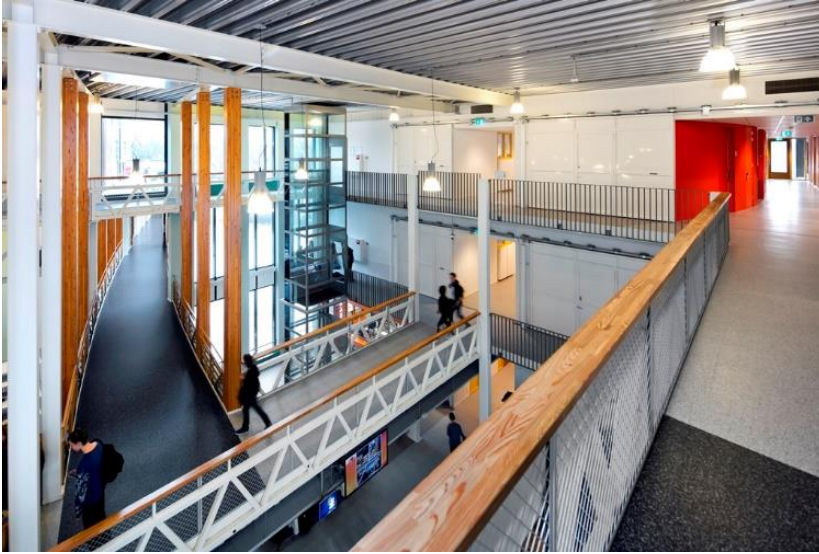


ENVIRONMENTAL PRODUCT DECLARATION

DLW LINOLEUM COMPACT

GERFLOR DLW LINOLEUM COMPACT SHEET FLOORING



Linoleum Compact – Linoleum flooring in rolls



Because we think actions speak louder than words, Gerflor has always been willing to act and to develop flooring solutions that meet the most challenging requirements in term of design, durability, easy installation, acoustic comfort, ...

When it comes to sustainability, we also set ourselves to the highest standards. We believe in developing great products that not only perform, but also contribute to achieving high indoor air quality and top contribution to all green building certification schemes.

All our products are:

- 100% Floorscore certified, meaning that our products have been independently third party certified to comply with strict volatile organic compounds (VOC) emissions criteria.
- 100% REACH compliant (voluntarily independently Third Party Verified)

All Gerflor new products are developed with a view to optimize the environmental impact at every stage of the product's life. This includes assessment of the manufacture, installation, ongoing maintenance, eventual uplift and recycling of the products. As part of this commitment, Gerflor has decided to take a leadership position by publishing a third party independently verified EPD for each of its product ranges.



ENVIRONMENTAL PRODUCT DECLARATION



LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025 and ISO 21930:2017

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on several environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.





| | |
|--|---|
| EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE | UL Environment 333 Pfingsten Road Northbrook, IL 60611 https://www.ul.com/ https://spot.ul.com/ |
| GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER | General Program Instructions v.2.1 April 2017 |
| MANUFACTURER NAME AND ADDRESS | Gerflor 50 Cours de la République, 69100 Villeurbanne, France |
| DECLARATION NUMBER | 4788756650.102.1 |
| DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT | DLW Linoleum Compact The functional unit used for this study is 1m ² of linoleum flooring, for a 25 years service life. |
| REFERENCE PCR AND VERSION NUMBER | PCR -Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 3.2, UL Environment. PCR - Part B: Flooring EPD Requirements, Second Edition, Dated September 28, 2018. UL Environment, Institut Bauen und Umwelt e.V. |
| DESCRIPTION OF PRODUCT'S INTENDED APPLICATION AND USE (AS IDENTIFIED WHEN DETERMINING PRODUCT RSL) | The product is classified in accordance with EN ISO 10874 and in reference to the FCSS (Floor Covering Standard Symbols) to be installed in various areas of application including commercial and industrial applications. |
| PRODUCT RSL DESCRIPTION (IF APPL.) | The stated RSL is 25 years. The manufacturer has provided this service life on the basis of his experience of flooring manufacture and supply. |
| MARKETS OF APPLICABILITY | Commercial market; North America & EU |
| DATE OF ISSUE | July 1, 2019 |
| PERIOD OF VALIDITY | 5 Years |
| EPD TYPE | Product-Specific |
| VARIABILITY OF REPORTED DATA | Products are grouped and reported as a weighted average product, based on production volume. Environmental impacts of each product have been compared and they have been considered as homogeneous. |

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

| | |
|--|--|
| EPD SCOPE | Cradle to Grave |
| YEAR(S) OF REPORTED MANUFACTURER PRIMARY DATA | 2016 |
| LCA SOFTWARE & VERSION NUMBER | Simapro 8.5 |
| LCI DATABASE(S) & VERSION NUMBER | Ecoinvent 3.4 – allocation cut-off by classification |
| LCIA METHODOLOGY & VERSION NUMBER | Methode EN 15804_FR_Ev-DEC 1.17 (EVEA) |
| The sub-category PCR review was conducted by: | UL Environment PCR Review Panel epd@ulenvironment.com |
| This declaration was independently verified in accordance with ISO 14025:2006. The UL Environment “Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report,” v3.2 (September 2018), based on ISO 21930:2017 and CEN Norm EN 15804 (2012), serves as the core PCR, with additional considerations from the USGBC/UL Environment Part A Enhancement (2017) <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL |  Grant R. Martin, UL Environment |
| This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by: |  Thomas P. Gloria, Industrial Ecology Consultants |
| LIMITATIONS Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of Flooring Products using EPD information shall be based on the product’s use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR. Full conformance with the PCR for Products allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible”. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. | |

This EPD conforms with ISO 21930:2017

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

Description of company/organization

The product is commercialized by Gerflor and made in Delmanhorst Manufacturing Plant (Germany). All Gerflor manufacturing sites complies with:

- ISO 9001 Quality Management System
- ISO 14001 Environmental Management System

Product description

Product identification

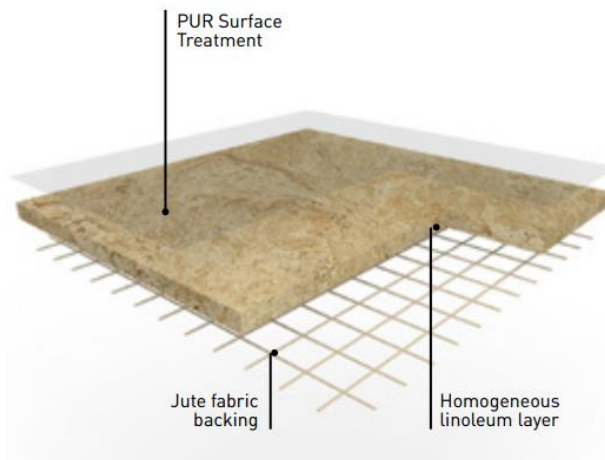
Product Designation: "DLW Linoleum Compact"

This environmental product declaration covers Gerflor DLW Linoleum Compact sheet flooring. DLW Linoleum compact sheet flooring is a 6'6" (2m) wide calendered homogeneous sheet flooring in 2.0mm to 3.2mm thickness made mostly of natural raw materials, including linseed oil, natural tree resins, wood flour, limestone, and colored pigments. The flooring is protected by a factory-applied PUR polyurethane surface treatment that provides easy maintenance, stain resistance and reduces the need to refinish the flooring.

The linoleum flooring are classified according to the United Nations Standard Products and Service Code (UNSPSC) as "Flooring" : UNSPSC Code 30161700.

And according to Construction Specification Institute (CSI) as "Resilient flooring" : CSI Code 09 65 00.

The following figure show the Compact Linoleum Product:



Product specifications

The products considered in this EPD meet or exceed one of the following Technical Specifications:
Meets or exceeds all technical requirements in ASTM F2034 Standard Specification for Linoleum Sheet Flooring
Meets or exceeds all technical requirements in EN ISO 24011 – Resilient floor coverings – Specification for plain and decorative linoleum

DLW Linoleum Sheet flooring meets requirements of the standard EN 14041 – Resilient, textile and stratified floor coverings: Essential characteristics.

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

The product also possesses the following characteristics:

- EN 13501-1 Fire Behavior $C_{fi} - s1$
- EN 13893 Slip Resistance $DS > 0.30$
- Fire Testing :
 - o Class 1 when tested in accordance with ASTM E 648
 - o Meets requirements of ASTM E662/NFPA 258 ; ASTM E84/NFPA 255 and CA/ULC S102.2

Product Specific EPD

Three products are grouped and reported in this EPD as a weighted average product, based on production volume. These three products have similar composition but have different thickness (2.0, 2.5 and 3.2 mm). Environmental impacts of each have been compared and products have been considered as homogeneous, with a weighted coefficient of variation less or equal to 20% for any impact category.

Application

DLW Linoleum is classified in accordance with EN ISO 10874 (class 34) and in reference to the FCSS (Floor Covering Standard Symbols) to be installed in various areas of application including commercial and industrial applications.

Declaration of Methodological framework

This EPD covers the entire life cycle of the product from cradle to grave (modules A1 to C4) excluding modules for which there are no inputs/outputs. No known flows are deliberately excluded from this EPD.

For this product, the stated RSL is 25 years. It should be noted, however, that the service life of a linoleum flooring may vary depending on the amount and nature of floor traffic and the type and frequency of maintenance. The manufacturer has provided this service life on the basis of his experience of flooring manufacture and supply. This RSL is applicable as long as the product use complies with that defined by ISO 14041 and ISO10 874 in accordance with the product's classification.

Technical Data

| Name | | Value | Unit |
|--------------------------|---------------------|----------|-------------------|
| Product Thickness | | 2.53 | mm |
| Product Weight | | 2.94 | kg/m ² |
| Product Form | Rolls width | 2.00 | mm |
| | Rolls length | 20 to 31 | m |

Table 1: technical data

Market Placement / Application Rules

The product declared in this document complies with the following codes or regulations:

- ISO 9001 Quality Management System and ISO 14001 Environmental Management System
- Floorscore SCS-
- Blauer Engel – Certificat n°27030

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

Material Composition

| Component | Mass % |
|-------------|--------|
| Linseed Oil | 32% |
| Wood Flour | 28% |
| Limestone | 22% |
| Hessian | 8% |
| Gum Rosin | 5% |
| Pigments | 4% |
| Varnish | <1% |

Table 2: content description

Product Manufacturing

Production process

DLW Linoleum Compact is made in the Gerflor manufacturing plant in Delmanhorst, Germany.

The production of the Linoleum flooring is divided into the following stages:

- Mixing: Linseed oil, Wood flour, Resin and Pigments are mixed together to obtain linoleum paste
- Calendering: The rolls are then calendered with hessian to get the desired shape.
- Shaping: rolls are cut at the desired dimensions.
- Packaging: The final product is rolled in paper on cardboard tubing.

Wastes from manufacturing are recycled back into production when possible, residual wastes are sent to landfill. Other wastes products are recycled externally whenever a process exists.

The following figure show the product flow diagram:

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

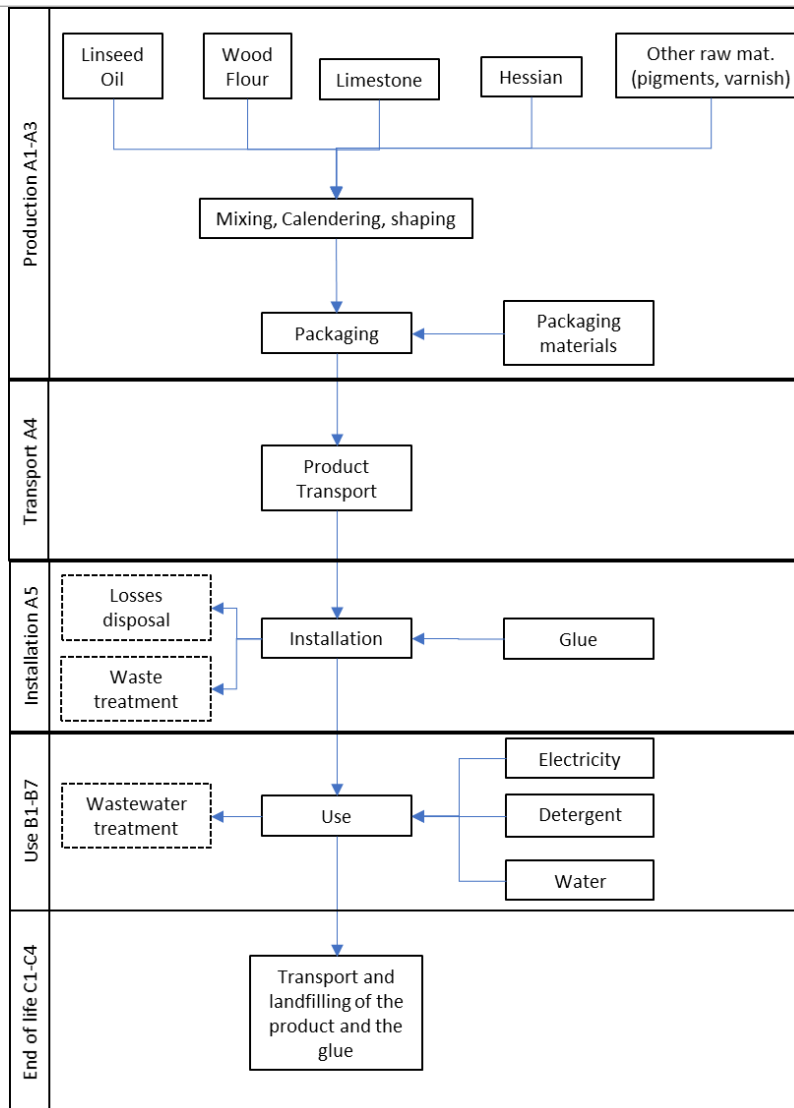


Table 3: Flow product diagram

Delivery and Installation

Packaging

The products are packed into paper, then rolls are placed into cardboard tubes. Sodium silicate is added between paper sheet.

The packaging waste scenario for paper and cardboard is 75% recycling, 20% landfilling and 5% incineration as describe in ULE Part A Requirements. Other materials are sent to landfill (50%) or incinerated (50%).

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

Delivery

DLW Linoleum Compact is made in Germany and is then sent to the US market. Distances taken in account are described here below.

- Transport distance 16-32T truck (factory to port): 80km
- Transport distance transoceanic freight: 6635km
- Transport distance 16-32T truck (US port to client): 3090km.

Product installation

The product is installed by hand using acrylic. Approximately 350 g/m² of this water-based low emission adhesive is used to fix the flooring in place.

During the installation approximately 10% of the material is lost as off-cuts – this waste is sent to landfill. Waste classification is according to RCRA for North American region (Resource Conservation and Recovery Act (RCRA), Subtitle 3).

Use Conditions

Cleaning and maintenance

Current cleaning of the installed floor has been included in this study as following:

- Dry vacuum cleaning : three times a week
- Wet cleaning by hand with water and detergent: every week
- Machine cleaning with water and detergent: every month

Reference Service Life (RSL)

For this product, the stated RSL is 25 years. It should be noted, however, that the service life of a linoleum flooring may vary depending on the amount and nature of floor traffic and the type and frequency of maintenance. The manufacturer has provided this service life on the basis of his experience of flooring manufacture and supply. This RSL is applicable as long as the product use complies with that defined by ISO 14041 and ISO10 874 in accordance with the product's classification.

Prevention of structural damage

To avoid excessive wear, usage should be restricted to the stated areas of application as outlined by the norm ISO 10 874.

Health aspects during usage

VOC emissions have been measured in accordance with NF EN ISO 16000 : total VOC at 28 days are inferior than 1000 µg/m³.

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

End of Life

Re-Use Phase

There's no take back program or re-use/recycling/energy recovery possibility for this product.

Disposal

For the purpose of this LCA, it has been assumed that 100% of the product is sent to landfill at the end of its useful life, according to the disposal pathway assumption in PCR Part A for non-metal materials in United States. Product is considered as non-hazardous waste according to north america regulation.

The transport between construction site and landfill facility is by truck, with a distance of 161 km.

Further information

Additional information can be found in <https://www.gerflorusa.com/>

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

Life Cycle Assessment (LCA)

A full Life Cycle Assessment has been performed according to ISO 14040, ISO 14044 and in compliance with EN15804.

This LCA comprises the following steps:

- Production Stage A1-A3 (raw materials, transport, manufacturing)
- Construction Stage A4-A5 (delivery of final product, installation in the building)
- Use Stage B1-B7 (use, maintenance, repair, replacement, refurbishment, energy, water)
- End of Life C1-C4 (deconstruction, transport, waste processing, disposal)

Functional Unit:

The functional unit is one square meter of installed product. The reference service life considered is 25 years.

| | Value | Unit |
|-----------------|-------|----------------|
| Functional Unit | 1 | m ² |
| Mass | 2.94 | kg |

Table 4: Functional Unit

System Boundary

EPD is declared from cradle to grave, including the following stages:

A1 – A3: includes the provision of all raw materials and their packaging, transport to the production site and energy consumption during the manufacturing of the product, as well as processing of waste generated by the factory.

A4 – A5: includes the transport from the factory to the final customer, packaging of the final product and the installation of the product, as well as all consumables and energy required and processing of waste generated during the installation.

B1 – B7: includes provision and transport of all materials, products and services related to the use phase of the product, as well as their related energy and water consumption, and the processing of any resulting waste.

C1 – C4: includes provision and transport of all materials, products and services related to the end of life phase of the product, including energy and water consumption, as well as the end of life processing of the product.

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

| | Production Stage | | | Construction Process Stage | | Use Stage | | | | | | | End-of-Life Stage | | | | Benefits & loads beyond syst. Bound. |
|----------------|---------------------|---------------------------|---------------|-----------------------------|------------------|-----------|-------------|--------|-------------|---------------|---|--|-------------------|-----------|------------------|----------|--|
| | Raw material supply | Transport to manufacturer | Manufacturing | Transport from gate to site | Assembly/Install | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use during product use | Operational water use during product use | Deconstruction | Transport | Waste processing | Disposal | Reuse, recovery or recycling potential |
| Modules | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Accounted for: | X | X | X | X | X | X* | X | X* | X* | X* | X* | X* | X* | X | X* | X | NA |

Table 5: Scope of the study

*module has been considered but has no associated inputs/outputs, therefore does not appear in the results.

NA: Not Applicability

Estimates and Assumptions

Estimates and assumptions are made for transport, installation and deconstruction procedure. Details are provided in section "LCA: scenarios and additional technical information".

Transport distances have been calculated from the production site to the geographical center of the destination country (US), which provides an average distance for all possible distribution centers within the country. Additional transport between the distribution center and the construction site is considered with a distance of 800 km, according to PCR, part B.

Transport distance from building site to the landfill treatment center is considered with a distance of 161 km, according to PCR part B.

Cut-off Rules

The cut -off criteria shall be 1% of renewable and non-renewable primary energy usage and 1% of the total mass of that unit process. The total neglected input flows per module shall be a maximum of 5% of energy usage and mass.

For this study, all input and output flows have been considered except packaging of raw material. Raw materials are included as per the product composition provided by the manufacturer and the packaging of the final product. Energy and water consumptions have also been considered at 100% according to the data provided.

Data Sources

As a general rule, specific data derived from specific production processes or average data derived from specific production processes have been used as the first choice as a basis for calculating an EPD.

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

To model the life cycle of the product in question, the software SimaPro 8.5, developed by PRé, has been used in conjunction with the LCA database ecoinvent v3.4.

Data Quality

The requirements for data quality and LCA data are in accordance with the specifications of the PCR.

Temporal Coverage – producer specific data is averaged over 1 year of production and from within the last 5 years (2016). Generic data is taken from the ecoinvent 3.4 database, the entirety of which was updated in 2017. Inputs to and outputs from the system are accounted for over a period of 100 years from the year for which the data set is deemed relevant.

Technological Coverage – the technological coverage of the data reflects the physical reality of the declared product.

Geographical Coverage – whenever possible, country specific data reflecting the reality of the Gerflor supply chain has been used. If country specific data is unavailable, European regional data is used in preference to global data sources.

Period Under Review

Data have been reviewed for the production year 2016.

Allocation

The overall values for the factory's material and energy consumptions during a period of one year have been divided by the annual production of each product to supply a value per square meter of flooring produced. All factory data is measured in square meters, and it is assumed that the process consumptions are governed by area of flooring processed rather than mass.

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/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

LCA: Scenarios and additional technical information

Transport to the construction site (A4)

| Name | Value | Unit |
|---|-------------------------|-------------------|
| Truck | | |
| Fuel Type | Diesel, low sulfur | |
| Liters of Fuel | 26 | l/100km |
| Vehicle Type | 16-32 metric ton EURO 4 | |
| Transport distance (truck) | 3 690 | km |
| Capacity utilization (including empty runs, mass based) | 36 | % |
| Gross density of products transported | 937 | kg/m ³ |
| Capacity utilization volume factor | < 1 | |
| Boat | | |
| Fuel Type | Heavy Fuel Oil | |
| Liters of Fuel | 0.047 | l/t.km |
| Vehicle Type | Transoceanic Ship | |
| Transport distance (boat) | 5 919 | km |
| Capacity utilization (including empty runs, mass based) | 100 | % |
| Gross density of products transported | 937 | kg/m ³ |
| Capacity utilization volume factor | <1 | |

Installation in the building (A5)

| Name | Value | Unit |
|--|----------|----------------|
| Ancillary materials: Adhesive | 3.50E-01 | kg |
| Net freshwater consumption specified by water source and fate | - | m ³ |
| Other resources | - | kg |
| Electricity consumption | - | kWh |
| Other energy carriers | - | MJ |
| Product loss per functional unit | 2.94E-01 | kg |
| Waste materials at the construction site before waste processing, generated by product installation | 2.94E-01 | kg |
| Output materials resulting from on-site waste processing (specified by route; e.g. for recycling, energy recovery and/or disposal) | - | kg |

| | | |
|---|----------|--------------------|
| Mass of packaging waste specified by type | - | - |
| Cardboard | 1,11E-01 | kg |
| Paper | 4,72E-02 | kg |
| Sodium Silicate | 1,66E-02 | kg |
| Biogenic carbon contained in packaging | 2,10E-01 | kg CO ₂ |
| Direct emissions to ambient air, soil and water | - | kg |
| VOC emissions | - | µg/m ³ |

Use (B1)

| Name | Value | Unit |
|---------------|--------|-------------------|
| VOC emissions | < 1000 | µg/m ² |

Maintenance (B2)

| Name | Value | Unit |
|--|----------|----------------------|
| Maintenance process information (cite source in report) | | |
| Dry vacuum cleaning: 3/week Wet cleaning: 1/week Machine cleaning: 1/month | | |
| Maintenance cycle | 3,90E+03 | Cycles/RSL |
| Maintenance cycle | 3.90E+03 | Cycles/ESL |
| Net freshwater consumption : tap water | 3.97E-03 | m ³ /year |
| Ancillary materials: Detergent | 6.04E-02 | kg/year |
| Other resources | - | kg |
| Energy input : Electricity | 4.90E-01 | kWh/year |
| Other energy carriers specified by type | - | kWh |
| Power output of equipment | - | kW |
| Waste materials from maintenance (specify materials) | - | kg |
| Direct emissions to ambient air, soil and water | - | kg |
| Further assumptions for scenario development (e.g. frequency and time period of use, number of occupants); | - | |

Repair (B3)

No data for given table

Replacement (B4)

No data for given table

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

According to ISO 14025

Refurbishment (B5)

No data for given table

Operational energy use (B6) and operational water use (B7)

No data for given table

Reference Service Life

| Name | Value | Unit |
|---|--|-------|
| Reference Service Life | 25 | years |
| Declared product properties (at the gate) and finishes, etc. | Declared product properties are described in Declaration of Performance (DOP), in accordance with EN 14041 | |
| Design application parameters (if instructed by the manufacturer), including references to the appropriate practices and application codes) | Products in accordance with EN 14041 and technical prescription of the manufacturer | |
| Outdoor environment, (if relevant for outdoor applications) | Not relevant for outdoor applications | |
| Indoor environment, (if relevant for indoor applications) | See accreditations : Floorscore and Blauer Engel | |
| Use conditions, e.g. frequency of use, mechanical exposure. | Use conditions in accordance with manufacturer prescriptions: see technical datasheet | |
| Maintenance, e.g. required frequency, type and quality of replacement components | Maintenance scenario is defined in the table above | |

End of Life (C1-4)

| Name | Value | Unit |
|---|----------|--------------------|
| Assumptions for scenario development (description of deconstruction, collection, recovery, disposal method and transportation) | | |
| Product are carried out by hand and sent to landfill. Waste transport is made by truck (16-32 metric ton Euro4). A 161km distance to the landfill treatment center has been considered. | | |
| <i>Collection process (specified by type)</i> | | |
| Collected separately | - | kg |
| Collected as mixed construction waste | 3.29E+00 | kg |
| <i>Recovery (specified by type)</i> | | |
| Reuse | - | kg |
| Recycling | - | kg |
| Landfill | 3.29E+00 | kg |
| Incineration | - | kg |
| Incineration with energy recovery | - | kg |
| Energy conversion efficient rate | - | |
| <i>Disposal (specified by type)</i> | | |
| Product or material for final deposition | - | kg |
| <i>Removals of biogenic carbon (excluding packaging)</i> | | |
| Not considered | - | kg CO ₂ |

Reuse, recovery and/or recycling potentials (D), relevant information

No data for given table

ENVIRONMENTAL PRODUCT DECLARATION



DLW LINOLEUM COMPACT
Linoleum flooring

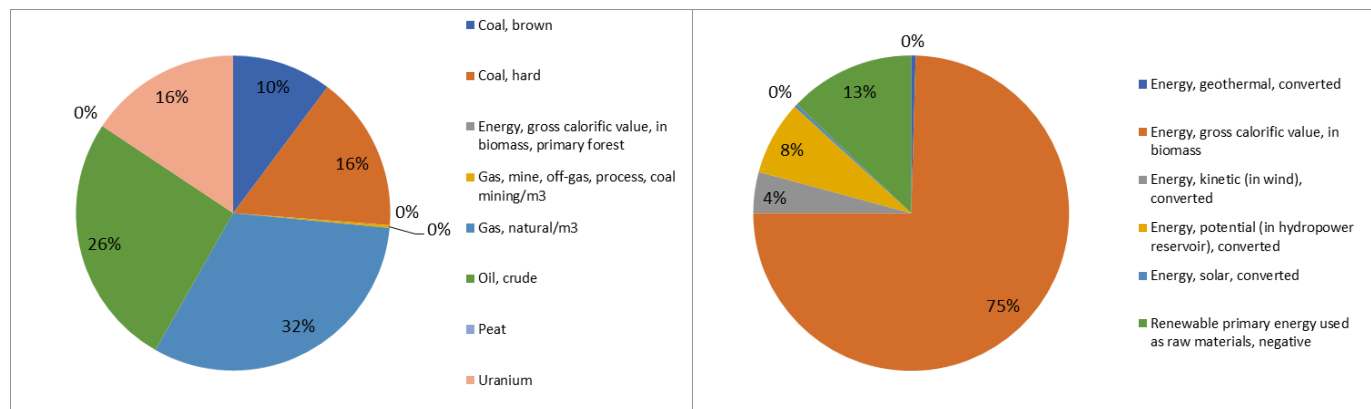
According to ISO 14025

Results

Life Cycle Inventory (LCI) analysis

| Indicator | Units | A1 | A2 | A3 | A4 | A5 | B1 | B2 | C2 | C4 |
|---|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Non-renewable primary energy by resource | | | | | | | | | | |
| Total of all compartments | MJ, net CV | 3.88E+01 | 1.80E+00 | 7.30E+01 | 3.22E+01 | 3.08E+01 | 0.00E+00 | 2.19E+02 | 1.35E+00 | 8.73E-01 |
| Coal, brown | MJ, net CV | 1.13E+00 | 1.08E-02 | 8.83E+00 | 2.43E-01 | 1.62E+00 | 0.00E+00 | 2.89E+01 | 8.62E-03 | 1.14E-02 |
| Coal, hard | MJ, net CV | 7.11E+00 | 7.96E-02 | 8.46E+00 | 1.84E+00 | 6.44E+00 | 0.00E+00 | 3.96E+01 | 7.47E-02 | 7.80E-02 |
| Energy, gross calorific value, in biomass, primary forest | MJ, net CV | 9.75E-03 | 6.73E-05 | 5.67E-03 | 1.22E-03 | 1.82E-03 | 0.00E+00 | 4.85E-04 | 5.00E-05 | 1.60E-05 |
| Gas, mine, off-gas, process, coal mining/m3 | MJ, net CV | 1.31E-01 | 1.48E-03 | 2.48E-01 | 3.36E-02 | 1.26E-01 | 0.00E+00 | 5.47E-01 | 1.35E-03 | 1.39E-03 |
| Gas, natural/m3 | MJ, net CV | 9.36E+00 | 8.51E-02 | 4.34E+01 | 1.68E+00 | 9.65E+00 | 0.00E+00 | 6.19E+01 | 6.96E-02 | 7.86E-02 |
| Oil, crude | MJ, net CV | 1.23E+01 | 1.58E+00 | 2.72E+00 | 2.78E+01 | 1.00E+01 | 0.00E+00 | 4.74E+01 | 1.18E+00 | 6.77E-01 |
| Peat | MJ, net CV | 1.06E-02 | 6.83E-05 | 1.72E-02 | 1.44E-03 | 5.17E-03 | 0.00E+00 | 7.47E-03 | 4.65E-05 | 7.17E-05 |
| Uranium | MJ, net CV | 8.71E+00 | 4.12E-02 | 9.32E+00 | 5.71E-01 | 2.90E+00 | 0.00E+00 | 4.08E+01 | 1.83E-02 | 2.65E-02 |
| Renewable primary energy by resource | | | | | | | | | | |
| Total of all compartments | MJ, net CV | 7.07E+01 | 2.62E-02 | 1.29E+01 | 4.31E-01 | 9.33E+00 | 0.00E+00 | 9.36E+00 | 1.61E-02 | 2.80E-02 |
| Energy, geothermal, converted | MJ, net CV | 2.32E-02 | 2.12E-04 | 1.47E-02 | 5.97E-03 | 1.88E-02 | 0.00E+00 | 4.09E-01 | 2.19E-04 | 3.05E-04 |
| Energy, gross calorific value, in biomass | MJ, net CV | 5.84E+01 | 8.51E-03 | 9.49E+00 | 1.42E-01 | 7.13E+00 | 0.00E+00 | 1.43E+00 | 5.95E-03 | 1.45E-02 |
| Energy, kinetic (in wind), converted | MJ, net CV | 2.50E-01 | 1.92E-03 | 1.31E+00 | 3.91E-02 | 2.41E-01 | 0.00E+00 | 2.49E+00 | 1.32E-03 | 1.71E-03 |
| Energy, potential (in hydropower reservoir), converted | MJ, net CV | 1.09E+00 | 1.54E-02 | 9.71E-01 | 2.43E-01 | 7.34E-01 | 0.00E+00 | 4.72E+00 | 8.57E-03 | 1.15E-02 |
| Energy, solar, converted | MJ, net CV | 1.06E-02 | 1.10E-04 | 2.46E-02 | 1.13E-03 | 3.85E-03 | 0.00E+00 | 3.07E-01 | 4.50E-05 | 7.85E-05 |

Table 6: Energy usage by source



Figures 1 & 2: Graphs showing the sources of non-renewable (Left) and renewable (Right) energy

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| Indicator | Units | A1 | A2 | A3 | A4 | A5 | B1 | B2 | C2 | C4 |
|--|---|----------|----------|----------|----------|----------|----|----------|----------|----------|
| Input flow indicators | | | | | | | | | | |
| Use of renewable primary energy excluding the renewable primary energy resources used as raw materials | MJ, calorific value ([Hi] lower calorific value) | 2.07E+01 | 2.62E-02 | 5.26E+00 | 4.31E-01 | 3.57E+00 | - | 9.36E+00 | 1.61E-02 | 2.80E-02 |
| Use of renewable primary energy resources used as raw materials | MJ, calorific value ([Hi] lower calorific value) | 5.00E+01 | - | 7.65E+00 | - | 5.76E+00 | - | - | - | - |
| Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | MJ, calorific value ([Hi] lower calorific value) | 3.85E+01 | 1.80E+00 | 7.30E+01 | 3.22E+01 | 1.76E+01 | - | 1.74E+02 | 1.35E+00 | 8.73E-01 |
| Use of non-renewable primary energy resources used as raw materials | MJ, calorific value ([Hi] lower calorific value) | 2.55E-01 | - | 2.55E-02 | - | 1.32E+01 | - | 4.53E+01 | - | - |
| Use of secondary materials | kg | 8.22E-01 | - | 8.22E-02 | - | 9.04E-02 | - | - | - | - |
| Use of renewable secondary fuels | MJ, calorific value ([Hi] lower calorific value) | - | - | - | - | - | - | - | - | - |
| Use of non-renewable secondary fuels | MJ, calorific value ([Hi]) | - | - | - | - | - | - | - | - | - |
| Net use of fresh water resources | m ³ | 3.77E-01 | 3.38E-04 | 6.15E-02 | 5.83E-03 | 6.20E-02 | - | 1.09E-01 | 2.40E-04 | 9.22E-04 |
| Output flow indicators | | | | | | | | | | |
| Water Pollution | m ³ | 4.18E+01 | 4.14E-02 | 6.53E+00 | 7.51E-01 | 5.64E+00 | - | 6.43E+00 | 3.18E-02 | 4.36E-02 |
| Air Pollution | m ³ | 9.89E+02 | 1.25E+01 | 3.24E+02 | 2.40E+02 | 3.79E+02 | - | 1.47E+03 | 9.65E+00 | 5.88E+00 |
| Hazardous waste disposed | kg | 2.44E-01 | 1.06E-03 | 5.02E-02 | 2.09E-02 | 2.08E-01 | - | 1.65E-01 | 8.67E-04 | 1.03E-03 |
| Non-hazardous waste disposed | kg | 1.29E+00 | 9.37E-02 | 9.30E-01 | 1.58E+00 | 1.47E+00 | - | 4.62E+00 | 7.15E-02 | 3.31E+00 |
| High-level Radioactive waste disposed | kg | 1.77E-04 | 1.22E-05 | 1.32E-04 | 2.13E-04 | 8.89E-05 | - | 5.19E-04 | 8.95E-06 | 5.00E-06 |
| Intermediate- and low-level radioactive waste disposed | kg | 2.80E-05 | 1.35E-07 | 2.95E-05 | 2.14E-06 | 1.01E-05 | - | 1.27E-04 | 7.06E-08 | 9.04E-08 |
| Components for re-use | kg | - | - | - | - | - | - | - | - | - |
| Materials for recycling | kg | - | - | 7.04E-02 | - | 1.38E-01 | - | - | - | - |
| Materials for energy recovery | kg | - | - | - | - | - | - | - | - | - |
| Exported energy | MJ, heating value ([Hi] lower heating value) per energy carrier | - | - | - | - | - | - | - | - | - |

Table 7: Input / Output Flow Indicators

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Life Cycle Impact Assessment (LCIA)

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. Module B2 – Maintenance has been evaluated for the entire life cycle of the product. The following table shows the impact assessment results for the product:

| Indicator | Units | A1 | A2 | A3 | A4 | A5 | B1 | B2 | C2 | C4 |
|---|--|----------|----------|----------|----------|----------|----|----------|----------|----------|
| TRACI Indicators | | | | | | | | | | |
| Global Warming Air | kg CO2 equiv. | 3.40E+00 | 1.16E-01 | 1.17E+01 | 2.12E+00 | 3.13E+00 | - | 1.15E+01 | 8.85E-02 | 2.92E-01 |
| Ozone Depletion Air | kg CFC 11 equiv. | 3.62E-07 | 2.88E-08 | 4.65E-07 | 5.07E-07 | 2.47E-07 | - | 9.96E-07 | 2.14E-08 | 1.18E-08 |
| Acidification Air | kg SO2 equiv. | 7.46E-02 | 5.23E-04 | 2.05E-02 | 1.31E-02 | 1.76E-02 | - | 3.84E-02 | 4.04E-04 | 3.11E-04 |
| Eutrophication | kg N equiv. | 7.52E-02 | 7.10E-05 | 1.04E-02 | 1.37E-03 | 9.69E-03 | - | 1.31E-02 | 5.45E-05 | 4.59E-04 |
| Smog Air | kg O3 equiv. | 3.23E-01 | 1.26E-02 | 2.55E-01 | 2.72E-01 | 1.54E-01 | - | 3.81E-01 | 9.55E-03 | 6.53E-03 |
| EN 15804 Indicators | | | | | | | | | | |
| Global Warming Potential (GWP) | kg CO2 equiv. | 3.36E+00 | 1.16E-01 | 1.17E+01 | 2.12E+00 | 3.08E+00 | - | 1.15E+01 | 8.84E-02 | 2.92E-01 |
| Depletion potential of the stratospheric ozone layer, (ODP) | kg CFC 11 equiv. | 2.96E-07 | 2.17E-08 | 3.83E-07 | 3.81E-07 | 1.98E-07 | - | 7.94E-07 | 1.61E-08 | 8.91E-09 |
| Acidification Potential of soil and water (AP) | kg SO2 equiv. | 6.65E-02 | 4.50E-04 | 1.80E-02 | 1.19E-02 | 1.66E-02 | - | 3.88E-02 | 3.50E-04 | 2.57E-04 |
| Eutrophication Potential (EP) | kg (PO4) equiv. | 4.17E-02 | 8.11E-05 | 6.90E-03 | 1.71E-03 | 5.74E-03 | - | 7.46E-03 | 6.14E-05 | 2.20E-04 |
| Formation potential of tropospheric ozone (POCP) | kg ethene equiv. | 2.18E-03 | 6.48E-05 | 2.21E-03 | 1.35E-03 | 1.46E-03 | - | 5.93E-03 | 4.92E-05 | 8.48E-05 |
| Abiotic depletion potential (ADP-elements) for non-fossil resources | kg Sb equiv. | 1.64E-05 | 3.63E-07 | 4.11E-06 | 5.89E-06 | 9.26E-06 | - | 1.46E-05 | 2.69E-07 | 5.09E-08 |
| Abiotic depletion potential (ADP-fossil fuels) for fossil resources | MJ, calorific value ([Hi] lower calorific value) | 3.00E+01 | 1.76E+00 | 6.37E+01 | 3.16E+01 | 2.79E+01 | - | 1.78E+02 | 1.33E+00 | 8.46E-01 |

Table 8: Environmental Impact Indicators

Biogenic carbon uptake in wood is included in the GWP indicator in the above Environmental Impacts Table. Table below reported uptake and emissions of CO₂:

| Parameter | Unit | Value |
|---|----------|----------|
| Biogenic Carbon Removal from Product | [kg CO2] | 0.00E+00 |
| Biogenic Carbon Emission from Product | [kg CO2] | 0.00E+00 |
| Biogenic Carbon Removal from Packaging | [kg CO2] | 2.10E-01 |
| Biogenic Carbon Emission from Packaging | [kg CO2] | 1.68E-01 |
| Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes | [kg CO2] | 0.00E+00 |
| Calcination Carbon Emissions | [kg CO2] | 0.00E+00 |
| Carbonation Carbon Removals | [kg CO2] | 0.00E+00 |
| Carbon Emissions from Combustion of Waste from Non- Renewable Sources used in Production Processes | [kg CO2] | 0.00E+00 |

Table 9: Carbon emissions and removal

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All EN 15804 indicators have been calculated using the method CML 4.1 (October 2012). TRACI impacts have been calculated using the method TRACI 2.1 v1.03 (2015).

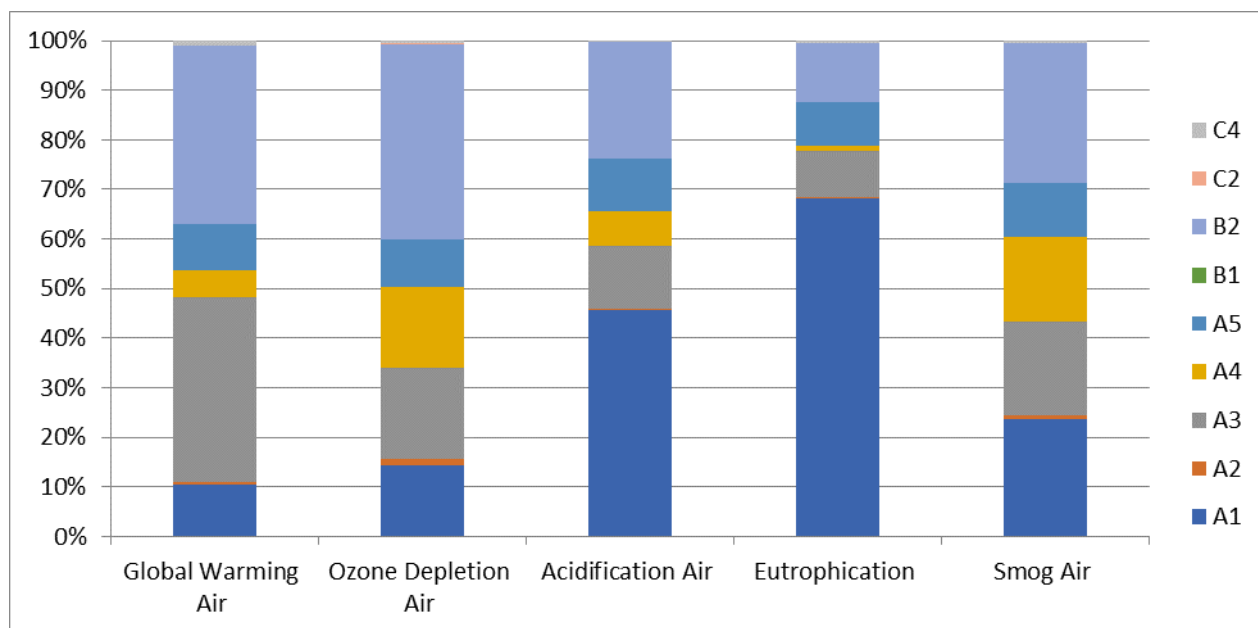


Figure 3: Graph depicting the impact indicators as calculated by the TRACI method

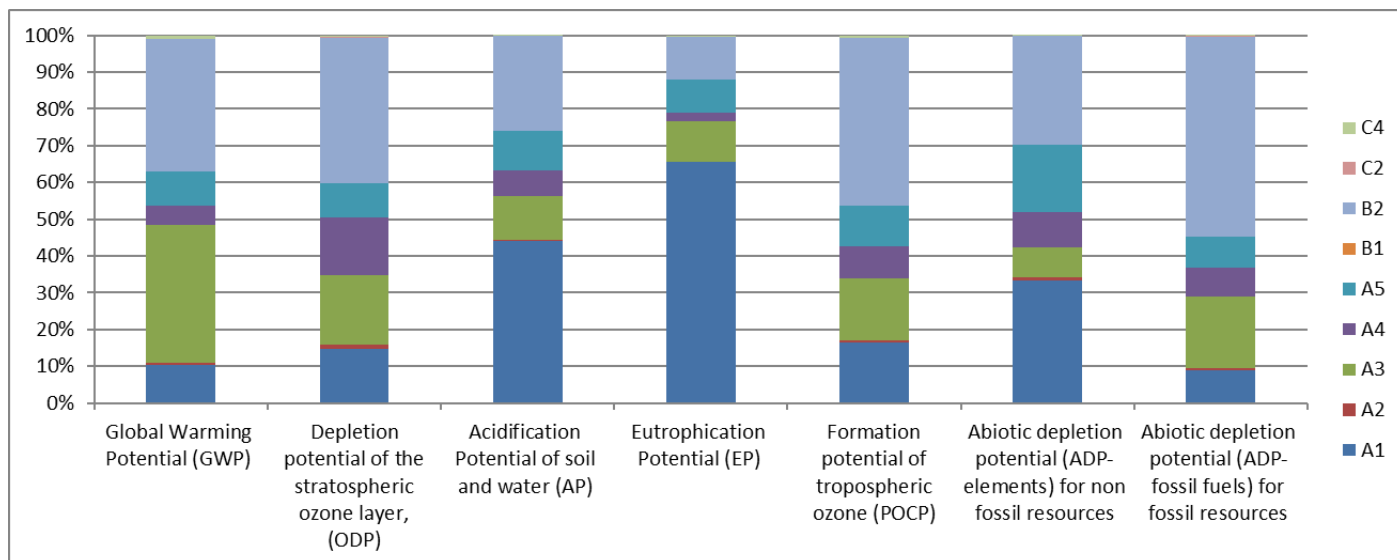


Figure 4: Graph depicting impact indicator results calculated according to EN 15804

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According to ISO 14025

Interpretation

The primary contributor to the environmental impacts of the product is the Stages B2 – Maintenance stage. This is because of the scenario of both long reference service life (RSL) of 25 years and the assumption of a weekly cleaning by using a machine and detergent. Then comes A1 – Extraction and transformation of the raw materials. Stage A3 – Manufacturing has the third greatest impact on average across the indicators, primarily due to the electricity usage during the production process, and the production losses.

Extraordinary Effects

Fire

Fire behaviour have been tested according to EN 13501-1. Product is classified Cfl-S1.
There's no test available for possible environmental impacts during fire.

Water

There's no test available for possible impacts following unforeseeable influence of water.

Mechanical Destruction

Mechanical damage does not chemically alter the product.

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Requisite Evidence



FloorScore®

Indoor Air Quality Certified to SCS-EC10.3-2014 v4.0

Registration # SCS-FS-01335



Certificat n°27030

References

ISO 14025

ISO 14025:2006 : Environmental labels and declarations — Type III environmental declarations — Principles and procedures

ISO 21930

ISO 21930 :2017 : Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services

EN 15804

EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

UL Environment

UL Environment General Program Instructions April 2017, version 2.1.

UL Standard 10010, PCR Part A

PCR -Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 3.2, UL Environment. <https://industries.ul.com/environment>

UL 10010-7, PCR Part B

PCR - Part B: Flooring EPD Requirements, Second Edition, Dated September 28, 2018. UL Environment, Institut Bauen und Umwelt e.V., www.bau-umwelt.com

ecoinvent V3.4

ecoinvent Life Cycle Inventory database Version 3.4 <http://www.ecoinvent.org>

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