# ENVIRONMENTAL PRODUCT DECLARATION

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

# U SeaProtect Slab 76 G220

**Version 1**
**Date of publication: 2024/04/18**
**Validity: 5 years**
**Valid until: 2029/04/17**
**Scope of the EPD®: Europe**


The International EPD® System
Programme operator: EPD international AB

Registration number: S-P-12816



Manufacturer address: Lübz Herr Möller Industriestraße 11
19386 Lübz

# General information

## Company information

**Manufacturer:** Saint-Gobain Isover G+H Ag
**Production plant:** Lübz
**Management system-related certification:** DIN EN ISO 9001 and DIN EN ISO 14001

**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 1.3.2 for Construction products; Complementary PCR (c-PCR-005), 2019-12-20. Thermal insulation products (EN 16783:2017)
**Prepared by:** IVL Swedish Environmental Research Institute, EPD International Secretariat
**UN CPC CODE:** 37990
**Owner of the declaration:** Saint Gobain Technical Insulation
**Product name and manufacturer represented:** U SeaProtect Slab 76 G220, Saint-Gobain Isover G+H Ag
**EPD® prepared by:** Carole Durantet (Saint Gobain Technical Insulation) and Patricia Jimenez Diaz (Saint-Gobain LCA central team)
**Contact:** Carole.Durantet@saint-gobain.com and Patricia.JimenezDiaz@saint-gobain.com
**Geographical scope of the EPD®:** Europe
**EPD® registration number:** S-P-12816
**Declaration issued:** 2024/04/18 valid until: 2029/04/17
**Demonstration of verification:** an independent verification of the declaration was made, according to ISO 14025:2010. 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 1.3.2
Complementary PCR (c-PCR-005), 2019-12-20. Thermal insulation products (EN 16783:2017)
**PCR review was conducted by:** The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
**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, Tlf 0034 630 64 35 93
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 of 1 m² of mineral wool with a thermal resistance of 0.645 $K.m^2.W^{-1}$ of U SeaProtect Slab 76 G220 20mm.

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

With the U SeaProtect, mineral wool provides a unique high-performance profile: It combines safety, comfort, and ease of handling.

The application field is thermal insulation, acoustic insulation, and fire protection constructions in shipbuilding.

It is primarily used for fire rated divisions as a lightweight alternative to other stone wool solutions. Beyond the general arguments, U SeaProtect has many more advantages over other stone wool solutions in marine applications, see here: www.isover-technical-insulation.com/documents/brochures/isover-ultimate-brochure-2023.pdf

**Technical data/physical characteristics:**
Thermal resistance: 0.645 $K.m^2.W^{-1}$ (UNE EN 12667) for 20 mm products
The thermal conductivity: 0.031 W/(m·K) (UNE EN 12667)
Reaction to fire: Non-Combustible 2010 FTP Code, Annex 1 Part 1 - with reference to ISO 1182:2010 & Surface covering with low flame spread characteristics acc. 2010 FTP Code, Annex 1 Part 5
Density: 76 $kg/m^3$

## Declaration of the main product components and/or materials

Description of the main components and/or materials for 1 $m^2$ of mineral wool with a thermal resistance of 0.645 $K.m^2.W^{-1}$ for the calculation of the EPD®:

| PARAMETER | VALUE |
|---|---|
| **Quantity for 1 m² of product** | 1.52 kg of finished product |
| **Thickness** | 20 mm |
| **Facing** | Glass fiber tissue: 0.22 kg/m² |
| **Packaging for the transportation and distribution** | Polyethylene film without printing: 0.008 kg/m²<br>Polyethylene film with printing: 0.010 kg/m²<br>Stretch film: 0.007 kg/m²<br>Wooden pallet: 0.086 kg/m² |
| **Product used for the Installation** | none |

## Description of the main product components and/or materials:

| Product components | Weight (%) | Post-consumer material weight (%) | Biogenic material weight- kg C/product |
|---|---|---|---|
| Mineral materials | 80 - 90% | 0% | 0 |
| Binder | 1 - 4% | 0% | 0.001 |
| Facing | 10 - 15% | 0% | 0 |
| Sum | 100% | 0% | 0.001 |
| **Packaging materials** | **Weight (kg/m²)** | **Weight-% (vs the product)** | **Biogenic material, weight- kg C/product** |
| Polyethylene film without printing | 0.008 | 0.3% | 0 |
| Polyethylene film with printing | 0.010 | 0.4% | 0 |
| Stretch film | 0.007 | 0.3% | 0 |
| Wooden pallet | 0.086 | 4.0% | 0.05 |

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 grave and module D |
| **FUNCTIONAL UNIT** | Providing a thermal insulation on 1 $m^2$ of product with a thermal resistance of 0.645 $K.m^2.W^{-1}$ for a thickness of 20 mm during 30 years |
| **SYSTEM BOUNDARIES** | Cradle to grave and module D (A + B + C + D) |
| **REFERENCE SERVICE LIFE (RSL)** | The Reference Service Life (RSL) of the insulation product is 30 years. This 30-year value is the amount of time that we recommend our products last for without refurbishment and corresponds to standard ship design life. |
| **CUT-OFF RULES** | The LCI data shall include, in accordance with EN 15804, a minimum of 95% of the total input flows (mass and energy) per module (e.g. A1-A3, A4-A5, B1-B5, B6-B7, C1-C4 and module D).<br>Flows related to human activities such as employee transport are excluded.<br>Transportation in-site is excluded<br>The construction of plants, production of machines and transportation systems are excluded |
| **ALLOCATIONS** | Allocation criteria are based on mass.<br>The polluter pays and modularity principles have been followed. |
| **GEOGRAPHICAL COVERAGE AND TIME PERIOD** | Scope: Europe<br>Data is collected from one production site Lübz located in Germany<br>Data collected for the year 2022<br>Cradle to grave study |
| **BACKGROUND DATA SOURCE** | The databases Gabi 2020.01 and ecoinvent v.3.6 |
| **SOFTWARE** | GaBi 10.6.2.9 |

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.

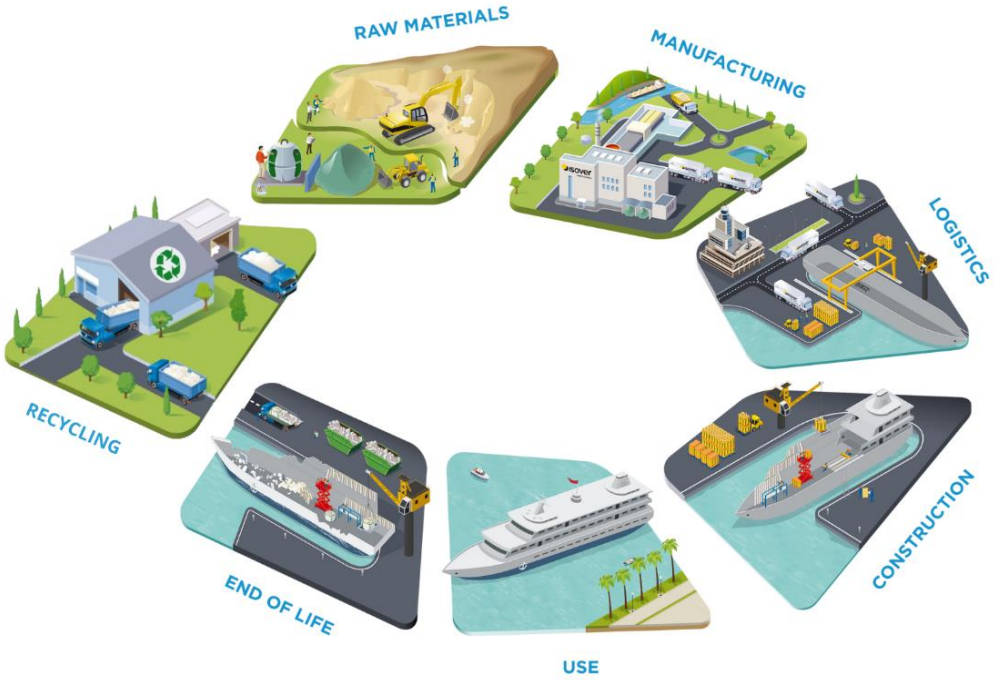
## LCA scope

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 | EU | EU | DE | 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 mineral wool products is subdivided into 3 modules A1, A2 and A3 respectively “raw material supply”, “transport to manufacturer” 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 binder components and sourcing (quarry) of raw materials for fiber production for mineral wool. Besides these raw materials, recycled materials (agglomerates) are also used as input.

**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 resin, the fusion of mineral wool, the fiberizing, the dry, the cutting and the packaging. This module also includes the emissions and wastes generated during manufacturing.

## 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 shipbuilding. 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 shipbuilding 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** | 1094 km (weighted average distance to cover all Europe) |
| **Capacity utilisation (including empty returns)** | 100% of the capacity in volume<br>30% of empty returns |
| **Bulk density of transported products*** | 152 kg/m$^3$ |
| **Volume capacity utilisation factor** | 1 |

* *Isover products presents a compression factor between 1 and 5.*

**A5, Installation in the shipbuilding site:** this module includes:

- No additional accessory was taken into account for the implementation phase insulation product.
- No energy is needed to install the product (manual installation without tool)

| PARAMETER | VALUE/DESCRIPTION |
|---|---|
| **Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)** | 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)** | Polyethylene film without printing: 0.008 kg/m² to landfill<br>Polyethylene film with printing: 0.010 kg/m² to landfill<br>Stretch film: 0.007 kg/m² to landfill<br>Wooden pallet: 0.086 kg/m² to material for recycling |

## 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 30 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, dismantling**

The dismantling of insulation products takes part manually during the deconstruction of the entire ship.

**C2, Transport to waste processing**
The model use for the transportation (see A4, transportation to the shipbuilding 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 mineral wool 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.<br>1.74 kg of product are collected with mixed construction waste |
| **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** | The product alongside the mixed construction waste from demolishing is landfilled.<br>1.74 kg of product are 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 wastes are landfilled. There is no reuse, nor recovery, nor recycling of this product. Hence, no recycling benefits are reported on stage D.

# 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 EF 3.0 method. 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. According to the EN 15804:2012+A2:2019/AC:2021 standard, the LCIA results are relative expressions translating impacts into environmental indicators (midpoint impact categories)."

This EPD including module C, we strongly advise against using the results of modules A1-A3 without considering the results of module C.

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

All the results refer to a functional unit of 1 $m^2$ of mineral wool with thermal resistance of 0.645 $m^2.K.W^{-1}$ for a thickness of 20 mm which is a commercial thickness. To obtain results of commercial thicknesses see "Additional Information" chapter.

# 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.] | 2.52E+00 | 1.10E-01 | 2.46E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.23E-03 | 0 | 3.18E-02 | 0 |
| Climate Change (fossil) [kg CO2 eq.] | 2.70E+00 | 1.07E-01 | 6.06E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.10E-03 | 0 | 2.68E-02 | 0 |
| Climate Change (biogenic) [kg CO2 eq.] | -1.86E-01 | 2.70E-03 | 1.86E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.28E-04 | 0 | 4.96E-03 | 0 |
| Climate Change (land use change) [kg CO2 eq.] | 9.80E-04 | 6.28E-06 | 2.15E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.98E-07 | 0 | 7.72E-05 | 0 |
| Ozone depletion [kg CFC-11 eq.] | 8.35E-07 | 1.59E-17 | 1.68E-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.53E-19 | 0 | 9.93E-17 | 0 |
| Acidification terrestrial and freshwater [Mole of H+ eq.] | 2.05E-02 | 6.16E-04 | 4.31E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.01E-05 | 0 | 1.92E-04 | 0 |
| Eutrophication freshwater [kg P eq.] | 6.35E-05 | 2.07E-08 | 1.31E-06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.81E-10 | 0 | 4.60E-08 | 0 |
| Eutrophication marine [kg N eq.] | 2.29E-03 | 3.05E-04 | 6.53E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.49E-05 | 0 | 4.95E-05 | 0 |
| Eutrophication terrestrial [Mole of N eq.] | 7.37E-02 | 3.34E-03 | 1.57E-03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.64E-04 | 0 | 5.44E-04 | 0 |
| Photochemical ozone formation - human health [kg NMVOC eq.] | 5.89E-03 | 5.71E-04 | 1.37E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.80E-05 | 0 | 1.50E-04 | 0 |
| Resource use, mineral and metals [kg Sb eq.][1] | 3.07E-06 | 1.29E-09 | 6.41E-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.11E-11 | 0 | 2.41E-09 | 0 |
| Resource use, energy carriers [MJ][1] | 3.93E+01 | 1.48E+00 | 8.33E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.04E-02 | 0 | 3.52E-01 | 0 |
| Water deprivation potential [m³ world equiv.][1] | 5.88E-01 | 1.05E-04 | 1.21E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.97E-06 | 0 | 2.81E-03 | 0 |

[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] | 6.14E+00 | 3.60E-02 | 1.25E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.71E-03 | 0 | 4.61E-02 | 0 |
| Primary energy resources used as raw materials (PERM) [MJ] | 1.55E+00 | 0 | 3.10E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total use of renewable primary energy resources (PERT) [MJ] | 7.69E+00 | 3.60E-02 | 1.56E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.71E-03 | 0 | 4.61E-02 | 0 |
| Use of non-renewable primary energy (PENRE) [MJ] | 3.79E+01 | 1.49E+00 | 8.06E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.06E-02 | 0 | 3.52E-01 | 0 |
| Non-renewable primary energy resources used as raw materials (PENRM) [MJ] | 1.39E+00 | 0 | 2.78E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total use of non-renewable primary energy resources (PENRT) [MJ] | 3.93E+01 | 1.49E+00 | 8.34E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.06E-02 | 0 | 3.52E-01 | 0 |
| Input of secondary material (SM) [kg] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Use of renewable secondary fuels (RSF) [MJ] | 8.33E-25 | 0 | 1.67E-26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Use of non-renewable secondary fuels (NRSF) [MJ] | 9.79E-24 | 0 | 1.96E-25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Use of net fresh water (FW) [m3] | 1.41E-02 | 6.53E-06 | 2.90E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.10E-07 | 0 | 8.87E-05 | 0 |

# Waste Category & Output flows

| | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | D REUSE, RECOVERY, RECYCLING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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] | 1.07E-08 | 9.58E-11 | 3.29E-10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.55E-12 | 0 | 5.36E-09 | 0 |
| Non-hazardous waste disposed (NHWD) [kg] | 7.75E-02 | 3.01E-05 | 3.86E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.43E-06 | 0 | 1.77E+00 | 0 |
| Radioactive waste disposed (RWD) [kg] | 4.60E-04 | 1.69E-06 | 9.32E-06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.01E-08 | 0 | 4.00E-06 | 0 |
| 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] | 8.31E-02 | 0 | 8.81E-02 | 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] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exported thermal energy (EET) [MJ] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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

| | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | REUSE, RECOVERY RECYCLING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Environmental indicators** | 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] | 2.70E+00 | 1.07E-01 | 6.06E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.10E-03 | 0 | 2.68E-02 | 0 |

[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.

## Information on biogenic carbon content

| Biogenic Carbon Content | | PRODUCT STAGE<br>A1 / A2 / A3 |
|---|---|---|
| | Biogenic carbon content in product [kg] | 1.35E-03 |
| | Biogenic carbon content in packaging [kg] | 5.06E-02 |

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

The product contains biogenic carbon due to the additives used. Regarding packaging, biogenic carbon is quantified due to wooden pallets production.

# Additional information:

## Influence of particular thicknesses

This EPD includes the range of thicknesses between 20 mm and 25 mm using a multiplication factor to obtain the environmental performance of every thickness. All the results of this EPD refer to 20 mm of thickness (value of R=0.645 $m^2$*K/W).

In the table below the main products with specific thicknesses are listed. To obtain the environmental performance associated with every specific thickness, the results expressed in this EPD® must be multiplied by its corresponding multiplication factor. The calculation of the conversion factor is based on the GWP-GHG indicator for A1-A3 and the results are scale linearly with the conversion factor.

| THICKNESS (MM) | THERMAL RESISTANCE ($m^2$k/W) | MULTIPLICATION FACTOR |
|---|---|---|
| **20** | 0.645 | **1** |
| **25** | 0.806 | **1.21** |

## Electricity information

| TYPE OF INFORMATION | DESCRIPTION |
|---|---|
| **Location** | Representative of electricity purchased by German plant |
| **Definition of the electricity** | 75% renewable energy<br>25% electricity grid mix of Germany |
| **Geographical representativeness description** | Split of energy sources of renewable electricity:<br>- Hydro 100%<br>Split of energy sources of German electricity grid mix:<br>- Nuclear: 21.41%<br>- Hard coal: 47.27%<br>- Natural gas: 24.08%<br>- Wind: 0.09%<br>- Photovoltaic: 0.46% |
| **Reference year** | 2022 |
| **Type of dataset** | Cradle to gate from Sphera database |
| **Source** | Guarantee of Origins certificate<br>European Residual Mixes 2019 - Association of Issuing Bodies |
| **$CO_2$ emission kg $CO_2$ eq. / kWh** | 0.16 kg of $CO_2$ eq/kWh<br>Based on Climate Change - fossil indicator |

## Data quality

Inventory data quality is judged by geographical, temporal, and technological representativeness. To cover these requirements and to ensure reliable results, first-hand industry data crossed with LCA background datasets were used. The data was collected from internal records and reporting documents from SAINT GOBAIN TECHNICAL INSULATION. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects good inventory data quality.

## Environmental impacts according to EN 15804:2012 + A1

The following tables presents results of 1 $m^2$ of mineral wool with thermal resistance of 0.645 $m^2.K.W^{-1}$ for a thickness of 20 mm which is a commercial thickness. To obtain results of commercial thicknesses see “Additional Information” chapter.

| | PRODUCT STAGE | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | REUSE, RECOVERY, RECYCLING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Environmental impacts** | 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 CO2eq.] | 2.65E+00 | 1.06E-01 | 5.86E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.04E-03 | 0 | 2.63E-02 | 0 |
| Ozone depletion (ODP) [kg CFC 11eq.] | 1.02E-06 | 2.12E-17 | 2.04E-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00E-18 | 0 | 1.32E-16 | 0 |
| Acidification potential (AP) [kg SO2eq.] | 1.35E-02 | 4.22E-04 | 2.84E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.06E-05 | 0 | 1.54E-04 | 0 |
| Eutrophication potential (EP) [kg (PO4)3-eq.] | 2.42E-03 | 1.04E-04 | 5.20E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.10E-06 | 0 | 1.74E-05 | 0 |
| Photochemical ozone creation (POCP) - [kg Ethylene eq.] | 4.49E-04 | 1.28E-05 | 1.01E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.25E-07 | 0 | 1.24E-05 | 0 |
| Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.] | 2.51E-05 | 1.34E-09 | 5.05E-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.38E-11 | 0 | 9.28E-09 | 0 |
| Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ] | 3.78E+01 | 1.48E+00 | 8.03E-01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.04E-02 | 0 | 3.42E-01 | 0 |

# References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7. EN 15804:2019+A2:2019/AC:2021 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
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