



ENVIRONMENTAL PRODUCT DECLARATION

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

VARIO® XTRA membrane

Version 2

Date of publication: 2018/06/11

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Validity: 5 years

Valid until: 2028/10/03

Scope of the EPD®: Europe



THE INTERNATIONAL EPD® SYSTEM

The International EPD® System Programme
operator: EPD international AB

Registration number: S-P-01141



General information

Company information

Owner of the declaration: Saint-Gobain ISOVER

Programme used: EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works – Environmental product declaration - core rules for the product category of construction product and The International EPD® System

PCR identification: PCR 2019:14 version 1.2.5 for Construction products

Prepared by: IVL Swedish Environmental Research Institute, EPD International Secretariat

UN CPC CODE: 3695 Builders' ware of plastics n.e.c.

Product name and location of production site: VARIO® XTRA is manufactured in Austria and commercialized by Saint-Gobain ISOVER

EPD® prepared by: Aymeric Collard (Marketing and Development central team) and Patricia Jimenez Diaz (Saint-Gobain LCA central team)

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Geographical scope of the EPD®: Europe

EPD® registration number: S-P-01141

Declaration issued: 2018/06/11, revision date: 2023/10/04 valid until: 2028/10/03

Demonstration of verification: an independent verification of the declaration was made, according to ISO 14025:2006. This verification was external and conducted by the following third party based on the PCR mentioned above.

Programme information

PROGRAMME: The International EPD® System

ADDRESS: EPD International AB - Box 210 60 - SE-100 31 Stockholm - Sweden

WEBSITE: www.environdec.com

E-MAIL: info@environdec.com

CEN standard EN 15804:2012 + A2:2019 serves as the Core Product Category Rules (PCR)

Product category rules (PCR): PCR 2019:14 Construction Products, version 1.2.5

PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com for a list of members.

President: Claudia A. Peña. University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact - Contact via info@environdec.com

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

EPD process certification EPD verification

Third party verifier: Marcel Gomez (Marcel Gómez Consultoria Ambiental, info@marcelgomez.com)

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third part verifier: Yes No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison.. For further information about comparability, see EN 15804 and ISO 14025.

Product description

Product description and description of use

This Environmental Product Declaration (EPD[®]) describes the environmental impacts 1 m² of airtight membrane.

This EPD applies for one specific product coming from one single plant.

The membrane VARIO[®] XTRA consists of a polyamide-based film paired with a polypropylene non-woven fabric which provides a broader range of water vapor diffusion resistance.

VARIO[®] XTRA is used in building, for instance loft, sarking, attic floor, massive walls with internal insulation and timber frame wall. With a Sd-value from 0.3m to 25m, VARIO[®] XTRA significantly limits the water transfer from the building interior to the construction, while allowing damp materials to dry out effectively depending on the relative humidity.

Technical data/physical characteristics:

Dynamic diffusion equivalent air layer thickness (Sd value): $0.3 \leq Sd \leq 25m$

Tensile strength: MD ≥ 140 N/50mm; CD ≥ 117 N/50mm (MD: machine direction; CD: cross direction)

Tear resistance (nail shank): $\geq 65N$

Reaction to fire (Euroclass): E

Declaration of the main product components and/or materials

Description of the main components and/or materials for 1 m² of membrane for the calculation of the EPD[®]:

| PARAMETER | VALUE |
|---|---|
| Quantity for 1 m ² of product | 80 g of finished product |
| Thickness | 220 μ m |
| Packaging for the transportation and distribution | Wooden pallet: 6.78 g/m ² Cardboard: 12.14 g/m ² Polyethylene (low-density): 1.7 g/m ² |
| Product used for the Installation | Metallic staples: 3.9 g/m ² |

Description of the main product components and/or materials:

| Product components | Weight (%) | Post-consumer material weight (%) | Biogenic material weight-kg C/kg |
|----------------------------|---------------|-----------------------------------|-----------------------------------|
| PA film | 0.35 – 0.5 % | 0% | 0 |
| PP non woven | 0.35 – 0.5 % | 0% | 0 |
| Additives | 0.05 – 0.07 % | 0% | 0 |
| Sum | 100% | | |
| Packaging materials | Weight (%) | Weight-% (vs the product) | Biogenic material, weight-kg C/kg |
| Wooden pallet | 33% | 8% | 0 |
| Cardboard | 59% | 15% | 0 |
| Polyethylene (low-density) | 8% | 2% | 0 |

During the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has not been used in a percentage higher than 0.1% of the weight of the product.

The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

LCA calculation information

| | |
|--|---|
| TYPE OF EPD | Cradle to gate with options and module D |
| DECLARED UNIT | 1 m ² of airtight membrane installed with a Sd-value from 0.3m to 25m |
| SYSTEM BOUNDARIES | Cradle to gate with options, modules A4–A5, B1–B7, C1–C4 and module D |
| REFERENCE SERVICE LIFE (RSL) | The Reference Service Life (RSL) of the insulation product is 50 years. This 50-year value is the amount of time that we recommend our products last for without refurbishment and corresponds to standard building design life. |
| CUT-OFF RULES | Life Cycle Inventory data shall according to EN 15804 include a minimum of 95% of total inflows (mass and energy) per module. Flows related to human activities such as employee transport are excluded. Transportation in-site is excluded The construction of plants, production of machines and transportation systems are excluded |
| ALLOCATIONS | Allocation criteria are based on mass. The polluter pays and modularity principles have been followed. |
| GEOGRAPHICAL COVERAGE AND TIME PERIOD | Scope: Europe Data is collected from Saint-Gobain ISOVER Data collected for the year 2020 |
| BACKGROUND DATA SOURCE | The databases Gabi 2022.1 and ecoinvent v.3.6 |
| SOFTWARE | GaBi 10 |

According to EN 15804:2012+A2:2019/AC:2021, EPDs of construction products may not be comparable if they do not comply with this standard. According to ISO 21930:2017, EPDs might not be comparable if they are from different programmes.

LCA scope

System boundaries (X=included. MND=module not declared)

| | PRODUCT STAGE | | | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY |
|--------------------|---------------------|-----------|---------------|--------------------|-----------------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|---|
| | Raw material supply | Transport | Manufacturing | Transport | Construction-Installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-recovery |
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Modules declared | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Geography | AT | AT | AT | EU | EU | EU | EU | EU | EU | EU | EU | EU | EU | EU | EU | EU | EU |
| Specific data used | >90% GWP- GHG | | | | | | | | | | | | | | | | |
| Variation products | 0% | | | | | | | | | | | | | | | | |
| Variation sites | 0% | | | | | | | | | | | | | | | | |

Life cycle stages



A1-A3, Product stage

Description of the stage: the product stage of the membrane products is subdivided into 3 modules A1, A2 and A3 respectively “raw material supply”, “transport” and “manufacturing”.

The aggregation of the modules A1, A2 and A3 is a possibility considered by the EN 15804 standard. This rule is applied in this EPD.

A1, Raw materials supply

This module takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process.

Specifically, the raw material supply covers production of granulate polymers for the film extrusion as well as the glue material.

A2, Transport to the manufacturer

The raw materials are transported to the manufacturing site. In our case, the modeling include: road, sea and rail (average values) of each raw material.

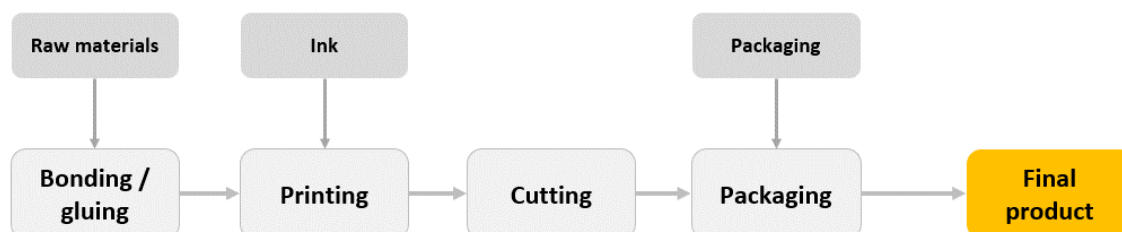
A3, Manufacturing

This module includes the manufacturing of the product and packaging. Specifically, it covers the manufacturing of polymeric membranes, the assembly, winding and packing steps. A loss rate is considered at this step as well as the amount of packaging waste (cardboard mandrel and polyethylene).

In addition, the production of packaging is considered at this stage.

Manufacturing process flow diagram

System diagram:



A4-A5, Construction process stage

Description of the stage: the construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building. Since there is a product loss during installation, the quantification of raw material compensation (A5) and its transport to the building site (A4) are considered.

A4, Transport to the building site: This module includes transport from the production gate to the building site. Transport is calculated based on a scenario with the parameters described in the following table.

| PARAMETER | VALUE |
|--|--|
| Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc. | Freight truck, maximum load weight of 24 t and consumption of 0.38 liters per km |
| Distance | 1560 km |
| Capacity utilisation (including empty returns) | 100% of the capacity in volume 30% of empty returns |
| Bulk density of transported products | 4620 m ² per pallet and 36 pallet per truck |
| Volume capacity utilisation factor | 1 |

A5, Installation in the building: this module includes:

| PARAMETER | VALUE/DESCRIPTION |
|---|--|
| Materials for installation (specified by materials) | 3.9 g/m ² of metallic staples <i>Note: other materials could be necessary for installation of the product.</i> |
| Water use | None |
| Other resource use | None |
| Quantitative description of energy type regional mix) and consumption during the installation process | None |
| Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type) | 10 % membranes and staples Wooden pallet: 6.78 g/m ² Cardboard: 12.14 g/m ² Polyethylene (low-density): 1.7 g/m ² |
| Distance | 50 km to landfill by truck |
| Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route) | Cardboard and wooden pallets packaging waste is sent to landfill (19%), recycling (57%) and incineration with energy recovery (24%). Polyethylene (low-density) packaging waste is sent to landfill (9%), Recycling (79%) and incineration with energy recovery (12%) |

B1-B7, Use stage (excluding potential savings)

Description of the stage: the use stage is divided into the following modules:

- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational energy use
- B7: Operational water use

Description of the scenarios and additional technical information:

The product has a reference service life of 50 years. This assumes that the product will last in situ with no requirements for maintenance, repair, replacement, or refurbishment throughout this period. Therefore, it has no impact at this stage.

C1-C4, End of Life Stage

Description of the stage: this stage includes the next modules:

C1, Deconstruction, demolition

The de-construction and/or dismantling of membranes take part of the demolition of the entire

building. There are not inputs or outputs quantified in this step.

C2, Transport to waste processing

The model use for the transportation (see A4, transportation to the building site) is applied.

C3, Waste processing for reuse, recovery and/or recycling

The product is considered to be landfilled without reuse, recovery or recycling.

C4, Disposal

The membrane is assumed to be 100% landfilled.

Description of the scenarios and additional technical information:

| PARAMETER | VALUE/DESCRIPTION |
|---|--|
| Collection process specified by type | The entire product, including any surfacing is collected alongside any mixed construction waste. 80 g of membrane and 3.9 g of metallic staples |
| Recovery system specified by type | There is no recovery, recycling or reuse of the product once it has reached its end of life phase. |
| Disposal specified by type | 100% (80 g) of membrane is landfilled |
| Assumptions for scenario development (e.g. transportation) | The waste going to landfill is transported 50 km by truck from deconstruction/demolition sites to landfill |

D, Reuse/recovery/recycling potential

100% of membrane waste is landfilled. There is no reuse, nor recovery, nor recycling of this product. Hence, the benefits and load reported on stage D proceed of the recycling and recovery energy of the packaging materials in stage A5.

LCA results














As specified in EN 15804:2012+A2:2019/AC:2021 and the Product Category Rules, the environmental impacts are declared and reported using the baseline characterization factors are from the ILCD. Specific data has been supplied by the plant, and generic data come from GABI and ecoinvent databases.

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

All emissions to air, water, and soil, and all materials and energy used have been included.











All the results refer to a declared unit of 1 m² of airtight membrane installed with a Sd-value from 0.3m to 25m, weighted 0.08kg/m² and with an estimated useful life of 50 years.

Environmental Impacts









| Environmental indicators | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | REUSE, RECOVERY RECYCLING |
|--|---------------|--------------------|-----------------|-----------|----------------|-----------|----------------|------------------|---------------------------|--------------------------|--------------------------------|--------------|---------------------|-------------|------------------------------|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
|  Climate Change [kg CO2 eq.] | 5.20E-01 | 1.26E-02 | 1.21E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.56E-04 | 0 | 1.96E-01 | -3.62E-03 |
|  Climate Change (fossil) [kg CO2 eq.] | 5.43E-01 | 1.26E-02 | 8.85E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.56E-04 | 0 | 1.96E-01 | 2.47E-03 |
|  Climate Change (biogenic) [kg CO2 eq.] | -2.37E-02 | 4.42E-06 | 3.23E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.01E-08 | 0 | 1.33E-05 | -6.11E-03 |
|  Climate Change (land use change) [kg CO2 eq.] | 2.33E-04 | 5.39E-07 | 2.61E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.10E-08 | 0 | 2.04E-06 | 7.48E-06 |
|  Ozone depletion [kg CFC-11 eq.] | 8.22E-09 | 2.84E-09 | 1.61E-09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.78E-11 | 0 | 7.64E-10 | 4.03E-10 |
|  Acidification terrestrial and freshwater [Mole of H+ eq.] | 2.35E-03 | 4.29E-05 | 2.80E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.74E-07 | 0 | 4.48E-05 | 2.47E-05 |
|  Eutrophication freshwater [kg P eq.] | 1.39E-02 | 4.57E-04 | 1.81E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.33E-06 | 0 | 6.69E-04 | 2.05E-04 |
|  Eutrophication marine [kg N eq.] | 7.60E-04 | 1.36E-05 | 9.61E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.76E-07 | 0 | 2.02E-05 | 1.39E-05 |
|  Eutrophication terrestrial [Mole of N eq.] | 2.20E-05 | 1.72E-08 | 2.22E-06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.49E-10 | 0 | 7.78E-08 | 5.43E-07 |
|  Photochemical ozone formation - human health [kg NMVOC eq.] | 1.47E-03 | 4.11E-05 | 1.86E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.36E-07 | 0 | 5.50E-05 | 3.93E-06 |
|  Resource use, mineral and metals [kg Sb eq.] ¹ | 1.18E-04 | 9.20E-09 | 1.19E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.87E-10 | 0 | 3.11E-08 | 5.77E-08 |
|  Resource use, energy carriers [MJ] ¹ | 1.05E+01 | 1.72E-01 | 1.22E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.51E-03 | 0 | 2.90E-02 | 1.16E-02 |
|  Water deprivation potential [m ³ world equiv.] ¹ | 5.10E-01 | 9.71E-05 | 5.87E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.98E-06 | 0 | 2.90E-03 | -1.39E-03 |

¹ The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator


Resources Use

| Resources Use indicators | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | D REUSE, RECOVERY, RECYCLING | |
|---|---------------|--------------------|-----------------|-----------|----------------|-----------|----------------|------------------|---------------------------|--------------------------|--------------------------------|--------------|---------------------|------------------------------|------------------------------|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
|  Use of renewable primary energy (PERE) [MJ] | 8.66E-01 | 4.63E-04 | 1.58E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.42E-06 | 0 | 1.99E-03 | 1.86E-01 |
|  Primary energy resources used as raw materials (PERM) [MJ] | 2.99E-01 | 0 | -2.11E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -9.62E-02 |
|  Total use of renewable primary energy resources (PERT) [MJ] | 1.17E+00 | 4.63E-04 | -5.26E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.42E-06 | 0 | 1.99E-03 | 9.01E-02 |
|  Use of non-renewable primary energy (PENRE) [MJ] | 6.84E+00 | 1.72E-01 | 8.52E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.51E-03 | 0 | 2.90E-02 | 1.28E-01 |
|  Non-renewable primary energy resources used as raw materials (PENRM) [MJ] | 3.70E+00 | 0 | 3.00E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -4.75E-02 |
|  Total use of non-renewable primary energy resources (PENRT) [MJ] | 1.05E+01 | 1.72E-01 | 1.15E+00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.51E-03 | 0 | 2.90E-02 | 8.00E-02 |
|  Input of secondary material (SM) [kg] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -7.36E-03 |
|  Use of renewable secondary fuels (RSF) [MJ] | 9.23E-26 | 0 | 9.23E-27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  Use of non-renewable secondary fuels (NRSF) [MJ] | 1.08E-24 | 0 | 1.08E-25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  Use of net fresh water (FW) [m3] | 1.21E-02 | 2.26E-06 | 1.40E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.60E-08 | 0 | 6.76E-05 | -3.07E-05 |



Waste Category & Output flows

| Waste Category & Output Flows | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | D REUSE, RECOVERY, RECYCLING |
|---|---------------|--------------------|-----------------|-----------|----------------|-----------|----------------|------------------|---------------------------|--------------------------|--------------------------------|--------------|---------------------|-------------|------------------------------|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
|  Hazardous waste disposed (HWD) [kg] | 1.53E-06 | 4.74E-07 | 2.79E-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.66E-09 | 0 | 9.92E-08 | 6.36E-08 |
|  Non-hazardous waste disposed (NHWD) [kg] | 5.92E-02 | 2.82E-04 | 2.40E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.74E-06 | 0 | 8.00E-02 | 9.27E-04 |
|  Radioactive waste disposed (RWD) [kg] | 1.04E-05 | 1.26E-06 | 1.97E-06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.56E-08 | 0 | 8.32E-08 | 1.95E-06 |
|  Components for re-use (CRU) [kg] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  Materials for Recycling (MFR) [kg] | 2.05E-03 | 0 | 9.63E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  Material for Energy Recovery (MER) [kg] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|  Exported electrical energy (EEE) [MJ] | 4.13E-03 | 0 | 3.31E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.89E-01 | 4.10E-03 |
|  Exported thermal energy (EET) [MJ] | 8.47E-03 | 0 | 6.87E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.83E-01 | 8.65E-03 |

Additional voluntary indicators from EN 15804 (according to ISO 21930:2017)

| Environmental indicators | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | REUSE, RECOVERY RECYCLING |
|---|---------------|--------------------|-----------------|-----------|----------------|-----------|----------------|------------------|---------------------------|--------------------------|--------------------------------|--------------|---------------------|-------------|------------------------------|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
|  GWP-GHG [kg CO2 eq.] ² | 5.43E-01 | 1.26E-02 | 8.82E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.56E-04 | 0 | 1.96E-01 | 2.47E-03 |

Information on biogenic carbon content

| Biogenic Carbon Content | | PRODUCT STAGE |
|---|---|---------------|
| | | A1 / A2 / A3 |
|  | Biogenic carbon content in product [kg] | 0.00E+00 |
|  | Biogenic carbon content in packaging [kg] | 8.11E-03 |

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

The product does not contain biogenic carbon. Regarding packaging, biogenic carbon is quantified due to wooden pallets and cardboard production.

² This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

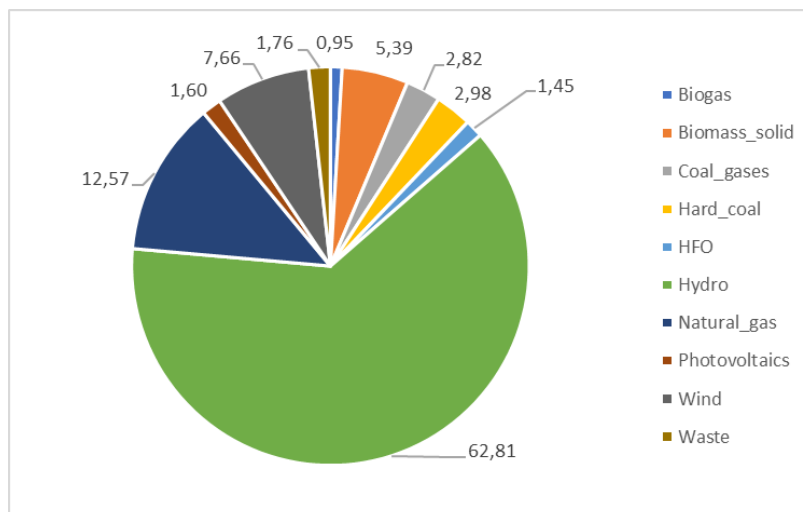
Differences versus previous versions

The differences versus previously published version are reference year of data collection and LCA software from TEAM to LCA for experts (Sphera) as well as LCA databases.

Additional information:

Electricity information

| TYPE OF INFORMATION | DESCRIPTION |
|---|--|
| Location | Representative of electricity consumed by the plant |
| Geographical representativeness description | Share of energy sources <ul style="list-style-type: none"> • Biogas: 0.95% • Biomass_solid: 5.39 % • Coal_gases: 2.82 % • Hard_coal: 2.98 % • HFO: 1.45 % • Hydro: 62.81 % • Natural_gas: 12.57 % • Photovoltaics: 1.60 % • Wind: 7.66 % • Waste: 1.76 % |
| Reference year | 2018 |
| Type of dataset | Cradle to gate |
| Source | Dataset from Gabi 2022.1 database |
| CO ₂ emission kg CO ₂ eq. / kWh | 0.181 kg of CO ₂ eq/kWh Based on Climate Change - fossil indicator |



Environmental impacts according to EN 15804:2012 + A1

The following tables presents results of VARIO XTRA according to EN 15804+A1 for 1 m² of airtight membrane installed with a Sd-value from 0.3m to 25m, weighted 0.08kg/m² and with an estimated useful life of 50 years.

| | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | REUSE, RECOVERY, RECYCLING |
|---|---------------|--------------------|-----------------|-----------|----------------|-----------|----------------|------------------|---------------------------|--------------------------|--------------------------------|--------------|---------------------|-------------|------------------------------|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
| Global Warming Potential (GWP) [kg CO ₂ eq.] | 5.11E-01 | 1.25E-02 | 8.59E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.54E-04 | 0 | 1.96E-01 | 2.59E-03 |
| Ozone depletion (ODP) [kg CFC 11eq.] | 8.09E-09 | 2.24E-09 | 1.41E-09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.57E-11 | 0 | 7.54E-10 | 4.44E-10 |
| Acidification potential (AP) [kg SO ₂ eq.] | 1.98E-03 | 3.31E-05 | 2.33E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.74E-07 | 0 | 3.15E-05 | 1.84E-05 |
| Eutrophication potential (EP) [kg (PO ₄) ₃ -eq.] | 4.43E-04 | 8.65E-06 | 5.37E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.76E-07 | 0 | 8.73E-06 | 9.16E-06 |
| Photochemical ozone creation (POCP) - [kg Ethylene eq.] | 1.03E-04 | 2.31E-06 | 1.48E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.69E-08 | 0 | 1.65E-06 | -1.06E-06 |
| Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.] | 1.18E-04 | 9.26E-09 | 1.19E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.89E-10 | 0 | 4.24E-08 | 5.84E-08 |
| Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ] | 5.86E+00 | 1.72E-01 | 7.45E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.50E-03 | 0 | 2.64E-02 | 3.20E-02 |

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