOCs) and carbon monoxide in the presence of nitrogen oxides under the influence of UV light. Ground level ozone may be harmful to human and ecosystem health and may also damage crops.

## 7. ENVIRONMENTAL PERFORMANCE

All results are referred to the Declared Unit that is 1 kg of adhesive (packaging included accounting for 0,4% w/w in respect to the packaging format of 25 kg).

**H40 No Limits**

| POTENTIAL ENVIRONMENTAL IMPACTS | Unit | TOTAL A1-A3 | A1 | A2 | A3 |
|---|---|---|---|---|---|
| Climate change (GWP-total) | kg $CO_2$ eq | 3,94E-01 | 3,87E-01 | 2,37E-02 | -1,69E-02 |
| Climate change - Fossil (GWP-fossil) | kg $CO_2$ eq | 4,22E-01 | 3,85E-01 | 2,35E-02 | 1,35E-02 |
| Climate change - Biogenic (GWP-biogenic) | kg $CO_2$ eq | -2,78E-02 | 2,55E-03 | 1,23E-04 | -3,05E-02 |
| Climate change - Land use and LU change (GWP-luluc) | kg $CO_2$ eq | 2,81E-04 | 2,25E-04 | 1,11E-05 | 4,43E-05 |
| Ozone depletion (ODP) | kg CFC-11 eq | 2,35E-08 | 1,67E-08 | 5,19E-09 | 1,53E-09 |
| Acidification (AP) | mol $H^+$ eq | 1,18E-03 | 1,03E-03 | 7,41E-05 | 6,93E-05 |
| Eutrophication, freshwater (EP-freshwater) | kg P eq | 5,72E-05 | 4,71E-05 | 2,01E-06 | 8,02E-06 |
| Eutrophication, freshwater (EP-freshwater) | kg $PO_4$ eq | 1,75E-04 | 1,45E-04 | 6,19E-06 | 2,46E-05 |
| Eutrophication, marine (EP-marine) | kg N eq | 2,87E-04 | 2,51E-04 | 1,58E-05 | 2,01E-05 |
| Eutrophication, terrestrial (EP-terrestrial) | mol N eq | 3,17E-03 | 2,79E-03 | 1,72E-04 | 2,05E-04 |
| Photochemical ozone formation (POCP) | kg NMVOC eq | 9,11E-04 | 7,76E-04 | 6,21E-05 | 7,22E-05 |
| Resource use, minerals and metals (ADP-minerals&metals)[1] | kg Sb eq | 1,30E-06 | 1,13E-06 | 8,97E-08 | 7,89E-08 |
| Resource use, fossils (ADP-fossil)[1] | MJ | 3,64E+00 | 3,06E+00 | 3,53E-01 | 2,33E-01 |
| Water use (WDP)[1] | $m^3$ depriv. | 9,58E-02 | 8,61E-02 | 1,98E-03 | 7,79E-03 |

| ADDITIONAL ENVIRONMENTAL IMPACTS | Unit | TOTAL A1-A3 | A1 | A2 | A3 |
|---|---|---|---|---|---|
| Particulate matter (PM) | disease inc. | 9,84E-09 | 7,08E-09 | 1,83E-09 | 9,26E-10 |
| Ionising radiation (IRP)[2] | kBq U-235 eq | 2,21E-02 | 1,87E-02 | 1,91E-03 | 1,52E-03 |
| Ecotoxicity, freshwater (ETP-fw)[1] | CTUe | 3,56E+00 | 3,03E+00 | 2,88E-01 | 2,44E-01 |
| Human toxicity, cancer (HTP-c)[1] | CTUh | 1,23E-10 | 7,13E-11 | 1,10E-11 | 4,08E-11 |
| Human toxicity, non-cancer (HTP-nc)[1] | CTUh | 3,65E-09 | 3,16E-09 | 2,84E-10 | 1,98E-10 |
| Land use / Soil quality (SQP)[1] | Pt | 4,80E+00 | 1,36E+00 | 2,42E-01 | 3,20E+00 |

[1] 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

[2] Disclaimer: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear full 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.

| USE OF RESOURCES | Unit | TOTAL A1-A3 | A1 | A2 | A3 |
|---|---|---|---|---|---|
| Use of non-renewable primary energy excluding resources used as raw materials - PENRE | MJ | 2,89E+00 | 2,35E+00 | 3,51E-01 | 1,89E-01 |
| Use of non-renewable primary energy resources used as raw materials - PENRM | MJ | 7,50E-01 | 7,04E-01 | 2,10E-03 | 4,44E-02 |
| Total use of non-renewable primary energy resources - PENRT | MJ | 3,64E+00 | 3,06E+00 | 3,53E-01 | 2,33E-01 |
| Use of renewable primary energy excluding resources used as raw materials - PERE | MJ | 1,71E-01 | 1,55E-01 | 8,28E-03 | 8,49E-03 |
| Use of renewable primary energy resources used as raw materials - PERM | MJ | 6,83E-01 | 1,05E-01 | 2,06E-03 | 5,76E-01 |
| Total use of renewable primary energy resources - PERT | MJ | 8,54E-01 | 2,60E-01 | 1,03E-02 | 5,84E-01 |
| Use of secondary material - SM | kg | 3,47E-01 | 3,47E-01 | 0,00E+00 | 0,00E+00 |
| Use of renewable secondary fuels - RSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Use of non-renewable secondary fuels - NRSF | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Use of net fresh water - FW | m3 | 2,74E-03 | 2,45E-03 | 6,50E-05 | 2,20E-04 |

| WASTE PRODUCTION AND OUTPUT FLOWS | Unit | TOTAL A1-A3 | A1 | A2 | A3 |
|---|---|---|---|---|---|
| Hazardous waste disposed - HWD | kg | 1,08E-03 | 0,00E+00 | 0,00E+00 | 1,08E-03 |
| Non-hazardous waste disposed - NHWD | kg | 2,42E-03 | 0,00E+00 | 0,00E+00 | 2,42E-03 |
| Radioactive waste disposed - RWD | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Components for re-use | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling | kg | 2,58E-03 | 0,00E+00 | 0,00E+00 | 2,58E-03 |
| Materials for energy recovery | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, electricity | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy, thermal | MJ | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

| GWP-GHG (according to IPCC 2013) | Unit | TOTAL A1-A3 | A1 | A2 | A3 |
|---|---|---|---|---|---|
| Climate change (GWP-total IPCC 2013)[3] | kg $CO_2$ eq | 4,11E-01 | 3,74E-01 | 2,33E-02 | 1,34E-02 |

## 8. INFORMATION ON BIOGENIC CARBON CONTENT

| BIOGENIC CARBON CONTENT | Unit | A1 - product | A3 - packaging |
|---|---|---|---|
| Biogenic Carbon content[4] | kg C | 0,00E+00 | 8,32E-03 |

[3] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

[4] 1 kg biogenic carbon is equivalent to 44/12 kg $CO_2$

## 9. ADDITIONAL ENVIRONMENTAL INFORMATION

**Quality and Environmental management systems**
Kerakoll is ISO 9001 certified since 2000.

**VOC emissions**
Volatile Organic Compounds (VOC) tests and evidence have been carried out on the product, according to ISO 16000 parts 3, 6, 9 and 11 and EN 16516. The involved product meets the requirements for the emission class Emicode EC1 Plus, as “very low VOC emission”, released by GEV (Gemeinschaft Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte e.V.).
It has been evaluated in emission chambers, in order to detect their VOC emissions after 3 and 28 days storage in the ventilated chambers, according to GEV test method.

## 10. DIFFERENCES VERSUS PREVIOUS VERSION OF THE EPD

2022-06-27 - Update to EN 15804:2019 and PCR 2019:14 v1.11. Change to Declared Unit of 1 kg and Cradle to Gate (A1-A3) EPD-type. Dataset: Ecoinvent 3.8.
2022-10-11 - Correction of % variation of GWP-GHG indicator for A1-A3
2022-11-14 - Corrections to the Scope paragraph table and the Content Declaration table. Some graphic adjustment to improve clarity (e.g. the image included In the Product (A1-A3) paragraph). Better clarification of Declared Unit.
2023-06-09 - Change images of product packaging and front page. Change In "content declaration" table. Chapter 6: change of environmental indicators nomenclature. Better clarification of packaging inclusion (Chapter 7).
2023-07-25 - Corrections of computational method for "use of resources - energy" indicators; corrections for indicators "waste production and output flows"; some editorial updates on the cover page and about general information of EPD (page 2).

## 11. REFERENCES

Ecoinvent - Ecoinvent Centre, www.ecoinvent.org
EMICODE GEV - Gemeinschaft Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte e. V. (pub.). www.emicode.de
EN 12004-1:2017 - Adhesives for ceramic tiles - Part 1: Requirements, assessment and verification of constancy of performance, classification and marking
EN 12004-2:2017 - Adhesives for ceramic tiles - Part 2: Test methods
EN 15804:2012+A2:2019 - Sustainability of construction works - Environmental Product Declarations - Core rules for the product category of construction products
EN ISO 16000-9:2008-04 - Indoor air – Part 9: Determination of the emission of volatile organic compounds from building products and furnishings – Emission test chamber method
EPD Study Report H40 No Limits, 2023-07-21
GPI - General Programme Instructions, The International EPD® System, Version 3.1
ISO 9001:2015 - Quality management systems - Requirements
ISO 14001:2015 - Environmental management systems - Requirements with guidance for use
ISO 14021:2016 - Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling)
ISO 14025:2009 - Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14040/44:2006 - Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006) and Requirements and guidelines (ISO 14044:2006)
ISO 16000-3:2013-01 - Indoor air –Part 3: Determination of formaldehyde and other carbonyl compounds by sampling using a pump
ISO 16000-6:2012-11 - Indoor air –Part 6: Determination of volatile organic compounds indoors and in test chambers by sampling on TENAX TA®, thermal desorption and gas chromatography using MS or FID
PCR for Construction Products, The International EPD System, 2019:14 Version 1.11, 2024-12-20
SimaPro - SimaPro LCA Software, Pré Consultants, the Netherlands, www.pre-sustainability.com
The International EPD® System - The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025 www.environdec.com

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.

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