

ENVIRONMENTAL-PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A1

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|--------------------------|--|
| Owner of the Declaration | DORMA Hüppe Raumtrennsysteme GmbH + Co. KG |
| Publisher | Institut Bauen und Umwelt e.V. (IBU) |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
| Declaration number | EPD-DHR-20170168-IBA3-EN |
| Issue date | 12.12.2017 |
| Valid to | 11.03.2024 |

**VARIFLEX 88/100 room partition system Full-wall element variant
DORMA Hüppe Raumtrennsysteme GmbH + Co. KG**

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1. General Information

DORMA Hüppe Raumtrennsysteme GmbH + Co. KG

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-DHR-20170168-IBA3-EN

This declaration is based on the product category rules:

Room partition systems, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

12.12.2017

Valid to

11.03.2024



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VARIFLEX 88/100 room partition system Full-wall element variant

Owner of the declaration

DORMA Hüppe Raumtrennsysteme GmbH + Co. KG
Industriestraße 5
26655 Westerstede/ Ochholt
Germany

Declared product / declared unit

The declared unit is 1m² of the VARIFLEX full-wall element room partition system including packaging materials and excluding the respective edge fasteners and sealants for walls, floors, and ceilings. The variant on which it is based is a full-wall element with direct coating on particle board.

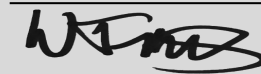
Scope:

This Environmental Product Declaration pursues a worst-case approach based on the VARIFLEX 100 variant. Data records are based on the comprehensive financial years of 2016 and 2017 at the production facility in Westerstede/Ocholt in Germany. This document is translated from the German Environmental Product Declaration into English. It is based on the German original version EPD-DHR-20170168-DE. The verifier has no influence on the quality of the translation. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A1. In the following, the standard will be simplified as *EN 15804 bezeichnet*.

Verification

| | |
|--|------------|
| The standard EN 15804 serves as the core PCR | |
| Independent verification of the declaration and data according to ISO 14025:2011 | |
| <input type="checkbox"/> | internally |
| <input checked="" type="checkbox"/> | externally |



Dr.-Ing. Wolfram Trinius,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The VARIFLEX 88/100 room partition system is a horizontally movable sound-insulated partition wall system made of steel

and aluminium, comprising individual elements which can be moved independently

and display the following features:

- wide variety of design options,
- cover panels suspended acoustically cantilevered,
- element heights of up to 14.5 metres.

The product is not subject to any EU harmonisation guidelines. Application of the products is subject to the respective national guidelines at the place of use. Please select one of the following options and delete the header of the selected [alternative]:

[Alternative 1a: Product according to the CPR based on a hEN]:

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration EN xyz:date, title and the CE-marking.

For the application and use the respective national provisions apply.

[Alternative 1b: Products according to the CPR based on an ETA]:

For the placing of the product on the market in the European Union/European Free Trade Association /EU/EFTA) (with the exception of Switzerland) the Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration ETA no. xyz:date, title and the CE-marking.

For the application and use the respective national provisions apply.

[Alternative 2a: Product not harmonised in accordance with the CPR but in accordance with other provisions for harmonisation of the EU]:

For the placing on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the following legal provisions apply:

- *Directive no. xyz: date, title*
- *Regulation no. xyz: date, title*
- and the harmonised standards based on these provisions:
- *EN xyz: date, title*

The CE-marking takes into account the proof of conformity with the respective harmonized standards based on the legal

provisions above.

For the application and use the respective national provisions apply.

[Alternative 2b: Product harmonized as well in accordance with the CPR as with other provisions for harmonisation of the EU]:

For the placing of the product on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the Regulation (EU) No. 305/2011/ (CPR) and the following other provisions for harmonisation apply:

- *Directive (EU) xyz: date, title*
- *Regulation (EU) no. xyz: date, title*

The product needs a declaration of performance in accordance with the CPR taking into consideration /EN xyz: date/, title or /ETA no. xyz/:date, title respectively and the CE-marking.

The CE-marking for the product takes into account the Declaration of Performance in accordance with the CPR and the proof of conformity with the following harmonised standards or based on the other provisions for harmonisation:

- *EN xyz: date, title*
- *Source, date, title*

For the application and use the respective national provisions apply.

[Alternative 3: Product for which no legal provisions for harmonisation of the EU exist]:

For the use and application of the product the respective national provisions at the place of use apply, in Germany for example the building codes of the federal states and the corresponding national specifications.

2.2 Application

The individual elements which can be moved independently are moved to the desired position in ceiling rails. The elements are braced using a spindle mechanism for sound-insulating and stable sealing of the elements towards the floor, wall and ceiling rail.

The room partition system offers flexible room utilisation by means of multifunctional and open room design:

- Areas and rooms are partitioned using mobile VARIFLEX 88/100 partition walls.
- Room sizes can be adapted to the respective group size.
- The high degree of sound insulation makes it possible for events to be held in parallel.
- Areas and rooms are utilised more efficiently.

Areas of application include: offices, hotels, conference centres, trade fairs, schools, religious institutions and Ateliers.

2.3 Technical Data

The following table depicts the technical data for the mobile Variflex 88/100 partition walls.

Constructional data

| Name | Value | Unit |
|--|------------|----------------------|
| Sound reduction index to /DIN EN ISO 10140:2010/ | 39-59 | dB |
| Heat transition coefficient to /DIN EN ISO 6946/ | 0.4 - 0.59 | W/(m ² K) |
| Load from wall weight | 0.36-0.59 | kN/m ² |

The product is not subject to any EU harmonisation guidelines.

Please select one of the following options and delete the header of the selected [alternative]:

[Alternative 1a: Product according to the CPR, based on a hEN]:

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN xyz: date, title*.
- Voluntary data: *source, date, title* (not part of CE-marking).

[Alternative 1b: Product according to the CPR, based on an ETA]:

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *ETA no. xyz, date, title*.
- Voluntary data: *source, date, title* (not part of CE-marking).

[Alternative 2a: Product not harmonised in accordance with the CPR but in accordance with other provisions for harmonisation of the EU]:

Performance data of the product according to the harmonised standards, based on provisions for harmonization.

Voluntary data: *source, date, title* (not part of CE-marking).

[Alternative 2b: Product harmonized as well in accordance with the CPR as with other legal provisions of the EU]:

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN xyz: date, title* or *ETA no. xyz, date, title* respectively.
- Performance data of the product, based on the harmonised standards, in accordance with the other provisions for harmonization.
- Voluntary data: *source, date, title* (not part of CE-marking)

[Alternative 3: Product for which no legal provisions for harmonisation of the EU exist]:

Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).

2.4 Delivery status

The VARIFLEX 88/100 room partition system is manufactured individually to customer demands. The variant on which the EPD is based concerns the following Details:

| | VARIFLEX 88 | VARIFLEX 100 |
|-----------------------------------|--------------------|--------------------|
| Element width | 1,100 mm | 1,100 mm |
| Element height | 3,000 mm | 3,000 mm |
| Element thickness | 88 mm | 100 mm |
| Surface area | 3.3 m ² | 3.3 m ² |
| Product weight | 113.7 kg | 134.6 kg |
| Packaging | 26 kg | 26 kg |
| Product weight per m ² | 34.5 kg | 40.8 kg |
| Packaging per m ² | 7.9 kg | 7.9 kg |

2.5 Base materials/Ancillary materials

The VARIFLEX 100 full element, which was regarded as a worst-case scenario, comprises the following (excluding production waste and packaging):

| Component | Percentage |
|-----------------|-------------|
| Particle board* | 50.3% |
| Bitumen foil | 21.0% |
| Steel | 17.1% |
| Aluminium | 4.7% |
| Glass wool | 1.7% |
| Plastics | 3.6% |
| Cast zinc | 0.9% |
| Paper | 0.7% |
| Copper | < 0.1 % |
| TOTAL | 100% |

*MDF board for VARIFLEX 88

None of the raw materials and ancillaries contain chemical compounds classified as substances of very high concern (SVHC).

2.6 Manufacture

The element frame requires vertical aluminium profiles and horizontal/vertical steel profiles. The vertical aluminium profiles are cut to size and the ends have cut-outs for the PU end pieces of the sealing strips. Notches are punched into the positions of the vertical steel profiles. The horizontal steel profiles are also punched.

Sealing profiles and optional magnetic bands are drawn through the chambers of the vertical profiles.

Cut aluminium profiles and moulded PU parts are merged as sealing strips for the top and bottom sealing.

Pressure tubes comprising steel tubes and pressure springs are prefabricated by compressing the individual parts for later operation of these sealing strips.

The horizontal and vertical steel profiles and the vertical aluminium profiles are fixed in place on an assembly bench. The horizontal and vertical steel profiles are positively connected to the perforations. The aluminium vertical profiles are fastened using the steel profiles, giving rise to the element frames of the partition wall element.

An extension unit (prefabricated by the supplier) is secured in the centre of the frame (spindle system along the principle of a car jack). The prefabricated pressure tubes and an operating tube are welded to this extension unit. The prefabricated sealing strips are fastened to the top and bottom ends of the pressure tubes.

Mineral wool is inserted into the cavities of the ensuing element frame. This mineral wool is covered on both sides of the element frame using glued Kraft paper.

Finished cover panels are sawn to the specified size for the cover panels on both sides. Chips and leftovers are suctioned off and collected.

On the back of the cover panels, suspension plates are screwed at designated positions for securing to the element frame at a later stage.

The cover panels and element frames are packed on pallets. On account of their high weights, the individual parts/assemblies are transported separately to and from the site.

The frame and cover panel are assembled by simply suspending and clamping the cover panels on site.

Offcuts are directed to recycling by a disposal company.

Permanent measurement and continuous improvement of the production processes are ensured by the Quality Management system in accordance with /DIN EN ISO 9001/.

2.7 Environment and health during manufacturing

Within the framework of production, environmental and occupational safety aspects are considered and the corresponding standards observed.

2.8 Product processing/Installation

The following machines, tools and plants as well as any associated noise protection measures are used:

- Saws for steel and aluminium, cordless screwdrivers, box column drills
- Noise control cabins for saws, noise barriers in the area of wood processing (CNC saws and edge processing)
- Extraction systems installed at all sawing areas for wood processing
- Extraction systems at all welding areas; welding areas feature safety barriers (glare protection)
- CNC punching machines for steel and aluminium profiles

2.9 Packaging

The VARIFLEX full-wall element is supplied ex works with the following transport packaging:

| Component | Percentage |
|--------------------|-------------|
| Wooden pallet | 85% |
| PU foil | 8% |
| Polystyrene strips | 4% |
| Corrugated board | 4% |
| TOTAL | 100% |

2.10 Condition of use

Some grease is required for lubricating the scissor mechanism during maintenance and repair of the room partition system. Annual maintenance for adjustments, for example, is recommended by the manufacturer. Repairs or replacements are not usually necessary. Cleaning is limited to occasional cleaning of the surface using water and/or standard cleaning agents.

2.11 Environment and health during use

At the current point in time, no interactions between the product, the environment and health are known. Additional information available in section 7.

2.12 Reference service life

According to empirical values gleaned by DORMA Hüppe Raumtrennsysteme + Co. KG, the useful life is 25 years with approx. 50 closing cycles/year, whereby DORMA Hüppe relies on its 60 years of Expertise. Description of the influences on the ageing of the product when applied in accordance with the rules of technology.

2.13 Extraordinary effects

Fire

No extraordinary impacts are known in the event of a fire.

Fire protection

| Name | Value |
|-------------------------|-------|
| Building material class | B2 |
| Burning droplets | - |
| Smoke gas development | - |

On request, the cover panel is available as Euroclass B-s2-d0.

Water

Possible impacts on the environment following unforeseen exposure to water can be eliminated.

Mechanical destruction

No negative environmental impact is known in the event of mechanical destruction.

2.14 Re-use phase

With reference to the material composition of the product system in accordance with section 2.6, the following possibilities are available:

Re-use

The entire room partition system can be re-used within the reference service life. De-construction from the building is carried out by DORMA Hüppe Rauntrennsysteme + Co. KG for a fee. This is conditional to identical room heights.

Material recycling

The metal content can be collected separately and directed to material recycling.

Theoretically, the particle board material can be recycled to manufacture new particle board.

Energy recovery

The particle board and plastic content can be disposed of via incineration and flue gas cleaning, and utilised to generate heat and electricity.

Landfilling

As the product does not contain any substances which are hazardous to the environment or human health, the entire system can be landfilled in the absence of waste recycling technologies. In Germany, landfilling is not permissible for wood components in accordance with the Waste Wood Act.

2.15 Disposal Packaging

The packaging components incurred during installation in the building are directed to an energy recovery process.

- /EWC 15 01 01/ Paper and cardboard packaging
- /EWC 15 01 02/ Plastic packaging
- /EWC 15 01 03/ Wooden packaging

Disposal phase

All materials are directed to energetic or metallurgical recycling in line with the available waste technology (see 2.15):

- /EWC 17 02 01/ Wood
- /EWC 17 02 03/ Plastic
- /EWC 17 03 02/ Asphalt, tar-free (bitumen mixtures)
- /EWC 17 04 01/ Copper, bronze, brass
- /EWC 17 04 02/ Aluminium
- /EWC 17 04 05/ Iron and steel

2.16 Further information

Further information on technical data and other product variants can be obtained from the following sources:

Tel.: +49 (0)4409 666-0

E-mail: info-hueppe@dormakaba.com

Internet: www.dorma-hueppe.de

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Authorised representatives of DORMA Hüppe Raumtrennsysteme GmbH + Co. KG: Dieter Sichelschmidt, Jörg Henke

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1m² of the VARIFLEX 88/100 full-wall element room partition system including packaging materials and excluding the respective edge fasteners and sealants for walls, floors, and ceilings.

Declared unit

| Name | Value | Unit |
|---------------------------|--------|-------------------|
| Declared unit | 1 | m ² |
| Basis weight | 40.8 | kg/m ² |
| Conversion factor to 1 kg | 0.0245 | - |
| Packaging | 7.9 | kg/m ² |

For IBU core EPDs (where clause 3.6 is part of the EPD): for average EPDs, an estimate of the robustness of the LCA values must be made, e.g. concerning variability of the production process, geographical representativeness and the influence of background data and preliminary products compared to the environmental impacts caused by actual production.

3.2 System boundary

Type of EPD: cradle to grave (with options)

The following modules are considered in accordance with EN 15804:

Product stage: A1 – A3

The module includes the extraction and treatment of raw materials as well as biomass production including all of the corresponding upstream chains and provision of electricity, steam and heat from primary energy sources, including extraction, refinement and

transport thereof as well as the requisite procurement transport to the plant gate.

Construction stage: A4 – A5

This module comprises the distribution route as well as energetic utilisation of packaging materials.

End-of-life stage: C2 – C3

This module considers transport to the recycling plant as well as the expenses incurred by collection, treatment and recycling. Biogenic carbon (e.g. from the particle board) is emitted here during incineration.

Possible potentials and avoided loads beyond the system boundary: D

Indication of potential product loads and credits outside the system boundary. These

comprise energy credits from thermal utilisation of packaging waste (A5) as well as the wood and plastic components of the product (C3) in the form of the average German power mix or thermal energy from natural gas as well as material credits as the result of metal Recycling.

3.3 Estimates and assumptions

Energy consumption was calculated specifically for production. All of the distribution countries were recorded proportionately in establishing the distribution transport distance.

A transport distance of 75 km is assumed to the disposal plant, whereby capacity utilisation is 50%.

3.4 Cut-off criteria

All of the data from the operational data survey and all emission measurements available during the review period indicated in 3.7 were taken into consideration in the model. Furthermore, data on transport expenses was recorded and analysed for all inputs taken into consideration.

It can be assumed therefore that the total processes ignored do not exceed 5% of the impact categories and are therefore of subordinate significance.

The infrastructure used in the manufacturing processes (especially machines and production equipment) was not considered in the analysis. Transport expenses for packaging were also ignored.

3.5 Background data

Version 8.0 of the software system for comprehensive analysis (GaBi) was used for modelling the life cycle. All of the background data sets used were taken from the 8.0 version of the /GaBi/ data base and the /ecoinvent/ data base (version 2.2). The data items contained in the data bases are documented online.

German data records were used for Modules A1-3 and the corresponding European data records were used for

transport associated with distribution and installation in the building (A4-A5) and disposal scenarios (C Modules).

On account of a lack of data sets for waste treatment, various material flows are summarised under the data set which would appear to make most sense from a technical perspective.

The secondary material shares (recycled content) can only be considered using generic data sets.

3.6 Data quality

The data was recorded using analyses of internal production and environmental data, LCA-relevant data within the supply chain, and analyses of the relevant data for the provision of energy. The data provided and originating from the operating data records and measurements has been checked in terms of plausibility. Following intensive examination, very good data representativity has been established.

The background data used for the analysis is generally not older than 10 years. Exceptions are represented by two disposal data sets from 2006 for which no adequate more recent replacement was available.

3.7 Period under review

The LCA is based on data recorded for the financial year 2016/17 at the production facility in Ocholt, Germany.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Germany

3.9 Allocation

There are no co-products. Within the framework of the manufacturing process, a single product is manufactured.

3.10 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.

The used background database has to be mentioned.

4. LCA: Scenarios and additional technical information

The following technical scenario information is required for the declared modules and optional for non-declared modules. Modules for which no information is declared can be deleted; additional information can also be listed if necessary.

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 if modules are not declared (MND).

A5 is not declared including the disposal of the packaging material on the construction site, the amounts of packaging materials included in the LCA calculations must be declared as technical scenario information for Module A5.

Transport to the building site (A4)

| Name | Value | Unit |
|---|-------|-------------------|
| Litres of fuel | | l/100km |
| Transport distance | 681 | km |
| Capacity utilisation (including empty runs) | 85 | % |
| Gross density of products transported | | kg/m ³ |
| Capacity utilisation volume factor | | - |

Installation into the building (A5)

| Name | Value | Unit |
|---|-------|----------------|
| Auxiliary | - | kg |
| Water consumption | - | m ³ |
| Other resources | - | kg |
| Electricity consumption | - | kWh |
| Other energy carriers | - | MJ |
| Material loss | - | kg |
| Output substances following waste treatment on site | - | kg |
| Dust in the air | - | kg |
| VOC in the air | - | kg |
| Waste for energy recovery | 7.88 | kg |

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use

conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies for the reference conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list on service life by BNB is declared.

End of life (C1-C4)

| Name | Value | Unit |
|--|-------|------|
| Collected separately waste type waste type | 40.8 | kg |
| Collected as mixed construction waste | - | kg |
| Reuse | - | kg |
| Recycling | 9.3 | kg |
| Energy recovery | 31.5 | kg |
| Landfilling | - | kg |

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

Parts of the product as well as the packaging are thermally utilised in a waste incineration plant. Metal is directed to the recycling circuit. Module D includes credits from energetic utilisation of packaging waste in Module A5 and energetic utilisation of non-metallic components of the product in Module C3. This is supplemented by material credits from recycling the metal components of the Product in C3.

| Name | Value | Unit |
|------------------------------------|-------|------|
| Incineration credit | 39.3 | kg |
| R1 factor waste incineration plant | >60 | % |
| Materials for recycling | 9.3 | kg |

5. LCA: Results

In Table 1 "Description of the system boundary", all declared modules shall be indicated with an "X"; all modules that are not declared shall be indicated with "MND" (As default the modules B3, B4, B5 are marked as MNR – module not relevant). In the following tables, columns can be deleted for modules that are not declared. Indicator values should be declared with three valid digits (eventually using exponential form (e.g. 1,23E-5 = 0,0000123)). A uniform format should be used for all values of one indicator.

If several modules are not declared and therefore have been deleted from the table, the abbreviations for the indicators can be replaced by the complete names, while the readability and clear arrangement should be maintained; the legends can then be deleted. If due to relevant data gaps, an indicator cannot be declared in a robust way, then the abbreviation "IND" (indicator not declared) should be used for this indicator.

- 0 - calculated value is 0
- 0 - value falls under the cut-off
- 0 - assumption which exclude any flows (e.g. exported electricity A1-A3)
- IND – in cases where the inventory does not support the methodological approach or the calculation of the specific indicator IND shall be used.

If no reference service life is declared (see chapter 2.13 "Reference Service Life"), the LCA results of the modules B1-B2 and B6-B7 shall refer to a period of one year. This shall then be indicated as an explanatory text below the tables. In addition, the formula for the quantification of such B-modules over the total life cycle shall be provided.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED; MNR = MODULE NOT RELEVANT)

| 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 |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| X | X | X | X | X | MND | MND | MNR | MNR | MNR | MND | MND | MND | X | X | MND | X |

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m² VARIFLEX full element

| Parameter | Unit | A1-A3 | A4 | A5 | C2 | C3 | D |
|---|------------------------------------|----------|-----------|----------|-----------|-----------|-----------|
| Global warming potential (GWP) | kg CO ₂ eq | 3.72E+01 | 1.89E+00 | 1.49E+01 | 2.64E-01 | 6.15E+01 | -5.84E+01 |
| Depletion potential of the stratospheric ozone layer (ODP) | kg CFC11 eq | 2.02E-05 | 2.39E-13 | 6.18E-13 | 8.87E-14 | 3.81E-08 | -1.7E-07 |
| Acidification potential of land and water (AP) | kg SO ₂ eq | 3.03E-01 | 4.39E-03 | 1.9E-03 | 7.11E-04 | 2.03E-02 | -1.46E-01 |
| Eutrophication potential (EP) | kg PO ₄ ³ eq | 2.97E-02 | 1.04E-03 | 3.43E-04 | 1.72E-04 | 4.17E-03 | -1.07E-02 |
| Formation potential of tropospheric ozone photochemical oxidants (POCP) | kg Ethen eq | 3.21E-02 | -1.45E-03 | 7.63E-05 | -2.47E-04 | 1.26E-03 | -1.34E-02 |
| Abiotic depletion potential for non fossil resources (ADPE) | kg Sb eq | 1.7E-03 | 1.96E-07 | 5.09E-07 | 2.13E-08 | -5.63E-06 | -1.17E-04 |
| Abiotic depletion potential for fossil resources (ADPF) | MJ | 1.22E+03 | 2.56E+01 | 4.02E+00 | 3.65E+00 | 3.21E+01 | -6.98E+02 |

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 m² VARIFLEX full element

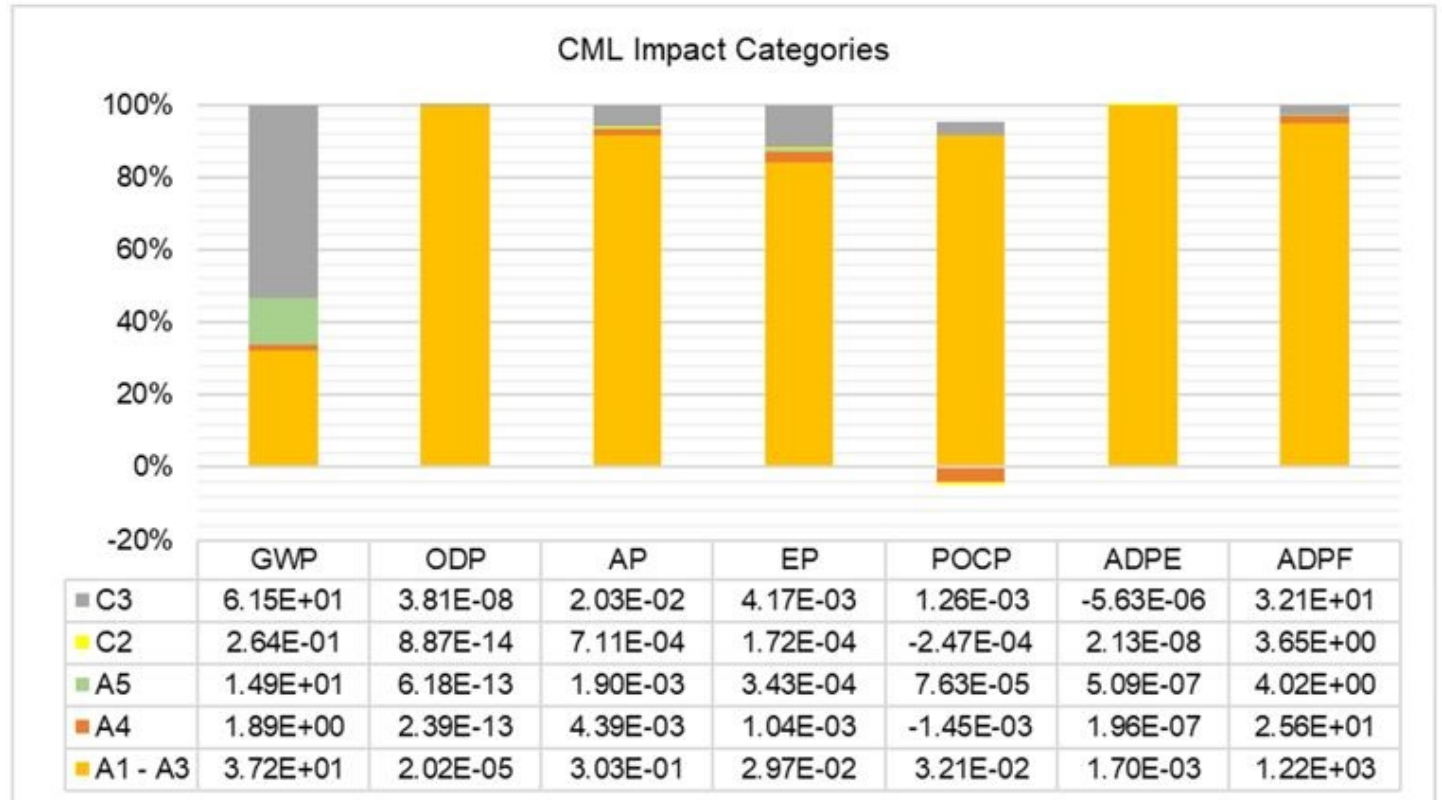
| Parameter | Unit | A1-A3 | A4 | A5 | C2 | C3 | D |
|---|----------------|----------|----------|-----------|----------|-----------|-----------|
| Renewable primary energy as energy carrier (PERE) | MJ | 5.6E+02 | 1.69E+00 | 1.12E+02 | 1.84E-01 | 3.35E+02 | -1.66E+02 |
| Renewable primary energy resources as material utilization (PERM) | MJ | 4.44E+02 | 0 | -1.11E+02 | 0 | -3.33E+02 | 0 |
| Total use of renewable primary energy resources (PERT) | MJ | 1E+03 | 1.69E+00 | 7.63E-01 | 1.84E-01 | 2.9E+00 | -1.66E+02 |
| Non renewable primary energy as energy carrier (PENRE) | MJ | 1.04E+03 | 2.57E+01 | 3.04E+01 | 3.66E+00 | 3.1E+02 | -7.65E+02 |
| Non renewable primary energy as material utilization (PENRM) | MJ | 3E+02 | 0 | -2.6E+01 | 0 | -2.74E+02 | 0 |
| Total use of non renewable primary energy resources (PENRT) | MJ | 1.34E+03 | 2.57E+01 | 4.41E+00 | 3.66E+00 | 3.58E+01 | -7.65E+02 |
| Use of secondary material (SM) | kg | 6.89E+00 | 0 | 0 | 0 | 0 | 0 |
| Use of renewable secondary fuels (RSF) | MJ | 0 | 0 | 0 | 0 | 0 | 0 |
| Use of non renewable secondary fuels (NRSF) | MJ | 0 | 0 | 0 | 0 | 0 | 0 |
| Use of net fresh water (FW) | m ³ | 6E-01 | 1.98E-03 | 3.62E-02 | 3.41E-04 | 1.43E-01 | -3.08E-01 |

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 m² VARIFLEX full element

| Parameter | Unit | A1-A3 | A4 | A5 | C2 | C3 | D |
|-------------------------------------|------|----------|----------|----------|----------|----------|-----------|
| Hazardous waste disposed (HWD) | kg | 2.99E-02 | 1.62E-06 | 4.57E-08 | 1.92E-07 | 3.97E-08 | -1.65E-07 |
| Non hazardous waste disposed (NHWD) | kg | 4.23E+00 | 1.87E-03 | 2.63E-01 | 2.8E-04 | 1.54E+00 | -4.72E+00 |

| | | | | | | | |
|-------------------------------------|----|----------|----------|----------|-------|----------|-----------|
| Radioactive waste disposed (RWD) | kg | 4.67E-02 | 2.95E-05 | 1.55E-04 | 5E-06 | 1.34E-03 | -2.83E-02 |
| Components for re-use (CRU) | kg | 0 | 0 | 0 | 0 | 0 | 0 |
| Materials for recycling (MFR) | kg | 9.83E-01 | 0 | 0 | 0 | 9.31E+00 | 0 |
| Materials for energy recovery (MER) | kg | 0 | 0 | 0 | 0 | 0 | 0 |
| Exported electrical energy (EEE) | MJ | 0 | 0 | 1.99E+01 | 0 | 7.16E+01 | 0 |
| Exported thermal energy (EET) | MJ | 3.09E+01 | 0 | 4.92E+01 | 0 | 2.02E+02 | 0 |

6. LCA: Interpretation



The provision of raw materials has the greatest influence on all impact categories. During this phase, the anodised aluminium components, some of which are part powder-coated with polyester resin, the steel components and bitumen sheeting can be primarily indicated as hotspots of environmental impact. These are supplemented by the particle board which accounts for the greatest mass percentage of the product. On account of the bound carbon, they still reduce the global warming potential (GWP) during the manufacturing phase.

The conspicuously high percentage of waste management (C3) accounting for the GWP is attributable to the incineration process for particle board where the biogenic carbon which makes a positive contribution in A1-A3 is released. But the incineration of plastic and bitumen also accounts for a significant third.

In the case of the formation potential for tropospheric ozone (POCP), transport accounts for a minor credit based on the negative characterisation factor of nitrogen monoxide (NO). Despite the apparently paradoxical results that more transports would lead to a reduction in overall near-ground ozone, this model does not contain any errors.

Due to the low relevance of consumables during the use phase, no environmental impacts are calculated for the declared product. No electricity is required for everyday operation.

Possible potentials and loads beyond the system boundary arise through material recycling and energetic utilisation of the offcuts during manufacturing, disposal of packaging and the product during the disposal Phase.

7. Requisite evidence

**Airborne
sound insulation:**

Measuring agency: Fraunhofer-Institut für Bauphysik, Nobelstr.
12,
D-70569 Stuttgart

Test

report: P-BA 141/2016 7.1 VOC emissions
For products used in interior applications: Test procedure in accordance with the AgBB scheme indicating the measuring agency, date and results as a range of values. At least the following must be declared:

8. References

Product

Category Rules for Building Products, Part A:

Calculation rules for the Life Cycle Assessment and requirements on the Background Report, version 1.5, 08/2016

DIN

EN ISO 14025:2011-10, Environmental designations and declarations – Type III Environmental Declarations – Basic principles and processes

Product

Category Rules for Building Products, Part B:

Requirements on the EPD for room partition systems, 04/2017

DIN

EN ISO 6946:2008-04, Thermal resistance and thermal transmittance - Calculation method

DIN

EN ISO 10140-2:2010-12, Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation

DIN

EN ISO 9001:2015-11, Quality management systems - Requirements

DIN

EN ISO 6946:2008-04, Building components and building elements - Thermal resistance and thermal transmittance - Calculation method

DIN

4102:1998-05, Fire performance of building materials and components

DIN

EN 15804:2014-07, Sustainability of construction works – Environmental product declarations – Core rules for the construction products product category

DIN

18032-3:1997-04, Testing of safety against ball throwing

DIN

EN ISO 140-3:2005, Acoustics – Laboratory

measurement of sound insulation of buildings and building elements – Part 3:
Measurement of airborne sound insulation of building elements

2001/118/EC, European Waste Catalogue (EWC) –
Commission decision of 16 January
2001 amending Decision 2000/532/EC as regards the list of
wastes

AgBB
2010, Health-related evaluation of emissions by
volatile organic compounds (VOC and SVOC) from construction
products

WECOBIS, Ecological building material information system,
German Ministry
of Transport, Building and Urban Affairs, 2012

GaBi

8.0, Software and data base for comprehensive
analysis, LBP, University of Stuttgart and thinkstep AG, 2017

ecoinvent, Data base for life cycle analysis (life cycle inventory
analysis
data), version 2.2, Swiss Centre for Life Cycle Inventories, St
Gallen

FSC,

Forest Stewardship Council

The literature referred to in the Environmental Product
Declaration must be listed in full. Standards already fully quoted
in the EPD do not need to be listed here again.

The current version of PCR Part A and PCR Part B of the PCR
document on which they are based must be referenced.



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