



In accordance with:
ISO 14025, ISO 21930 :2017, EN15804+A2:2019/AC:2021

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|--------------------------|---|
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| Programme operator: | EPD International AB |
| EPD registration number: | EPD-IES-0024426 |
| Publication date: | 2026-04-07 |
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An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com.

Knauf Insulation EPDs are EPD of multiple products, based on a representative product.

Please note that any ancillary materials used for the installation of the product are excluded from the LCA calculations.

Programme-related information and verification



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 characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

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| Programme: | The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com support@environdec.com |
| EPD registration number: | EPD-IES-0024426 |
| Published: | 2026-04-07 |
| Valid until: | 2031-04-07 |
| EPD owner | Knauf Insulation Sprl Rue de Maestricht 95 4600 Visé (Belgium) |
| Product Category Rules: | PCR 2019:14. Construction products (EN 15804+A2) Version 2.0.1 C-PCR-005 Thermal insulation products (EN 16783: 2024) Version: 2025-04-08 |
| Product group classification: | UN CPC 37 |
| Reference year for plant data: | 2025 |
| Geographical application scope: | Europe |

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|--|
| CEN standard EN 15804 and ISO standard ISO 21930 serve as the Core Product Category Rules (PCR) |
| Product category rules (PCR): PCR 2019:14. Construction products (EN 15804+A2) Version 2.0.1, UN CPC 37 C-PCR-005 Thermal insulation products (EN 16783: 2024) Version: 2024-05-03 |
| PCR review was conducted by: Rob Rouwette (chair), Noa Meron (co-chair) A full list of members is available on www.environdec.com . The review panel may be contacted via support@environdec.com . |
| External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through: <input checked="" type="checkbox"/> EPD process certification* without a pre-verified LCA/EPD tool |
| Third-party verification, accountable for the certification: <i>Bureau Veritas Certification Sverige ABV, Fabriksgatan 13, Göteborg, 41250</i> |
| Accredited by: <i>SWEDAC - Sverige AB 1236</i> |
| *EPD process certification involves an accredited certification body certifying and periodically auditing the EPD process and conducting external and independent verification of EPDs that are regularly published. More information can be found in the General Programme Instructions on www.environdec.com . |
| Procedure for follow-up of data during EPD validity involves third party verifier: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

General information

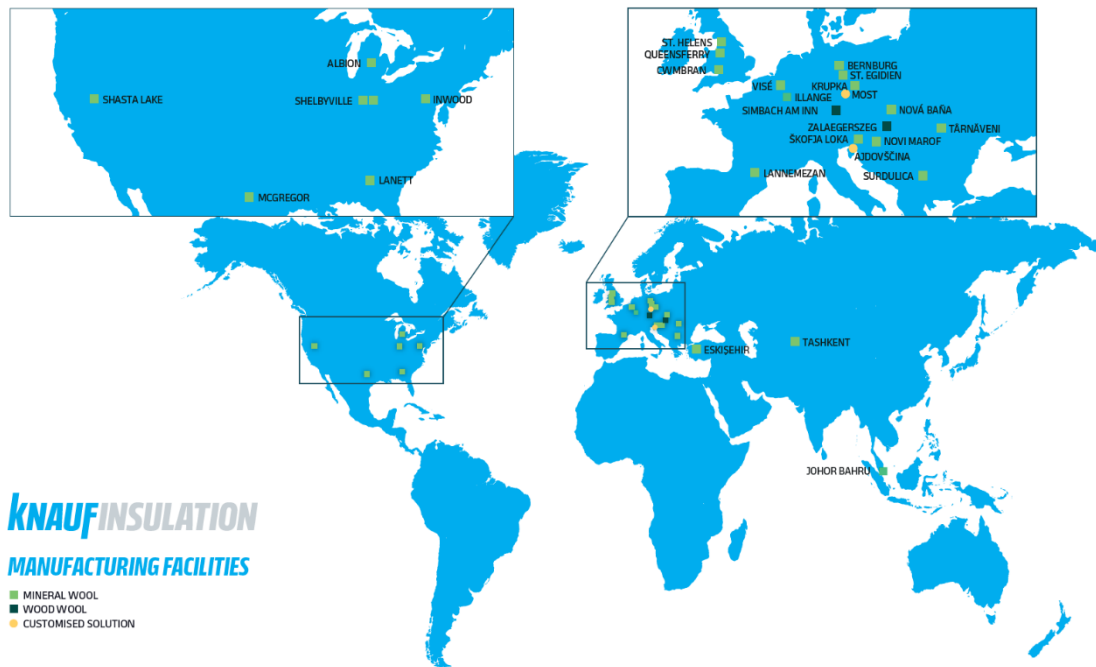
Information about the company

Description of the organisation:

Knauf Insulation is a leading provider of glass and rock mineral wool, as well as wood wool insulation solutions. With more than 40 years of experience in the insulation industry, it is one of the most respected names in insulation worldwide.

As part of the Knauf Group, a €15.4bn turnover family-owned global manufacturer of building materials and construction systems, Knauf Insulation employs more than 6,000 employees and has 28 manufacturing sites in 15 countries, with a turnover of €2.5bn.

Knauf Insulation’s mission is to challenge conventional thinking and create innovative insulation solutions that shape the way we live and build in the future, with care for the people who make them, the people who use them and the world we all depend on. Its vision is to lead the change in smarter insulation solutions for a better world.



The Headquarters is located in Visé, in Belgium.



Product-related or management system-related certifications:

All Knauf Insulation sites which are covered by EPD process certification system, including the sites considered for this EPD, are ISO 9001, ISO 14001, ISO 50001 and ISO 45001 certified under the scope "Design, Development and Production of Insulation Materials and Systems".

Knauf Insulation supports the Ten Principles of the United Nations Global Compact on human rights, labor, environment and anti-corruption.

Name and location of production site:

The intended application of this product in the construction industry is within Europe. The data used for the production stage life cycle assessment is related to production plant(s) located in Bernburg (Germany).

Address: Weststraße 1, 06406 Bernburg (Saale), Germany.

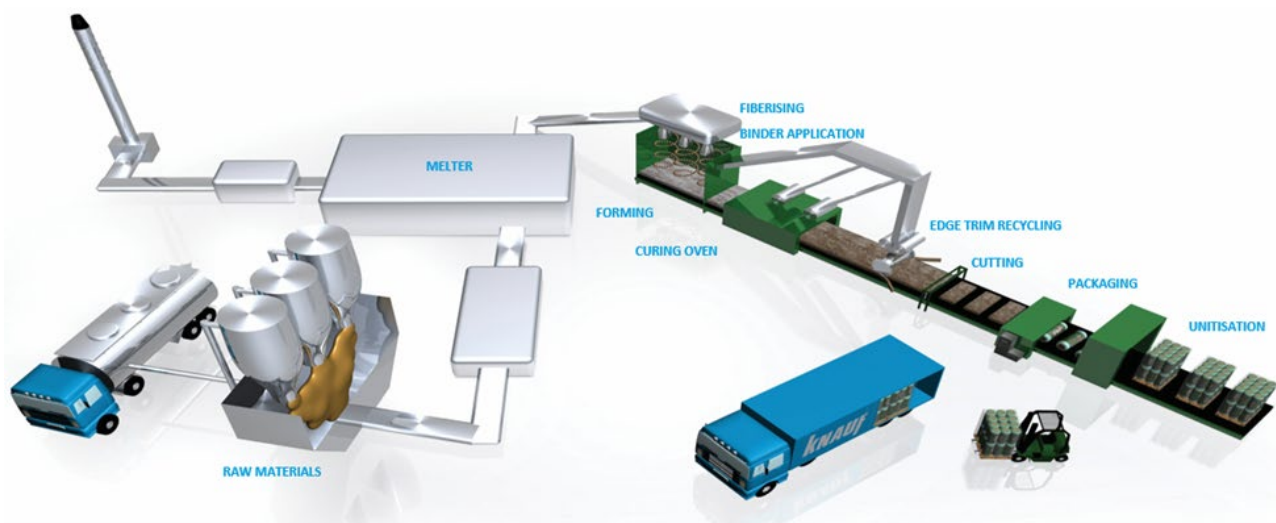
Information about Glass Mineral Wool production

Knauf Insulation glass mineral wool products (GMW) are available in the form of rolls, slabs/batts and blowing wool.

Typically, the density of glass mineral wool falls within the range of 10 to 85 kg/m³, and it comprises a minimum of 92% inert materials. The inert part primarily comprises recycled glass (external cullet), which constitutes up to 80% of the composition. Sand and dolomite are introduced to the mix, and the entire blend is melted together in a furnace.

For slabs/batts and rolls, the residual fraction, which accounts for up to 8%, is composed of bio-based binder components. At Knauf Insulation, the binder used for the glass mineral wool products is the ECOSE® Technology binder. ECOSE® Technology contains no added formaldehyde or phenol. Additionally, this binder is derived from rapidly renewable natural raw materials, specifically plant starch.

Blowing wool insulation is a non-bonded, virgin fibrous insulation material, manufactured as a loose-fill product without the use of binders. In contrast, rolls and slabs/batts of insulation are bonded and cured in an oven.



Product information

Product name(s)

Mineral Plus ADP-030-UD

Product identification

The declared insulation consists of Mineral Plus ADP-030-UD, a glass mineral wool, with a polypropylene spunbonded facing slab of 1m² (considered for this EPD).

For the placement of the products on the construction market in the European Union/ EFTA (with exception of Switzerland and UK), the Regulation/ (EU) No 305/2011/ applies. The products concerned need Declarations of Performance / DoP M4335QPCPR taking into consideration the harmonized product standard EN 13162 and the CE-marking.

Product description

The main application for Mineral Plus ADP-030-UD is pitched roof.

UN CPC code

37990: Non-metallic mineral products (including mineral wool, expanded mineral materials, worked mica, articles of mica, non-electrical articles of graphite or other carbon and articles of peat).

Geographical scope

The product is manufactured in Bernburg (Germany). Energy-related information is described in the next section. Regarding the market area, the product is mainly marketed in Europe.

Technical Characteristics

| Parameter | Value |
|---|-------------------------------|
| Thermal conductivity/ EN 12667 | 0.03 W/(mK) at 10°C |
| Water vapor diffusion resistance (EN 12086) | 1 |
| Thermal Resistance (ISO 8301) | 3.3 m ² K/W |
| Declared density range/ EN 1602 | 61 kg/m ³ (+/-10%) |

The density specified in this document is provided solely and exclusively for the purpose of Life Cycle Assessment (LCA) calculations and should not be relied on for safety or any other technical requirements or specifications. Additional technical characteristics of the product can be found in the Declaration of Performance (DoP).

LCA information

Functional unit / declared unit

The declared unit is 1m² of polypropylene faced glass mineral wool Mineral Plus ADP-030-UD with R-value of 3.3 m²K/W (for a thickness of 100 mm and a declared lambda of 0.03 W/mK).

Reference service life

The RSL or durability of Mineral Plus ADP-030-UD is as long as the lifetime of the building equipment in which it is used (at least 60 years).

Time representativeness & Information on Specific Data

The complete reference year used for the plant(s) production data is 2025. The product group/s considered in this EPD is produced in one single manufacturing plant; therefore, variations issue for sites is not relevant.

The data which is used to carry out the LCA calculations contains more than 45% specific data and less than 55% generic data. Data quality information used in this EPD is compliant with EN 15941.

Database(s) and LCA software used

The LCA model, the data aggregation and environmental impacts are calculated with the software LCA for Experts (GaBi) 10.9 and its content version 2025.2. MLC datasets from the same content version are utilized for these calculations. The impact models used are those indicated in EN 15804:2012+A2:2019 and EF 3.1 (February 2023).

Gas information

Gas input (residual mix reference year: 2021) from Germany is selected for Bernburg (Germany).

Electricity information

| Plants (countries) | Electricity mixes | Locations (electricity) | Dataset Reference Year | Impact (kg CO _{2,eq} /kwh) |
|--------------------|------------------------|-------------------------|------------------------|-------------------------------------|
| Bernburg (Germany) | EAC's (100% windpower) | Europe | 2021 | 0.013 |

Description of system boundaries

The system boundary of the EPD follows the modularity approach defined by the EN 15804:2012+A2:2019.

The type of EPD is cradle-to-grave and module D.

For a comprehensive assessment, it is strongly recommended to consider the results from all the modules. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3). Relying exclusively on Modules A1-A3 may lead to incomplete conclusions.

A comprehensive list and detailed explanations of each stage within the EPD are available as follows.

The product stage (A1-A3) includes:

- A1 – raw material extraction and processing, processing of secondary material input (e.g. recycling processes), for the processing/sorting of recycled glass into cullet, only the use of electricity is considered,
- A2 – transport to the manufacturer and
- A3 – manufacturing.

This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of-waste state or disposal of final residues during the product stage.

The LCA results are presented in an aggregated format for the product stage, where modules A1, A2, and A3 are consolidated into a single module, denoted as A1-A3.

| Product Parameters | Value |
|--|-------------------|
| Glass mineral wool weight [(without facing/ coating weight)] | 6.1 kg |
| Area | 1m ² |
| Thickness | 100 mm |
| Volume | 0.1m ³ |
| Facing/ coating weight | 0.15 kg |
| Packaging – PE film | 0.04 kg |
| Packaging - Wooden pallet | 0.63 kg |

The construction process stage includes:

- A4 – transport to the construction site and
- A5 – installation into the building.

The transport to the building site (A4) and installation (A5) included in this LCA use the following parameters:

| Parameter | Value |
|--|---|
| Average transport distance (truck) | 600 km |
| Type of fuel and vehicle consumption or type of vehicle used for transport (truck) | Truck Euro 6 (28 – 32 t / 22 t payload) |
| Truck capacity utilisation (including 30% of empty returns) | 28 % of the weight capacity |
| Loss of materials on site | 2% |
| Packaging – PE film | 40 % recycled, 60 % incinerated |
| Packaging – Wooden Pallets | 40 % recycled, 60 % incinerated |

The treatment and the transport of the packaging waste after the installation of the product (A5) have been considered.

The Use stage (B1-B7) includes:

- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational Energy Use
- B7: Operational Water Use

Once installation is complete, no actions or technical operations are required during the use stages until the end of life. Therefore, the mineral wool has no impact (excluding potential energy savings) on this stage.

The end-of-life stage includes:

- C1 – de-construction, demolition,
- C2 – transport to waste processing,
- C3 – waste processing for reuse, recovery and/or recycling and
- C4 – disposal.

This includes provision of all transport, materials, products and related energy and water use. The common manual dismantling impact of insulation is considered as very small and can be neglected in C1.

While Knauf Insulation's glass mineral wool products are partially recycled at the end of their life through the Resulation recycling system in Visé (Belgium), an established collection system does not yet exist in all countries. Therefore, the assumption chosen in this study, 100% landfill (C4) after the use phase, is the most conservative approach.

| Parameter | Value |
|--|---|
| Disposal type (mineral wool) | 100% landfill |
| Average transport distance waste (C2) | 80 km |
| Type of fuel and vehicle consumption or type of vehicle used for transport | Truck-trailer, Euro 6, 34 - 40t gross weight / 27t payload capacity/ 40 L for 100 km (if 100 % utilization) |
| Truck capacity utilization | 50 % of the weight capacity |

Module D includes reuse, recovery and/or recycling potential. According to EN 15804:2012+A2:2019 any declared benefits and loads from net flows leaving the product system not allocated as co-products and having passed the end-of waste state shall be included in module D. The benefits considered in module D originate from packaging recycling or incineration.

Recycled material

The mineral wool scrap generated during the manufacturing process is recycled internally and fed back into the mineral wool production process at multiple stages.

The average product recycled content for the considered plant(s), excluding internal recycling, was calculated at 79% in 2025. The calculation is taking into account the % of secondary materials from external supply input into the batch against virgin raw materials supply. The external waste considerations and the calculation methodology applied are also in accordance with the ISO 14021 standard.

Content Declaration

The product does not contain substances on the "Candidate List of Substances of Very High Concern for Authorisation" in force at the time of the EPD publication under the REACH regulation (if above 0.1% of the mass).

| Product components | Weight % | Post-consumer recycled material % <i>(out of total)</i> | Biogenic material % <i>(out of total)</i> | Biogenic material, kg C/product <i>(out of total)</i> |
|--------------------|----------|--|--|--|
| Mineral Materials | 20 - 60 | 0 | 0 | 0 |
| Recycled Glass | 50 - 80 | 50-100 | 0 | 0 |
| Bio - based binder | 2 - 10 | 0 | 80 | 0.12 |
| Additives | < 1 | 0 | 0 | 0 |

| Packaging Materials | Weight, kg/ DU or FU | Weight % <i>(versus the product)</i> | Biogenic material, kg C/product <i>(out of total)</i> |
|--|----------------------|---|--|
| Packaging - PE film <i>(0-50% recycled content)</i> | 0.04 | 0.59 | 0 |
| Packaging - Wooden pallet | 0.63 | 10.33 | 0.32 |
| TOTAL | 0.67 | 10.92 | 0.32 |

Note: This content declaration table applies to all product thickness covered in this EPD. Knauf Insulation EPDs are EPD of multiple products, based on a representative product (Mineral Plus ADP-030-UD 100 mm).

Conversion factor to mass

The conversion factor used in this EPD involves multiplying the results by 0.16 to obtain Environmental Impact Indicator results for 1 kg. Please note, an insulation product should always be defined by both its thickness and R-value. Focusing only on the product's weight could result in misinterpretations.

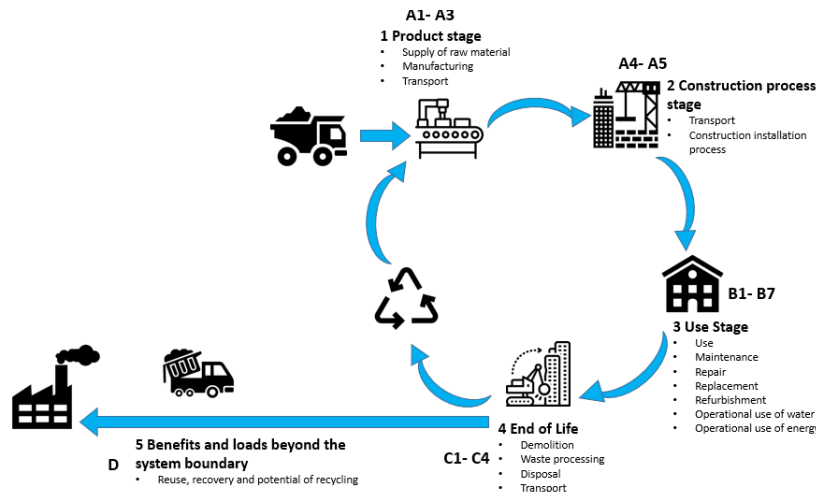
More information:

www.knauf.com

Name and contact information of LCA practitioner:

Clara del Val
Knauf Insulation Sprl
Rue de Maestricht 95
4600 Visé (Belgium)
Contact: sustainability@knaufinsulation.com

Process flow diagram, declared Modules, geography, share of specific data (in GWP-GHG indicator) & data variation



Life cycle stages and the description of the system boundaries for the reference product LCA (X = included in the LCA, MND = module is not declared)

| | Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | | Resource recovery stage | |
|------------------------|---------------------|-----------|---------------|----------------------------|---------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|-------------------------|------------------------------------|
| | Raw material supply | Transport | Manufacturing | Transport | Construction installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | | Reuse-Recovery-Recycling-potential |
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | |
| Modules declared | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Geography | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe | Europe |
| Share of specific data | > 45 % | | | | | | | | | | | | | | | | | |
| Variation* – products | 0% | | | | | | | | | | | | | | | | | |
| Variation** – Sites | 0% | | | | | | | | | | | | | | | | | |

* Variation regarding the average EPD result in terms of GWP-GHG indicator

** Variation regarding the average EPD result in terms of GWP-GHG indicator amongst products covered with this EPD

The declaration of data sources, reference years, data categories, and share of primary data is summarized in the table below.

| Process | Source type | Source | Version number | Reference Year |
|--|----------------|------------------|----------------|----------------|
| Energy for manufacturing | Collected data | Knauf Insulation | - | 2025 |
| | Database | Sphera | MLC 2025.2 | 2025 |
| Glass mineral wool + packaging manufacturing | Collected data | Knauf Insulation | - | 2025 |
| | Database | Sphera | MLC 2025.2 | 2025 |

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Data quality declaration of material processes:

- Components in GMW: secondary data | MLC 2025.2
- Process energy: secondary data | MLC 2025.2

According to PCR 2019:14 v.2.0.1, infrastructure should be excluded from the system boundary (except for energy-related infrastructure), which aligns with Knauf Insulation's approach. However, it is possible that some GaBi background datasets may include infrastructure impacts as part of their modelling.

Additional environmental information

All raw materials used in the manufacture of the declared product, the required energy, water consumption and the resulting emissions are considered in the LCA. As a result, recipe components with a share of less than 1% are included. All neglected processes contribute less than 5% to the total mass or less than 5% to the total energy consumption. For information, the impact of the mineral wool plant construction or manufacturing equipment is not taken into account in the life cycle assessment.

Allocation criteria with by-products (mineral wool for ceiling tiles) are based on cost. Materials required for fixing and installation are not included in the scope of this LCA. The impact of any additional construction products or materials not included in this EPD should be accounted for at building level. Regarding installation, this EPD only includes the environmental impacts relating to the product itself, such as material losses and packaging disposal.

Knauf Insulation adopts a conservative approach in its EPDs.

Conversion factors to specific thickness

The results of this EPD apply to a thickness of 100 mm, with an R-value of 3.3 m²K/W. Multiplication factors for the primary product thickness are provided to calculate the environmental performance for each thickness in the table below.

| Product thickness (mm) | Thickness Conversion factor |
|------------------------|-----------------------------|
| 60 | 0.6 |
| 240 | 2.4 |

Since this product is faced, it is not possible to make a direct linear scale between different thicknesses. The amount of facing does not change with thickness, so the impact of the facing (and glue) is always the same (0.47 kg CO_{2,eq}/m²).

To adjust the results for the GWP-total indicator, the impact of the facing (and glue) should first be subtracted from the GWP-total value provided in this EPD. The resulting value should then be multiplied by the appropriate conversion factor in the table. For thickness not listed, conversion factors can be calculated by dividing the target product thickness by 100 mm, as the results scale linearly. Finally, the impact of the facing must be added back.

Potential environmental impacts: 1m² of glass mineral wool Mineral Plus ADP-030-UD with a thickness of 100 mm and the R-value of 3.3 m²K/W.

These results are representative of all the products mentioned in this EPD.

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

| ENVIRONMENTAL IMPACTS | | | | | | | | | | |
|------------------------|---|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter | Unit | A1-3*** | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D** |
| GWP-fossil | kg CO2 eq. | 5.28E+00 | 8.19E-01 | 4.93E-01 | 0.00E+00 | 0.00E+00 | 4.45E-02 | 0.00E+00 | 9.86E-02 | -4.90E-01 |
| GWP-biogenic | kg CO2 eq. | -1.63E+00 | 0.00E+00 | 1.03E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.00E-01 | 0.00E+00 |
| GWP-luluc | kg CO2 eq. | 6.99E-03 | 8.38E-03 | 4.62E-04 | 0.00E+00 | 0.00E+00 | 4.57E-04 | 0.00E+00 | 4.30E-04 | -4.83E-04 |
| GWP-total | kg CO2 eq. | 3.65E+00 | 8.27E-01 | 1.53E+00 | 0.00E+00 | 0.00E+00 | 4.50E-02 | 0.00E+00 | 7.99E-01 | -4.91E-01 |
| ODP | kg CFC 11 eq. | 5.80E-12 | 1.35E-13 | 2.24E-13 | 0.00E+00 | 0.00E+00 | 7.36E-15 | 0.00E+00 | 5.66E-14 | -3.24E-12 |
| AP | mol H+ eq. | 5.36E-02 | 1.01E-03 | 1.29E-03 | 0.00E+00 | 0.00E+00 | 5.42E-05 | 0.00E+00 | 7.33E-04 | -7.74E-04 |
| EP-freshwater | kg P eq. | 1.05E-04 | 2.19E-06 | 2.29E-06 | 0.00E+00 | 0.00E+00 | 1.20E-07 | 0.00E+00 | 2.11E-06 | -3.06E-07 |
| EP-marine | kg N eq. | 7.79E-03 | 3.78E-04 | 2.15E-04 | 0.00E+00 | 0.00E+00 | 2.03E-05 | 0.00E+00 | 2.02E-04 | -2.43E-04 |
| EP-terrestrial | mol N eq. | 2.29E-01 | 4.01E-03 | 5.45E-03 | 0.00E+00 | 0.00E+00 | 2.14E-04 | 0.00E+00 | 2.15E-03 | -2.68E-03 |
| POCP | kg NMVOC eq. | 9.84E-03 | 8.91E-04 | 3.52E-04 | 0.00E+00 | 0.00E+00 | 4.77E-05 | 0.00E+00 | 5.90E-04 | -7.88E-04 |
| ADP-minerals & metals* | kg Sb eq. | 2.06E-06 | 5.41E-08 | 4.52E-08 | 0.00E+00 | 0.00E+00 | 2.95E-09 | 0.00E+00 | 1.02E-08 | -4.13E-08 |
| ADP-fossil* | MJ | 8.03E+01 | 1.04E+01 | 2.24E+00 | 0.00E+00 | 0.00E+00 | 5.69E-01 | 0.00E+00 | 1.32E+00 | -1.06E+01 |
| WDP* | m ³ world eq. | 1.37E+00 | 3.72E-03 | 1.29E-01 | 0.00E+00 | 0.00E+00 | 2.03E-04 | 0.00E+00 | 7.58E-03 | -4.05E-02 |
| Acronyms | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | | | | | | | | | |

* Disclaimer 2: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

** : [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].

*** The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant

Potential environmental impact – additional mandatory and voluntary indicators

| Indicator | Unit | A1-A3 | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D |
|-------------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| GWP-GHG [2] | kg CO ₂ eq. | 5.26E+00 | 8.30E-01 | 4.93E-01 | 0.00E+00 | 0.00E+00 | 4.51E-02 | 0.00E+00 | 9.91E-02 | -4.93E-01 |

[2] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product.

Use of resources: 1m² of glass mineral wool Mineral Plus ADP-030-UD with a thickness of 100 mm and the R-value of 3.3 m²K/W.

These results are representative of all the products mentioned in this EPD.

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

RESOURCES USE

| Parameter | Unit | A1-3*** | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D* |
|-----------|----------------|----------|----------|-----------|----------|----------|----------|----------|----------|-----------|
| PERE [3] | MJ | 7.11E+01 | 7.86E-01 | -6.06E+00 | 0.00E+00 | 0.00E+00 | 4.29E-02 | 0.00E+00 | 1.54E-01 | 0.00E+00 |
| PERM [3] | MJ | 1.75E+01 | 0.00E+00 | 3.49E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PERT [3] | MJ | 8.86E+01 | 7.86E-01 | -5.71E+00 | 0.00E+00 | 0.00E+00 | 4.29E-02 | 0.00E+00 | 1.54E-01 | 0.00E+00 |
| PENRE [3] | MJ | 7.71E+01 | 1.04E+01 | 8.24E+01 | 0.00E+00 | 0.00E+00 | 5.69E-01 | 0.00E+00 | 1.32E+00 | 0.00E+00 |
| PENRM [3] | MJ | 3.15E+00 | 0.00E+00 | 6.29E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| PENRT [3] | MJ | 8.03E+01 | 1.04E+01 | 8.25E+01 | 0.00E+00 | 0.00E+00 | 5.69E-01 | 0.00E+00 | 1.32E+00 | 0.00E+00 |
| SM | kg | 4.78E+00 | 0.00E+00 | 9.76E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RSF | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRSF | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW | m ³ | 3.79E-02 | 3.89E-04 | 3.15E-03 | 0.00E+00 | 0.00E+00 | 2.12E-05 | 0.00E+00 | 2.52E-04 | -1.83E-03 |

Acronyms
 PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

*: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].

*** The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.

[3] From International EPD PCR 2.0.1 for Construction Products, the option B, mentioned in Annex 3, was used for the calculation if the primary energy use indicators.

Waste production and output flows: 1m² of glass mineral wool Mineral Plus ADP-030-UD with a thickness of 100 mm and the R-value of 3.3 m²K/W.

These results are representative of all the products mentioned in this EPD.

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

| OUTPUT FLOWS AND WASTE CATEGORIES | | | | | | | | | | |
|-----------------------------------|------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter | Unit | A1-3*** | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D* |
| Hazardous waste disposed | kg | 4.04E-07 | 4.18E-10 | 8.79E-09 | 0.00E+00 | 0.00E+00 | 2.28E-11 | 0.00E+00 | 2.09E-08 | 4.96E-09 |
| Non-hazardous waste disposed | kg | 1.25E-01 | 1.46E-03 | 1.46E-01 | 0.00E+00 | 0.00E+00 | 7.94E-05 | 0.00E+00 | 6.14E+00 | 4.13E-03 |
| Radioactive waste disposed | kg | 6.47E-04 | 1.97E-05 | 2.54E-05 | 0.00E+00 | 0.00E+00 | 1.07E-06 | 0.00E+00 | 1.81E-05 | -4.30E-04 |
| Components for reuse | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material for recycling | kg | 0.00E+00 | 0.00E+00 | 3.32E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for energy recovery | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Exported energy, electricity | MJ | 0.00E+00 | 0.00E+00 | 1.58E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Exported energy, thermal | MJ | 0.00E+00 | 0.00E+00 | 2.84E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

*: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].

*** The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.

Additional impact categories and indicators: 1m² of glass mineral wool Mineral Plus ADP-030-UD with a thickness of 100 mm and the R-value of 3.3 m²K/W.

These results are representative of all the products mentioned in this EPD.

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

| ADDITIONAL IMPACT CATEGORIES AND INDICATORS | | | | | | | | | | |
|---|---|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter | Unit | A1-3**** | A4 | A5 | B1-B7 | C1 | C2 | C3 | C4 | D* |
| PM | Disease Incidence | 6.22E-07 | 9.88E-09 | 1.42E-08 | 0.00E+00 | 0.00E+00 | 5.35E-10 | 0.00E+00 | 8.92E-09 | -1.20E-08 |
| IRP* | kBq U235 eq. | 8.91E-02 | 2.83E-03 | 3.69E-03 | 0.00E+00 | 0.00E+00 | 1.54E-04 | 0.00E+00 | 1.75E-03 | -7.00E-02 |
| ETP-fw** | CTUe | 9.59E+01 | 1.36E+01 | 2.53E+00 | 0.00E+00 | 0.00E+00 | 7.39E-01 | 0.00E+00 | 8.00E-01 | -3.64E+00 |
| HTP-c** | CTUh | 5.56E-09 | 1.83E-10 | 1.31E-10 | 0.00E+00 | 0.00E+00 | 9.97E-12 | 0.00E+00 | 1.01E-10 | -1.18E-10 |
| HTP-nc** | CTUh | 3.63E-07 | 1.02E-08 | 8.38E-09 | 0.00E+00 | 0.00E+00 | 5.58E-10 | 0.00E+00 | 1.08E-08 | -1.81E-09 |
| SQP** | dimensionless | 2.03E+02 | 4.61E+00 | 4.37E+00 | 0.00E+00 | 0.00E+00 | 2.51E-01 | 0.00E+00 | 3.11E-01 | -6.93E+00 |
| Acronyms | PM = Particulate matter emissions; IRP= Ionising radiation, human health; ETP-fw: Ecotoxicity (freshwater); ETP-c: Human toxicity, cancer effects; HTP-nc: Human toxicity, non-cancer effects; SQP: Land use related impacts / soil quality | | | | | | | | | |

* Disclaimer 1: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

** Disclaimer 2: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

***: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].

**** The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.

Information on biogenic carbon content

| Results per functional or declared unit | | |
|---|----------|------------------------|
| BIOGENIC CARBON CONTENT | kg C | kg CO ₂ eq. |
| Biogenic carbon content in product | 1.22E-01 | 4.47E-01 |
| Biogenic carbon content in packaging | 3.15E-01 | 1.16E+00 |

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

LCA interpretation

Environmental impacts

All impact categories except the Abiotic Depletion Potential for Non-Fossil Resources (ADP- minerals &metals) and the Depletion Potential of the Stratospheric Ozone layer (ODP) are dominated by the production. This is mainly due to the consumption of energy (electricity and natural gas) during the production of glass mineral wool.

The Global Warming Potential (GWP-total) is clearly dominated by the production, mostly due to energy consumption but significantly reduced through the use of electricity from renewable sources.

The Depletion Potential of the Stratospheric Ozone layer (ODP) is mostly influenced by the manufacturing phase (module A1-A3) and significantly influenced using electricity.

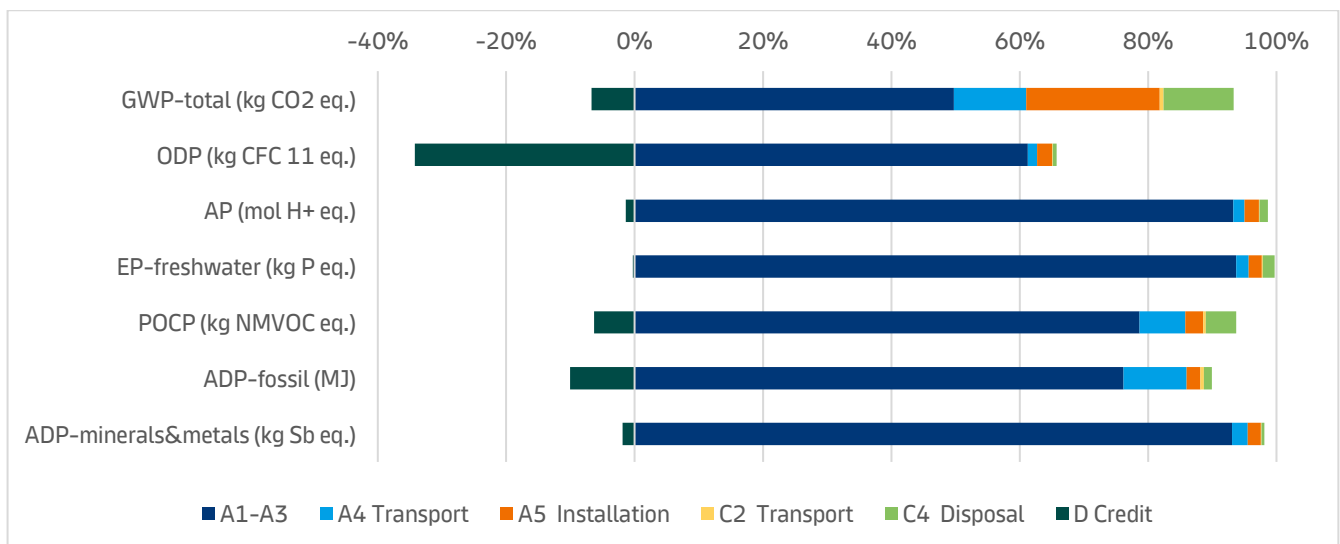
The Acidification Potential (AP) is also dominated by the production due to the process's emissions and the electricity consumption. Most of the impact is by emissions of sulphur dioxide, ammonia and nitrogen oxides.

The Eutrophication Potential Fresh Water (all EP indicators in total) is mainly influenced by production due to emissions from the curing oven, furnace and other unit processes. The glucose for the binder production also has an impact because of crops fertilizers use.

The Formation Potential of Tropospheric Ozone (POCP) is dominated by emissions from the manufacturing processes (including energy use) and raw materials.

The Abiotic Depletion Potential for Non-Fossil Resources (ADP- minerals &metals) is dominated by the raw materials production.

The Abiotic Depletion Potential for Fossil Resources Potential (ADP-fossil) is dominated by energy consumption for the production. The packaging (plastic) and the binder have also a non-negligible impact.



Resources use

Total Use of Non-Renewable Primary Energy Resources (PENRT) is dominated by the production of glass mineral wool products (especially due to the energy consumption) and with little influence of raw materials, binder and packaging.

Total Use of Renewable Primary Energy Resources (PERT) is dominated by the binder (bio-based), the production and the packaging (wooden pallets).

For the Use of **Secondary Material (SM)**, there is a lot of external cullet used into the batch process (recycled glass from windows, bottles and jars).

Version history

| Version | Date | Difference(s) versus previous version(s) |
|-----------------|------------|--|
| Original | 2026-04-07 | - |

Abbreviations

| Abbreviation | Definition |
|---|---|
| General Abbreviations | |
| EN | European Norm (Standard) |
| EPD | Environmental Product Declaration |
| EF | Environmental Footprint |
| GPI | General Programme Instructions |
| ISO | International Organization for Standardization |
| LCA | Life Cycle Assessment |
| PCR | Product Category Rules |
| c-PCR | Complementary Product Category Rules |
| CEN | European Committee for Standardization |
| CLC | Co-location centre |
| CPC | Central product classification |
| GHS | Globally harmonized system of classification and labelling of chemicals |
| GRI | Global Reporting Initiative |
| Environmental Impact Indicators (EN 15804) | |
| GHG | Greenhouse gas |
| GWP | Global Warming Potential (kg CO ₂ eq.) |
| GWP-fossil | Global Warming Potential from fossil sources (kg CO ₂ eq.) |
| GWP-biogenic | Global Warming Potential from biogenic sources (kg CO ₂ eq.) |
| GWP-luluc | Global Warming Potential from land use and land use change (kg CO ₂ eq.) |
| GWP-total | Total Global Warming Potential (kg CO ₂ eq.) |
| GWP-GHG | Global Warming Potential for greenhouse gases (kg CO ₂ eq.) |
| ODP | Ozone Depletion Potential (kg CFC-11 eq.) |
| AP | Acidification Potential (mol H ⁺ eq.) |
| EP | Eutrophication Potential |
| EP-freshwater | Freshwater eutrophication potential (kg P eq.) |
| EP-marine | Marine eutrophication potential (kg N eq.) |
| EP-terrestrial | Terrestrial eutrophication potential (mol N eq.) |
| POCP | Photochemical Ozone Creation Potential (kg NMVOC eq.) |
| ADP | Abiotic Depletion Potential |
| ADP-minerals&metals | Abiotic depletion potential for non-fossil resources (kg Sb eq.) |
| ADP-fossil | Abiotic depletion potential for fossil resources (MJ) |
| WDP | Water Deprivation Potential (m ³) |
| Resource Use Indicators | |
| PERE | Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ) |
| PERM | Use of renewable primary energy resources used as raw materials (MJ) |
| PERT | Total use of renewable primary energy resources (MJ) |
| PENRE | Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ) |
| PENRM | Use of non-renewable primary energy resources used as raw materials (MJ) |
| PENRT | Total use of non-renewable primary energy resources (MJ) |
| SM | Use of secondary material (kg) |
| RSF | Use of renewable secondary fuels (MJ) |
| NRSF | Use of non-renewable secondary fuels (MJ) |
| FW | Use of net fresh water (m ³) |

Waste Indicators

| | |
|-----|-------------------------------------|
| HW | Hazardous Waste (disposed) (kg) |
| NHW | Non-Hazardous Waste (disposed) (kg) |
| RW | Radioactive Waste (disposed) (kg) |

Output Flow Indicators

| | |
|-----|------------------------------------|
| CFR | Components for Reuse (kg) |
| MR | Material for Recycling (kg) |
| MER | Materials for Energy Recovery (kg) |
| EEE | Exported Energy, Electricity (MJ) |
| EET | Exported Energy, Thermal (MJ) |

Lifecycle Stages / Modules

| | |
|----|------------------------------------|
| A1 | Raw material supply |
| A2 | Transport |
| A3 | Manufacturing |
| A4 | Transport to site |
| A5 | Construction/Installation |
| B1 | Use |
| B2 | Maintenance |
| B3 | Repair |
| B4 | Replacement |
| B5 | Refurbishment |
| B6 | Operational energy use |
| B7 | Operational water use |
| C1 | Deconstruction/Demolition |
| C2 | Transport to waste processing |
| C3 | Waste processing |
| C4 | Disposal |
| D | Reuse-Recovery-Recycling potential |

Other Relevant Terms

| | |
|------------------------|--|
| CAS No. | Chemical Abstracts Service Number |
| CFC-11 eq. | Chlorofluorocarbon-11 Equivalents |
| CO ₂ eq. | Carbon Dioxide Equivalents |
| DoP | Declaration of Performance |
| EAC's | Energy Attribute Certificate |
| EC No. | European Community Number |
| GMW | Glass Mineral Wool |
| kg | Kilogram |
| kg C | Kilograms of Carbon |
| kg CO ₂ eq. | Kilograms of Carbon Dioxide Equivalent |
| m ² K/W | Meter Squared Kelvin per Watt |
| m ³ | Cubic Meter |
| MJ | Megajoule |
| MLC | Managed Life Cycle Content (formerly GaBi databases) |
| N eq. | Nitrogen Equivalents |
| ND | Not Declared |
| NMVOC | Non-Methane Volatile Organic Compounds |
| P eq. | Phosphorus Equivalents |
| PE | Polyethylene |
| PET | Polyethylene Terephthalate |
| PU | Polyurethane |
| RMW | Rock Mineral Wool |
| RSL | Reference Service Life |
| R-value | Thermal Resistance |
| Sb eq. | Antimony Equivalents |
| SVHC | Substances of Very High Concern |
| W/(mK) | Watts per Meter-Kelvin |

References

International EPD® System

General Programme Instructions of the International EPD® System. Version 5.0.1
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C-PCR-005 Thermal insulation products (EN 16783: 2024) Version: 2025-04-08

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EN 15804:2012+A2:2019/AC:2021: Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products

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LCA for Experts 10.9

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EN1602: 2013 Thermal insulation products for building applications – Determination of the apparent density

EN 12667

EN 12667: 2001 Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meter methods – Products of high and medium thermal resistance

EN 13162

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EN 15978: 2011

EN 15978: 2011 Sustainability of construction works – Assessment of environmental performance of buildings – Calculation method

ISO 8301:1991

Thermal insulation – Determination of steady-state thermal resistance and related properties – Heat flow meter apparatus

ISO 21930:2017

Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services

ISO 14021

ISO 14021:2016 Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)

DoP M4335QPCPR

Declaration of Performance

www.dopki.com

DIN 4102-17

Fire behaviour of building materials and building components – Part 17: Melting point of mineral wool insulating materials – Terms and definitions, requirements and test





2026_04_02 Mineral Plus ADP-030-UD - BB (I-report)

I-report is an interactive report created with GaBi based on the scenario. More details about the product characteristics, plant allocation and scenario on i-report

BR_GMW_2025 (Background Report)

Calculation rules for the Life Cycle Assessment and Requirements and more details about the production on the Background Report

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