
# ENVIRONMENTAL PRODUCT DECLARATION

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

## Isover EPS 150 S

**Version date: 06.11.2025**
**Validity: 5 years**
**Valid date: 05.11.2030**
**Specific EPD**
**Scope of the EPD: Europe**

epd square .

Programme operator: EPD Square, s.r.o.
Registration number: SQ 00-049

EPD VERIFIED


Saint-Gobain Construction Products, s.r.o.

SAINT-GOBAIN

# General information

## Programme information

| | |
|---|---|
| **PROGRAMME:** | EPD Square, s.r.o. |
| **ADDRESS:** | Lermontovova 3, 811 05 Bratislava, Slovakia |
| **WEBSITE:** | www.epdsquare.com |
| **E-MAIL:** | info@epdsquare.com |

## PCR information

**Product Category Rules (PCR)**

CEN standard EN 15804:2012 + A2:2019/AC:2021 serves as the Core Product Category Rules (PCR)

**Product category rules (PCR):** EPD Square PCR v1.0, 2024
**Complementary PCR**: (c-PCR-005), 2019-12-20. Thermal insulation products (EN 16783:2017)

**PCR review was conducted by:** The Technical Committee of the EPD Square. See www.epdsquare.com for a list of members.

**Chair of the PCR review:** Marcela Ondova.

## Verification

External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through:

☐ Individual EPD verification without a pre-verified LCA/EPD tool
☒ Individual EPD verification with a pre-verified LCA/EPD tool
☐ EPD process certification* without a pre-verified LCA/EPD tool
☐ EPD process certification* with a pre-verified LCA/EPD tool
☐ Fully pre-verified EPD tool

**Independent third-party verification of the declaration and data, according to ISO 14025:2006:**
☒ EPD verification by individual verifier

**Third party verifier:** Daniel Satola, Daniel Satola Consulting, danielsatolaconsulting@gmail.com
**Approved by:** EPD Square, s.r.o.

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

## Ownership and limitation on use of EPD

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

EPDs within the same product category but published in different EPD programmes may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterization factors); and be valid at the time of comparison. For further information about comparability, see EN 15804:2012+A2:2019/AC:2021 and ISO 14025:2006.

# Information about EPD owner

**Address and contact information of the EPD owner**: Saint-Gobain Construction Products, s.r.o., Stará Vajnorská 139, 831 04 Bratislava, Slovakia, poradenstvo@saint-gobain.com
**Contact person:** Vladimír Balent, vladimir.balent@saint-gobain.com
**Description of the organization of the EPD owner:** An international company operating in 64 countries, member of the Saint-Gobain Group with more than 190,000 employees. The ISOVER division's business is the manufacture and sale of thermal, acoustic and fire insulation made of mineral wool and polystyrene, as well as the provision of technical support and sales services of insulation.
**Management system-related certification:** ISO 14001
**LCA Practitioner:** Ing. Ľudmila Vaculová Mečiarová, PhD., meciarova@epdclarity.com, EPD Clarity, s.r.o.
**Communication**: The intended use of this EPD is for B2B communication.

# Product information

**Product name:** Isover EPS 150 S
**Visual representation of the product:**
**UN CPC CODE:** 54650 - Insulation services
**Manufacturing site**: Vlárska 44, 917 01 Trnava, Slovakia


# Product description and application

Expanded polystyrene (EPS) is produced by foaming solid beads of expandable polystyrene using saturated water vapor, forming blocks that are then cut into individual sheets. During this process, the beads expand to twenty to fifty times their original volume, creating a very fine cellular structure within each bead. Pentane, a naturally occurring gas produced, for example, in the digestive systems of animals or through the decomposition of plant material by microorganisms, is used in the foaming process. Polystyrene foam and its manufacturing process do not contain, and have never contained, substances that deplete the Earth's ozone layer, such as CFCs.

Isover EPS 150S insulation boards are designed for thermal insulation in applications requiring high-pressure load resistance, such as industrial floors and roof terraces. The boards are suitable for insulation layers in energy-efficient buildings (low-energy and passive houses) with common insulation thicknesses ranging from 200 to 300 mm. They can withstand permanent loads of up to 3 000 kg/m² with a deformation of less than 2%.

To calculate the impact of the range of commercial thicknesses between 20 mm and 200 mm, see the table “Conversion to specific thickness" in the additional information section.

For more information: www.isover.sk

# Technical data/physical characteristics:

| TECHNICAL ASPECT | VALUE / DESCRIPTION |
|---|---|
| **Thermal resistance** | 3,0 m²K/W (UNE EN 12667) |
| **Thermal conductivity** | 0,034 W/(m·K) (UNE EN 12667) |
| **Water vapor transmission** | 30 - 70 (EN 12086) |
| **Compressive strength** | 150 kPa (EN 826) |
| **Permanent load capacity** | 3000 kg/m$^2$ |
| **Reaction to fire class** | E (EN 13 501-1) |
| **Thickness of product** | 100 mm (range 20 – 200 mm) |
| **Density** | 23 - 28 kg/m$^3$ |
| **Packaging for the distribution and transportation** | PE film + stretch film |

## Content declaration

The functional unit of this EPD is 1 $m^2$ of EPS board with 100 mm thickness. The content declaration is representative of this thickness.

Description of the main components and/or materials:

| Product components | Mass (%) | Post-consumer recycled material (mass - % of product) | Biogenic material (mass - % of product) | Biogenic material (kg C/DU) |
|---|---|---|---|---|
| Polystyrene | 92 % | 0% | 0 | 0 |
| Water | 5,3 % | 0% | 0 | 0 |
| Pentane | 2 % | 0% | 0 | 0 |
| Flame retardant* | 0,7 % | 0% | 0 | 0 |
| Sum | 100% | 0% | 0 | 0 |
| **Packaging materials** | **Mass (kg)** | **Mass - % (vs the product)** | **Biogenic material, weight- kg C/DU** | |
| LDPE foil | 0,0356 | 1,4 % | 0 | |
| Sum | 0,0356 | 1,4 % | 0 | |

* A mixture of retardants, none of which are on the candidate list of substances of very high concern subject to authorization

## Hazardous substances

At the date of issue of this declaration, there is no “Substance of Very High Concern” (SVHC) in concentration above 0.1% by weight, and neither do their packaging, following the European REACH regulation (Registration, Evaluation, Authorization and Restriction of Chemicals).

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

# LCA Information

| | |
|---|---|
| **TYPE OF EPD** | Cradle to gate with options, module C1-C4, module D and optional modules (A4–A5). |
| **FUNCTIONAL UNIT** | 1 m² of product with a thermal resistance of 3,0 m²K/W, a thickness of 100 mm for 50 years. |
| **SYSTEM BOUNDARIES** | Mandatory modules = A1-A3; C1-C4 and D; Optional modules = A4-A5 |
| **REFERENCE SERVICE LIFE (RSL)** | The Reference Service Life (RSL) of the insulation product is 50 years, provided that the product is installed correctly into the building. This 50-year value is the amount of time that we recommend our products last without refurbishment and corresponds to standard building design life. |
| **CUT-OFF RULES** | In the case that there is not enough information, the process energy and materials representing less than 1% of the whole energy and mass used can be excluded (if they do not cause significant impacts). The addition of all the inputs and outputs excluded cannot be bigger than 5% of the whole mass and energy used, as well as the emissions to the environment occurred. Flows related to human activities, such as employee transport, are excluded.<br>The construction of plants, production of machines and transportation systems are excluded since the related flows are supposed to be negligible compared to the production of the building product when compared at these systems lifetime level. |
| **ALLOCATIONS** | Allocation is based on the annual production rate and made with high accuracy and precision. The values for 1 $m^2$ of the products which are used within this study are calculated by considering the total product weight per annual production. In the production plant, several kinds of products are produced; since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the produced products' output is fixed to 1 $m^2$ and the corresponding amount of product is used in the calculations. The polluter pays and the modularity principles as well have been followed. |
| **GEOGRAPHICAL COVERAGE AND TIME PERIOD** | Scope: Europe<br>Data is collected from one production site Vlárska 44, located in Slovakia<br>Data collected for the year 2023 |
| **BACKGROUND DATA SOURCE** | The databases Ecoinvent v.3.10.1, Ecoinvent v3.11 (2024) and OneClick LCA 2023, data from Plastics Europe (2020) and EUROSTAT<br>EF Package 3.1 |
| **SOFTWARE** | OneClick LCA |

## Data quality declaration

The data was collected from internal records and reporting documents from Saint-Gobain Construction Products, s.r.o. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects 100% inventory data quality. The data quality information has been provided according to the requirements of EN 15941. The data assessment was done using the Product Environmental Footprint Category Rules. The data has been collected internally, considering the latest available average production amounts and measurements during the period of 2023. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects 100% inventory data quality. The quality level in this study is qualified as Good. Data quality rating procedure has been performed using a rating system where “1” means Very good quality, and “5” means Very poor quality. No fair, poor or very poor data was found during the assessment of relevant data.

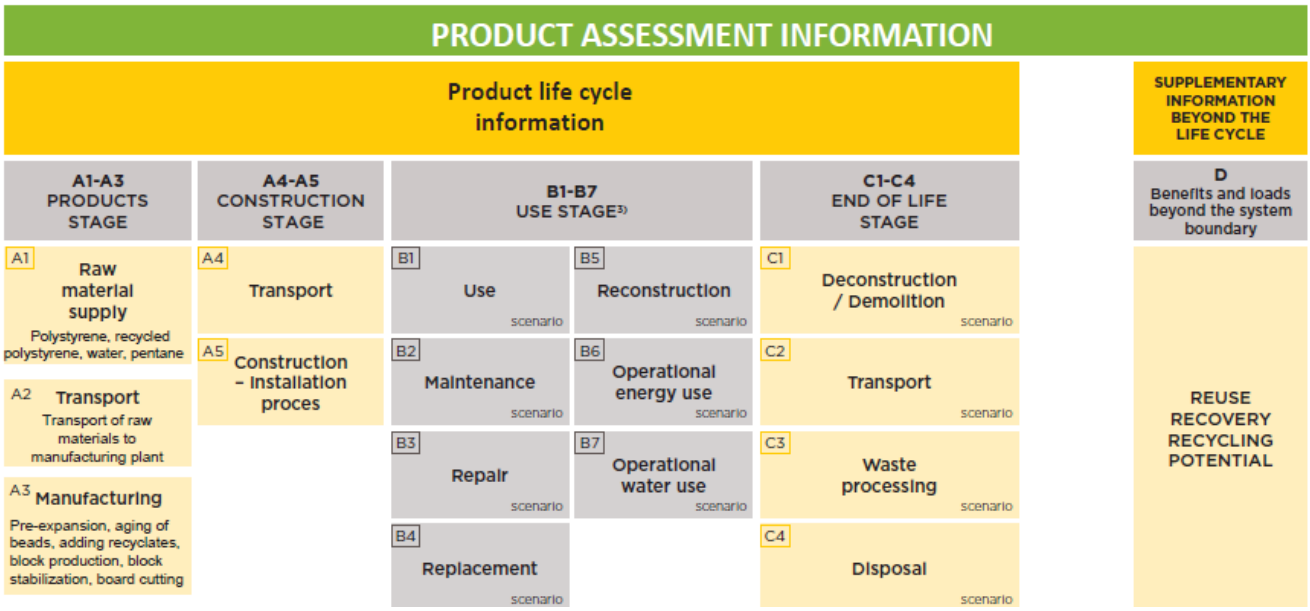
| Geographical rating | Technology rating | Time-related rating | Average rating |
|---|---|---|---|
| 1,9 | 1,5 | 1,1 | 1,5 |

## Description of system boundaries

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 | MND | MND | MND | MND | MND | MND | MND | X | X | X | X | X |
| Geography | EU | EU | SK | EU | EU | - | - | - | - | - | - | - | EU | EU | EU | EU | EU |
| Specific data used | 54% | | | | | | | | | | | | | | | | |
| Variation products | single product | | | | | | | | | | | | | | | | |
| Variation sites | single site | | | | | | | | | | | | | | | | |

# Life cycle stages




* The phases of the life cycle included are shown in yellow.

## A1-A3. Product stage

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

### A1. Raw materials supply

This module includes the extraction and transformation of raw materials. Within the product stage accurate data has been used. In the case of absence in the database, it was modelled as close to reality as possible using proxy, representative datapoint.

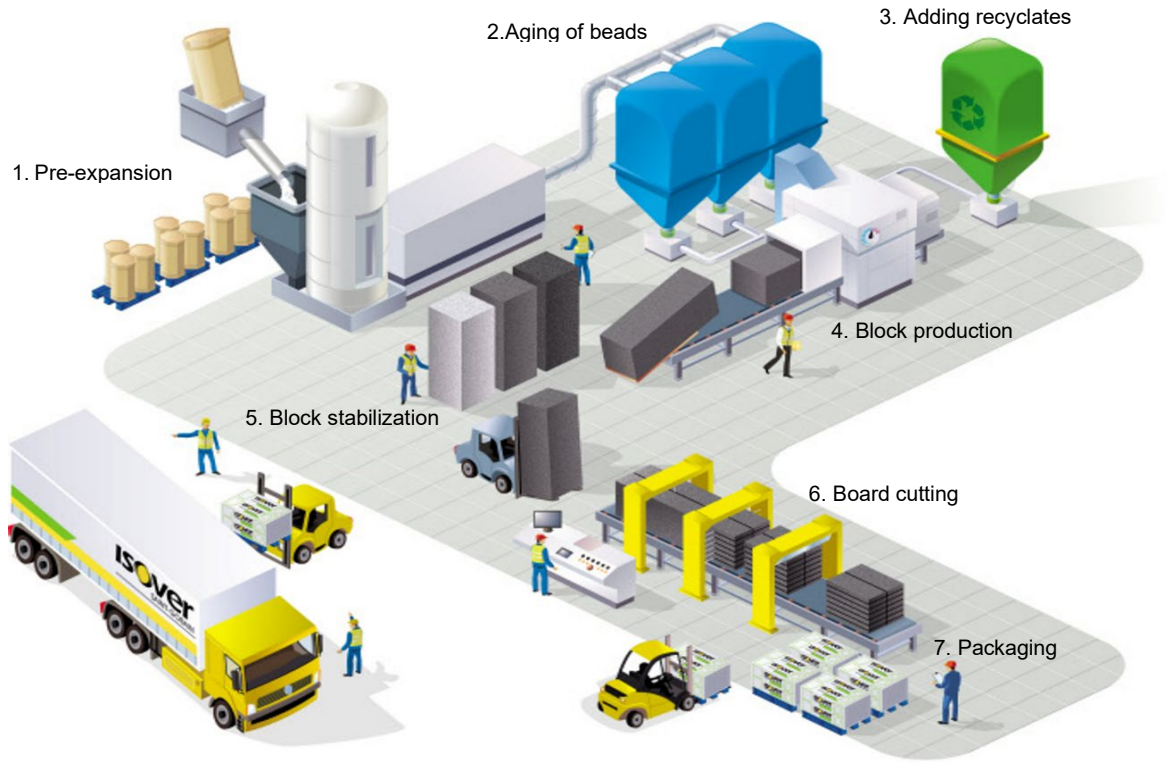
### A2. Transport to the manufacturer

This module includes the transportation of raw materials and packaging to the manufacturing site. The modelling includes road transportation.

### A3. Manufacturing

This module includes the manufacture of products and the manufacture of packaging. The production process begins with the pre-expansion of the primary raw material, followed by the aging of the beads. After incorporating recycled material, the blocks are produced. These blocks are then stabilized and subsequently cut into boards. The final step is packaging. The production of packaging material is considered at this stage. The processing of any waste arising from this stage is also included. In the plant, lots of products are produced. Therefore, electricity, natural gas, and propane are allocated on yearly consumption. The allocation is based on the annual consumption as well as the total amount ($m^2$) of produced products.

**Manufacturing process**




## A4-A5. Construction process stage

The construction process is divided into 2 modules: A4, Transport to the building site, and A5, Installation in the building.

### 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 / DESCRIPTION |
|---|---|
| **Fuel type and consumption of vehicle or vehicle type used for transport, e.g., long-distance truck, boat, etc.** | Freight truck trailer 24 t payload, diesel consumption 38 liters for 100 km |
| **Distance** | 187 km by truck |
| **Capacity utilization (including empty returns)** | 100% (0% empty returns) |
| **Bulk density of transported products** | 23-28 kg/m$^3$ |
| **Volume capacity utilization factor** | 1 (by default) |

### A5. Installation in the building

This module includes: the installation of the product, the transport and management of packaging. Losses during installation are less than 1%.

Assumption:

- The impacts of installation are negligible
- Plastic foils are recycled at the nearest facility
- The distance is assumed to be 50 km and the transportation method assumed to be lorry.

- No additional accessory, water, or energy was considered for the installation of the insulation product.

| PARAMETER | VALUE / DESCRIPTION |
|---|---|
| **Waste of materials on the building site before waste processing, generated by the product's installation (specified by type)** | Packaging: 0,0356 kg |
| **Transport of packaging waste** | 50 km by truck |
| **Output materials (specified by type) as results of waste processing at the building site, e.g., of collection for recycling, for energy recovery, disposal (specified by route)** | PE film: 40% is recycled, 37% is incinerated, 23% is landfilled |
| **Direct emissions to ambient air, soil, and water** | None |

## B1-B7. Use stage (excluding potential savings)

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

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

This stage includes the following modules:

- **C1**: **Deconstruction, demolition**. In this case, the environmental impact is expected to be very small and can be neglected.
- **C2: Transport to waste processing**
- **C3: Waste processing for reuse, recovery, and/or recycling**
- **C4: Waste disposal**, including physical pre-treatment and site management.

**Description of the scenarios and additional technical information for the end of life:**

| PARAMETER | VALUE/DESCRIPTION |
|---|---|
| **Energy for demolition** | 0 MJ/kg diesel |
| **Collection process specified by type** | 100% collected with mixed deconstruction and demolition waste |
| **Recovery system specified by type** | 9% of waste is recycled, 59% of waste is incinerated |
| **Disposal specified by type** | 32% of waste is landfilled |
| **Assumptions for scenario development (e.g., transportation)** | Average truck trailer with 27t payload, diesel consumption 38L/100km, Transport distance to recycling: 50 km, Transport distance to incineration plant: 50 km, Transport distance to landfill: 50 km |

## D. Reuse/recovery/recycling potential

In module D, it's declared the environmental benefits and loads from reusable products, recyclable materials, or energy recovery. The recycled EPS and packaging foil have been modelled to avoid use of primary materials. EPS and packaging foil are also incinerated, and the generated energy and electricity can replace the need for heat energy in district heating and electricity.

# Environmental performance

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 based on EF 3.1. Raw materials and energy consumption, as well as transport distances have been taken directly from the manufacturing plant.

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.
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).

**Disclaimer 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 following indicators:

- Resource use, mineral and metals [kg Sb eq.]
- Resource use, energy carriers [MJ]
- Water deprivation potential [$m^3$ world equiv.]
- Land use [Pt]
- Human toxicity (cancer) [CTUh]
- Human toxicity(noncancer) [CTUh]
- Ecotoxicity (freshwater [CTUe]

**Disclaimer 2:** The impact category Ionizing radiation, human health [kBq U235 eq.] 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 material is also not measured by this indicator.

**Disclaimer 3:** The assumptions for the modules are in accordance with the project report (LCA study).

Results refer to a declared unit of 1 $m^2$ of Isover EPS 150 S with thermal resistance of 3 $m^2K/W$ for a thickness of 100 mm. To obtain results with different commercial thicknesses see additional information section.

## Environmental Impacts

| Environmental indicators | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE LIFE CYCLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 $CO_2$ eq.] | 9,39E+00 | 8,99E-02 | 4,44E-02 | X | X | X | X | X | X | X | 0,00E+00 | 1,78E-02 | 4,73E+00 | 9,85E-02 | -7,76E-01 |
| Climate Change (fossil) [kg $CO_2$ eq.] | 9,39E+00 | 8,99E-02 | 4,45E-02 | X | X | X | X | X | X | X | 0,00E+00 | 1,78E-02 | 4,73E+00 | 9,85E-02 | -7,76E-01 |
| Climate Change (biogenic) [kg $CO_2$ eq.] | 1,21E-04 | 0,00E+00 | -1,21E-04 | X | X | X | X | X | X | X | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Climate Change (land use change) [kg $CO_2$ eq.] | 3,48E-04 | 3,23E-05 | 1,59E-06 | X | X | X | X | X | X | X | 0,00E+00 | 7,04E-06 | 3,44E-05 | 5,95E-06 | 7,18E-05 |
| Ozone depletion [kg CFC-11 eq.] | 1,65E-07 | 1,79E-09 | 2,11E-11 | X | X | X | X | X | X | X | 0,00E+00 | 3,13E-10 | 7,64E-10 | 2,32E-10 | -9,31E-09 |
| Acidification terrestrial and freshwater [Mole of H+ eq.] | 3,24E-02 | 1,87E-04 | 1,06E-05 | X | X | X | X | X | X | X | 0,00E+00 | 5,79E-05 | 6,40E-04 | 6,46E-05 | -2,77E-03 |
| Eutrophication freshwater [kg P eq.] | 3,45E-04 | 6,05E-06 | 3,27E-07 | X | X | X | X | X | X | X | 0,00E+00 | 1,27E-06 | 1,03E-05 | 9,62E-07 | -2,19E-06 |
| Eutrophication marine [kg N eq.] | 5,11E-03 | 4,49E-05 | 7,43E-06 | X | X | X | X | X | X | X | 0,00E+00 | 1,93E-05 | 3,37E-04 | 5,51E-04 | -4,11E-04 |
| Eutrophication terrestrial [Mole of N eq.] | 5,40E-02 | 4,85E-04 | 4,50E-05 | X | X | X | X | X | X | X | 0,00E+00 | 2,10E-04 | 3,14E-03 | 2,62E-04 | -4,54E-03 |
| Photochemical ozone formation - human health [kg NMVOC eq.] | 2,91E-02 | 3,11E-04 | 1,30E-05 | X | X | X | X | X | X | X | 0,00E+00 | 8,82E-05 | 7,88E-04 | 1,14E-04 | -2,56E-03 |
| Resource use, mineral and metals [kg Sb eq.][1] | 4,29E-06 | 2,99E-07 | 1,09E-08 | X | X | X | X | X | X | X | 0,00E+00 | 5,44E-08 | 2,55E-07 | 2,03E-08 | 2,11E-07 |
| Resource use, energy carriers [MJ][1] | 2,17E+02 | 1,26E+00 | 1,80E-02 | X | X | X | X | X | X | X | 0,00E+00 | 2,54E-01 | 5,62E-01 | 2,00E-01 | -1,89E+01 |
| Water deprivation potential [m³ world equiv.][1] | 8,08E+00 | 6,29E-03 | 1,31E-03 | X | X | X | X | X | X | X | 0,00E+00 | 1,25E-03 | 9,97E-02 | 9,95E-04 | -6,05E-01 |

[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

## Additional (optional) environmental impact indicators – EN 15804+A2

| Environmental indicators | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE LIFE CYCLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 |
| Particulate matter emissions [Disease incidence] | 3,62E-07 | 6,62E-09 | 1,25E-10 | X | X | X | X | X | X | X | 0,00E+00 | 1,57E-09 | 3,85E-09 | 1,45E-09 | -2,97E-08 |
| Ionising radiation, human health [kBq U235 eq.] | 2,61E-01 | 1,63E-03 | 7,43E-05 | X | X | X | X | X | X | X | 0,00E+00 | 2,77E-04 | 1,50E-03 | 2,04E-04 | 1,60E-02 |
| Ecotoxicity (freshwater) [CTUe] | 1,41E+01 | 1,68E-01 | 1,92E-02 | X | X | X | X | X | X | X | 0,00E+00 | 3,45E-02 | 2,42E+01 | 2,95E-01 | -1,17E-01 |
| Human toxicity, cancer effects [CTUh] | 6,65E-10 | 1,51E-11 | 2,40E-12 | X | X | X | X | X | X | X | 0,00E+00 | 2,99E-12 | 2,98E-10 | 5,10E-12 | -3,48E-11 |
| Human toxicity, non-cancer effects [CTUh] | 1,41E-08 | 8,00E-10 | 8,96E-11 | X | X | X | X | X | X | X | 0,00E+00 | 1,62E-10 | 1,19E-08 | 8,06E-10 | -2,81E-10 |
| Land use related impacts / soil quality [Dimensionless] | 4,23E+00 | 7,64E-01 | 2,22E-02 | X | X | X | X | X | X | X | 0,00E+00 | 1,98E-01 | 3,34E-01 | 4,64E-01 | 1,97E-01 |

## Resources Use

| Resources Use indicators | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE LIFE CYCLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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] | 1,40E+00 | 2,21E-02 | 1,16E-03 | X | X | X | X | X | X | X | 0,00E+00 | 3,97E-03 | 2,64E-02 | 3,19E-03 | 6,20E-02 |
| Primary energy resources used as raw materials (PERM) [MJ] | 0,00E+00 | 0,00E+00 | 0,00E+00 | X | X | X | X | X | X | X | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Total use of renewable primary energy resources (PERT) [MJ] | 1,40E+00 | 2,21E-02 | 1,16E-03 | X | X | X | X | X | X | X | 0,00E+00 | 3,97E-03 | 2,64E-02 | 3,19E-03 | 6,20E-02 |
| Use of non-renewable primary energy (PENRE) [MJ] | 1,25E+02 | 1,26E+00 | -1,42E+00 | X | X | X | X | X | X | X | 0,00E+00 | 2,54E-01 | -5,64E+01 | -3,08E+01 | -1,98E+01 |
| Non-renewable primary energy resources used as raw materials (PENRM) [MJ] | 9,31E+01 | 0,00E+00 | -1,51E+00 | X | X | X | X | X | X | X | 0,00E+00 | 0,00E+00 | -6,23E+01 | -2,93E+01 | 0,00E+00 |
| Total use of non-renewable primary energy resources (PENRT) [MJ] | 2,19E+02 | 1,26E+00 | -2,94E+00 | X | X | X | X | X | X | X | 0,00E+00 | 2,54E-01 | -1,19E+02 | -6,01E+01 | -1,98E+01 |
| Use of secondary material (SM) [kg] | 6,83E-03 | 5,87E-04 | 5,65E-05 | X | X | X | X | X | X | X | 0,00E+00 | 1,12E-04 | 1,30E-03 | 7,20E-05 | 2,48E-01 |
| Use of renewable secondary fuels (RSF) [MJ] | 1,30E-03 | 7,42E-06 | 4,54E-07 | X | X | X | X | X | X | X | 0,00E+00 | 1,42E-06 | 1,02E-05 | 1,35E-06 | 5,15E-06 |
| Use of non-renewable secondary fuels (NRSF) [MJ] | 0,00E+00 | 0,00E+00 | 0,00E+00 | X | X | X | X | X | X | X | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Use of net fresh water (FW) [$m^3$] | 1,55E-01 | 1,72E-04 | -1,72E-05 | X | X | X | X | X | X | X | 0,00E+00 | 3,57E-05 | 1,40E-03 | -2,96E-03 | -1,39E-02 |

## Waste Category & Output flows

| | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE LIFE CYCLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Waste Category & Output Flows** | 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] | 1,23E-01 | 1,84E-03 | 4,94E-04 | X | X | X | X | X | X | X | 0,00E+00 | 3,94E-04 | 4,61E-02 | 3,53E-04 | -9,22E-03 |
| Non-hazardous waste disposed (NHWD) [kg] | 1,35E+00 | 3,88E-02 | 5,95E-02 | X | X | X | X | X | X | X | 0,00E+00 | 7,81E-03 | 1,65E+00 | 3,97E+00 | -8,38E-02 |
| Radioactive waste disposed (RWD) [kg] | 3,20E-05 | 4,05E-07 | 1,89E-08 | X | X | X | X | X | X | X | 0,00E+00 | 6,85E-08 | 3,80E-07 | 4,98E-08 | 4,11E-06 |
| Components for re-use (CRU) [kg] | 0,00E+00 | 0,00E+00 | 0,00E+00 | X | X | X | X | X | X | X | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for Recycling (MFR) [kg] | 4,50E-03 | 0,00E+00 | 1,42E-02 | X | X | X | X | X | X | X | 0,00E+00 | 0,00E+00 | 2,20E-01 | 0,00E+00 | 0,00E+00 |
| Material for Energy Recovery (MER) [kg] | 0,00E+00 | 0,00E+00 | 0,00E+00 | X | X | X | X | X | X | X | 0,00E+00 | 0,00E+00 | 1,48E+00 | 0,00E+00 | 0,00E+00 |
| Exported electrical energy (EEE) [MJ] | 0,00E+00 | 0,00E+00 | 8,90E-02 | X | X | X | X | X | X | X | 0,00E+00 | 0,00E+00 | 7,60E+00 | 0,00E+00 | 0,00E+00 |
| Exported thermal energy (EET) [MJ] | 0,00E+00 | 0,00E+00 | 1,20E-01 | X | X | X | X | X | X | X | 0,00E+00 | 0,00E+00 | 1,04E+01 | 0,00E+00 | 0,00E+00 |

## Additional voluntary indicators from EN 15804

| Environmental indicators | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE LIFE CYCLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | D Reuse, recovery, recycling |
| GWP-GHG [kg $CO_2$ eq.][2] | 9,39E+00 | 8,99E-02 | 4,45E-02 | X | X | X | X | X | X | X | 0,00E+00 | 1,78E-02 | 4,73E+00 | 9,85E-02 | -7,76E-01 |

## Information on biogenic carbon content

| Biogenic Carbon Content | PRODUCT STAGE |
|---|---|
| | A1 / A2 / A3 |
| Biogenic carbon content in product [kg] | - |
| Biogenic carbon content in packaging [kg] | - |

*Note: 1 kg biogenic carbon is equivalent to 44/12 kg $CO_2$.*

The product does not contain biogenic carbon.

[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 $CO_2$ is set to zero.

# Additional environmental information:

## Conversion to specific thicknesses

This EPD includes the range of products with different thicknesses between 20 mm and 200 mm. A multiplication factor can be applied to obtain the environmental performance of every thickness. All the results of this EPD refer to the reference thickness of 100 mm with a value of R = 3 m²K/W

To obtain the environmental performance associated with every specific thickness, the results expressed in this EPD must be multiplied by its corresponding conversion factor.

| THICKNESS (mm) | THERMAL RESISTANCE (m²K/W) | CONVERSION FACTOR | GWP-GHG (KG $CO_2$ / m²) FOR A1-A3 STAGE |
|---|---|---|---|
| **20** | 0,55 | 0,20 | 1,88E+00 |
| **30** | 0,85 | 0,30 | 2,82E+00 |
| **40** | 1,15 | 0,40 | 3,76E+00 |
| **50** | 1,45 | 0,50 | 4,70E+00 |
| **60** | 1,75 | 0,60 | 5,63E+00 |
| **80** | 2,35 | 0,80 | 7,51E+00 |
| **90** | 2,60 | 0,90 | 8,45E+00 |
| **100** | 3,00 | 1,00 | 9,39E+00 |
| **120** | 3,50 | 1,20 | 1,13E+01 |
| **160** | 4,70 | 1,60 | 1,50E+01 |
| **180** | 5,25 | 1,80 | 1,69E+01 |
| **200** | 5,85 | 2,00 | 1,88E+01 |

## Environmental impacts – EN 15804+A1, ISO 21930

| Environmental indicators | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE LIFE CYCLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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.] | 9,25E+00 | 8,93E-02 | 4,45E-02 | X | X | X | X | X | X | X | 0,00E+00 | 1,77E-02 | 4,73E+00 | 9,42E-02 | -7,60E-01 |
| Ozone depletion (ODP) [kg CFC-11 eq.] | 1,99E-07 | 1,42E-09 | 1,74E-11 | X | X | X | X | X | X | X | 0,00E+00 | 2,50E-10 | 6,48E-10 | 1,85E-10 | -1,31E-08 |
| Acidification potential (AP) [ kg $SO_2$ eq.] | 2,74E-02 | 1,50E-04 | 7,80E-06 | X | X | X | X | X | X | X | 0,00E+00 | 4,41E-05 | 4,52E-04 | 4,80E-05 | -2,35E-03 |
| Eutrophication potential (EP) [kg $(PO_4)^{3-}$ eq.] | 4,03E-03 | 3,79E-05 | 2,45E-06 | X | X | X | X | X | X | X | 0,00E+00 | 1,10E-05 | 1,57E-04 | 4,37E-05 | -2,20E-04 |
| Photochemical ozone creation (POCP) [kg Ethylene eq.] | 2,13E-03 | 1,59E-05 | 7,84E-07 | X | X | X | X | X | X | X | 0,00E+00 | 4,08E-06 | 3,07E-05 | 1,82E-05 | -1,79E-04 |
| Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.] | 4,06E-06 | 2,92E-07 | 1,05E-08 | X | X | X | X | X | X | X | 0,00E+00 | 5,31E-08 | 2,24E-07 | 1,97E-08 | 2,26E-07 |
| Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ] | 2,08E+02 | 1,24E+00 | 1,67E-02 | X | X | X | X | X | X | X | 0,00E+00 | 2,49E-01 | 5,36E-01 | 1,96E-01 | -1,84E+01 |

## Manufacturing energy scenario

The energy used during the manufacturing (A3) is based on the following:

| PARAMETER | INFORMATION |
|---|---|
| **Energy data source and quality** | Electricity, Slovakia, residual mix |
| **Source** | LCA study for country specific residual electricity mixes based on AIB 2023 and calculated by One Click LCA, OneClickLCA 2023 |
| **GWP-GHG $CO_2$ eq.** | 0,45 kg of $CO_2$ eq./kWh |
| **Energy data source and quality** | Heat production, natural gas, at industrial furnace >100kW |
| **Source** | ecoinvent 3.10.1 |
| **GWP-GHG $CO_2$ eq.** | 0,0773 of $CO_2$ eq./MJ |
| **Energy data source and quality** | Natural gas |
| **Source** | LCA inventory for heat production from natural gas (OneClickLCA 2023) |
| **GWP-GHG $CO_2$ eq.** | 2,42 kg of $CO_2$ eq./$m^3$ |
| **Energy data source and quality** | Market for propane, burned in building machine |
| **Source** | ecoinvent 3.10.1 |
| **GWP-GHG $CO_2$ eq.** | 0,0944 kg of $CO_2$ eq./MJ |

# Abbreviation

| | |
|---|---|
| DU | Declared unit |
| EPD | Environmental Product Declaration |
| eq. | equivalents |
| FU | Functional unit |
| g | gram |
| GJ | Giga Joules (as Net Calorific Value) |
| kg | kilogram |
| kWh | kilowatt-hour |
| L | liter |
| LCA | Life Cycle Assessment |
| LCI | Life Cycle Inventory |
| LCIA | Life Cycle Impact Assessment |
| MJ | Mega Joules (as Net Calorific Value) |
| $m^2 \cdot K/W$ | kilowatt per square meter |
| PCR | Product Category Rules |
| RSL | Reference Service Life (in years) |
| ton | metric ton |
| W/(m.K) | Watts per meter-Kelvin |
| GWP | Global warming potential |
| GWP-GHG | Global warming potential - Greenhouse gas |
| GHG | Greenhouse gas |
| EF | Environmental footprint |

# References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