Environmental Product Declaration No. 037/2016

ETICS-CERESIT CERETHERM VISAGE

Issuance date: 01.02.2016
Validity date: 01.02.2021

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Basic information

This declaration is the type III Environmental Product Declaration (EPD) based on EN 15804 and verified according to ISO 14025 by external auditor. It contains the information on the impacts of declared construction materials on environment and their aspects verified by the independent Body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (see point 5.3 of the standard).
Life cycle: A1-A3 modules in accordance with EN 15804 (Cradle to Gate)
The year of preparing the characteristic: 2015
Declared durability: Under normal conditions, ETICS products are expected to last the service life of a building (60 years)
PCR: ITB PCR A (PCR based on EN 15804)
Declared unit: 1 m^2 of ETICS
Reasons for performing LCA: B2B
Representativeness: European product

Manufacturer and Product Information

Henkel offers a very wide choice of ETIC Systems tailored to varied needs. While all of them guarantee insulating performance and durability, some have additional properties, such as for example exceptionally quick installation or the impact resistance.

Application

HENKEL ETICS is a trade name for External Thermal Insulation Composite System, which comprises insulation board (bonded and mechanically fixed) with reinforced undercoat, and decorative finishes as described in European Technical Approval ETA-11/0395. The system is complete and equipped with a vast selection of adhesives, base coats, renders and decorative coats of various colors. The system provides variety of solutions depending on requirements of the investors, building designers and construction workers. HENKEL ETICS also offers a wide range of solutions for all building types, from detached houses to multi-storey developments (< 25 m high). It is fully certified and the exact specification is tailored to meet the requirements of each project, whether residential or commercial, in compliance with all current building regulations in Poland and Europe.

The thermal insulation technology, used in fixing thermal insulation, is made of foamed polystyrene boards (EPS) to the substrate and preparation of a reinforced layer, a render coating and, an obligatory or optional paint coating. The system can be applied both on new, or existing external surfaces of vertical building walls (already plastered, or not) made of masonry, or adhered materials, such as bricks and blocks (ceramic, lime-sand, stone, cellular concrete), or of concrete (poured at the construction site, or in the form of prefabricated elements).

Ceresit Ceretherm VISAGE ETICS is a system for general application in terms of thermal insulation.

Distinguishing features

• Available in three different lines: stone effect, wood effect and special effect

• Resistant to biological contamination

• Easy to maintain

• Easy to apply

• Resistant to weather conditions

• Color durability (UV resistant)

- Long-term durability
- Minimizing development of thermal bridges
- Easy to integrate with other facades materials (ETICS)
- Lightweight (little excessive weight in comparison to natural materials)
- Effect providing of natural materials

The subject of this EPD is based on the actual technical documents for factory HENKEL Operations Sp. z o.o. in Poland and other mentioned European HENKEL factories. All actual technical documents are always available on HENKEL website.

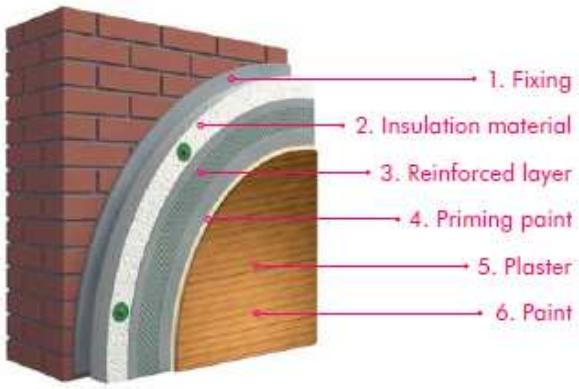

Figure 1. VISAGE ETICS layers

Set of products for Ceresit Ceretherm VISAGE under this EPD is shown in Table 1

Table 1. Ceresit Ceretherm VISAGE ETICS specification

1. Fixing	Ceresit CT 83 Adhesive Mortar or Ceresit CT 85 FLEX Adhesive and Reinforcing Mortar, plastic anchors Ceresit CT 330 or CT 335 with a steel core or others classified as ETAG 014, number of fasteners and their arrangement should be determined by an architect, based on the substrate analysis and load calculations
2. Insulation material	EPS-boards marked Ceresit CT 315 (or others classified as PN-EN 13163:2004) with thickness up to 25 cm, with a flat or shaped end face
3. Reinforced layer	Ceresit CT 325 Glass fibre mesh with a density of 145 g/m² and above, Ceresit CT 85 FLEX Adhesive and Reinforcing Mortar
4. Priming paint	Ceresit CT 16 Acrylic Paint
5. Plaster	Ceresit CT 60 VISAGE Acrylic Plaster, Ceresit CT 710 VISAGE Natural Stone Plaster, Ceresit CT 720 VISAGE Wood Plaster + CT 721 VISAGE Wood Colour Impregnate, Ceresit CT 730 VISAGE Luminous Plaster, Ceresit CT 760 VISAGE Architectural Concrete Plaster
6. Paint	Ceresit CT 721 VISAGE Wood Colour Impregnate, Ceresit CT 740 VISAGE Metallic Paint, Ceresit CT 750 VISAGE Opal Lack

Environmental characteristics (LCA) for HENKEL ETICS are presented in a few cases, depending on:

- kind of finishing coat: mineral, acrylic, silicate, silicone or mixed (silicone-silicate), and
- thickness of EPS boards for reference ranging from 10cm up to 20cm.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Allocation

The allocation rules used for this EPD are based on general ITB-PCR A. The ETICS system production is a line process with multiple co-products. Allocation was done on product mass basis.

All impacts from raw materials extraction are allocated in A1 module of EPD. 99,9% of impacts from line production were inventoried and allocated to all ETICS sub products production which generates different percentage of production in each of factories impacts in module A3. Municipal waste and waste water of whole factory were allocated to module A3. Electricity was inventoried for whole production process. Emissions are measured separately as well and presented in A3 module.

System limits

The life cycle analysis of the examined products covers “Product Stage”, A1-A3 modules (Cradle to Gate) in accordance with EN 15804+A1 and ITB-PCR A. Details on systems limits are provided in product specific report. All materials and energy consumption inventoried in factory were included in calculation. Office impacts were also taken into consideration. In the assessment, all significant parameters from gathered production data are considered, i.e. all material used per formulation, utilised thermal energy, internal fuel and electric power consumption, direct production waste, and all available emission measurements. This study also takes into account some material flows of less than 1% and energy flows with a proportion of less than 1 %. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804, machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

A1 and A2 Modules: Raw materials supply and transport

Raw materials for ETICS production come from local suppliers and from more distant locations. Data on transport of the different products to the manufacturing plants is collected and modelled for all factories by assessor. Means of transport include truck, train and ship, and Polish and European fuel averages are applied.

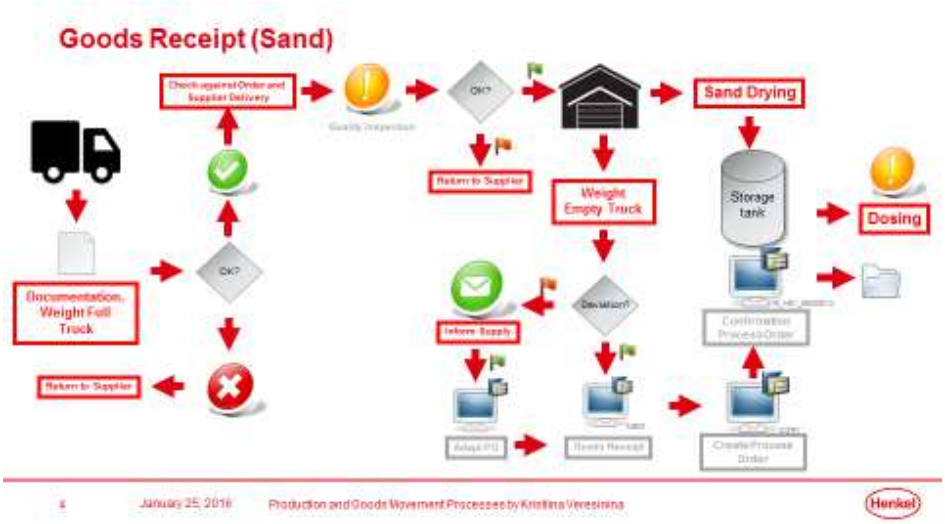

Figure 2. Raw materials delivery scheme.

A3: Production

The Figure 3 show the working process during the production of powder production, Figure 4 - wet production. The raw materials are stored in the production factory in silos, big bags, or sacks accordingly. According to the applicable formulation, they are dosed and intensely mixed. Next, products are filled into containers (or packed into paper bags – dry mixes) and send to quality control. Then, they are temporarily stored, or delivered directly as ready-to-use products.

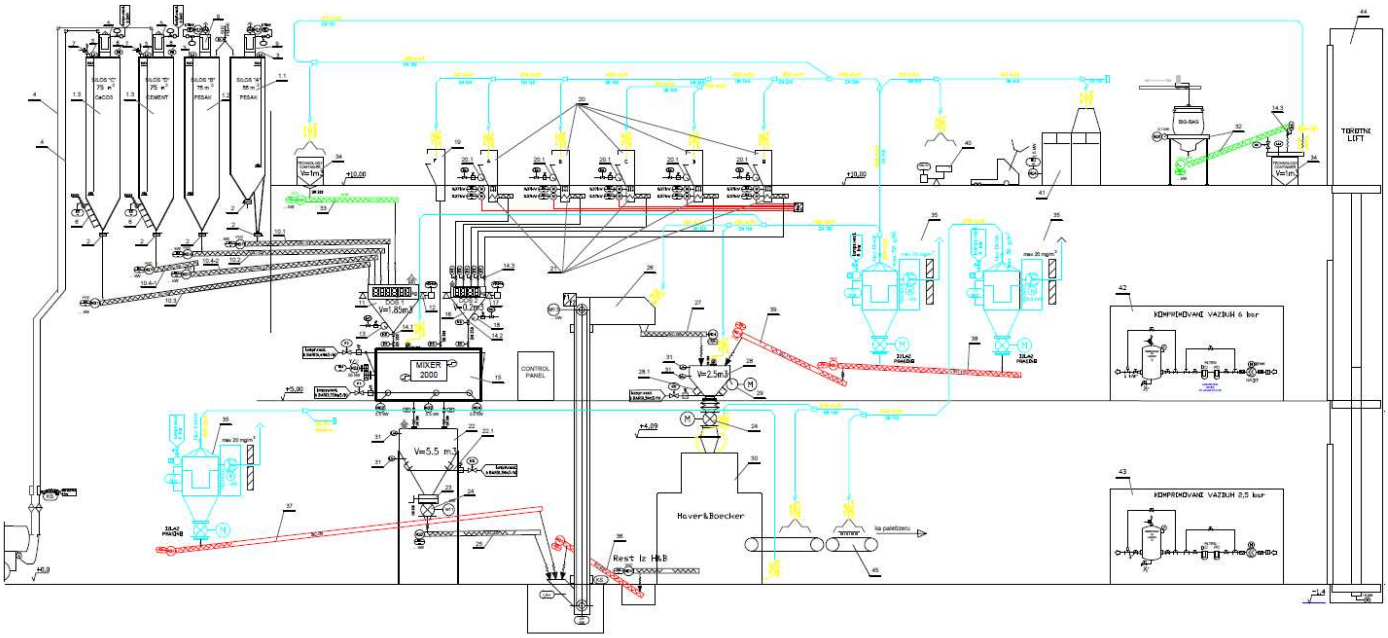

Figure. 3 Dry products production scheme at HENKEL factories

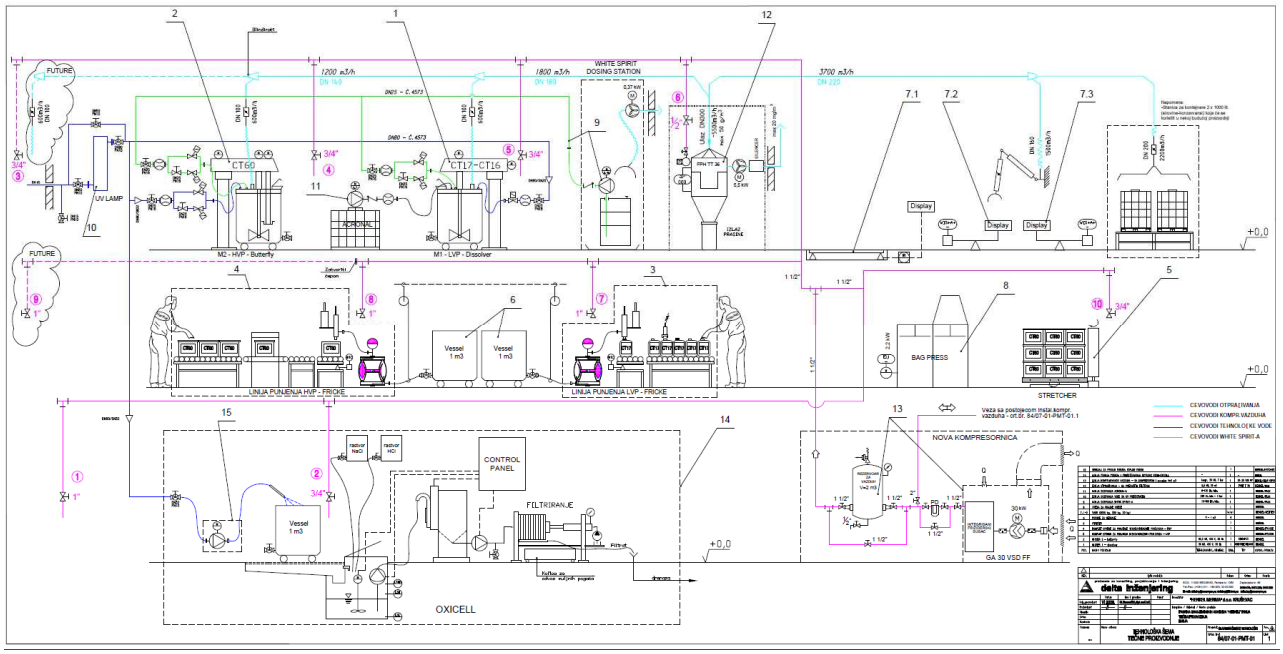

Figure. 4 Wet products production scheme at HENKEL factories

Manufacture covers all processes linked to production, which comprises various related operations besides on-site activities, including Ceresit Ceretherm components production process, packaging and internal transportation. The manufacturing process also yields data on the combustion of refinery products, such as diesel and gasoline, related to the production process. Use of electricity, fuels and auxiliary materials in the production is taken into account using national data. The environmental profile of these energy carriers is modelled by ITB for average Polish and European conditions. Packaging-related flows in the production process and all upstream packaging are

included in the manufacturing module. Apart from production of packaging material, the supply and transport of packaging material are also considered in the LCA model. It is assumed that packaging waste generated in the course of production and up-stream processes is 100% collected and incinerated based on a multi-input and multi-output process specific to the elementary composition of the waste. Energy (e.g. electricity) are credited using national production averages.

Data collection period

The data for manufacture of the examined products refer to the year 2014. The life cycle assessments were prepared for locations in Poland and Europe as reference area.

Data quality

The values determined to calculate the LCA originate from verified HENKEL inventory data.

Assumptions and estimates

The impacts of the representative HENKEL products for each ETICS layer were aggregated using weighted average. The weighted average method was used according to the percentage of each product in ETICS based on the relation to whole production quantity. Impacts for each product and factory were inventoried and calculated separately.

Calculation rules

LCA was done in accordance to PCR A document.

Note

Factory-prefabricated boards made of expanded polystyrene (EPS), mesh glass fibre and anchors are not produced by HENKEL. The impacts of those products were included from databases shown below.

Databases

The data for the processes come from the following databases: Ecoinvent, EMPA, Ullmann's, Plastic-Europe, ITB-Data, SPC. Specific data quality analysis was a part of external ISO audit. Characterization factors are CML ver. 4.2 based on EN 15804:2013+A1 version. (PN EN 15804+A1:2014-04)

LIFE CYCLE ASSESSMENT (LCA) - Results

Declared unit

The declaration refers to 1 m^2 of complete ETICS.

Table 2. System boundaries for environmental characteristic for Ceresit Ceretherm VISAGE ETICS

Environmental assessment information (MNA – Module not assessed, MD – Module Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MD	MD	MD	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

VISAGE ETICS

1 m^2, EPS 10 cm

Environmental impacts: (1 m^2, EPS 10 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO_2 eq.] (100 years)	8,41	0,43	0,23	9,07
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	3,79E-07	5,45E-05	7,32E-07	5,56E-05
Acidification potential of soil and water	[kg SO_2 eq.]	6,73E-02	1,63E-03	5,96E-03	7,49E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	6,46E-03	0,00E+00	1,19E-04	6,58E-03
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	4,35E-03	2,88E-04	1,76E-04	4,81E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	4,60E-01	0,00E+00	1,03E-01	5,62E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	141,21	3,05	5,45	149,71
Environmental aspects on resource use: (1 m^2 EPS 10 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	0,74	0,00	0,20	0,94
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	160,20	INA	5,99	166,19
Use of secondary material	[kg]	1,09	0,00	8,15E-05	1,09
Use of renewable secondary fuels	[MJ]	1,99	0,00	0,00	1,99
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	3,25	0,031	0,17	3,45
Other environmental information describing waste categories: (1 m^2 EPS 10 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	4,80E-04	0,00	9,61E-06	4,90E-04
Non-hazardous waste disposed	[kg]	3,02E-01	4,98E-03	3,01E-01	0,61
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	1,73E-03	1,73E-03
Materials for recycling	[kg]	4,31E-03	0,00	5,19E-02	5,62E-02
Materials for energy recovery	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ]	0,00	0,00	0,00	0,00

VISAGE ETICS

1 m^2, EPS 12 cm

Environmental impacts: (1 m^2, EPS 12 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO_2 eq.] (100 years)	11,39	0,43	0,23	12,0
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	4,64E-07	5,45E-05	7,32E-07	5,57E-05
Acidification potential of soil and water	[kg SO_2 eq.]	9,13E-02	1,63E-03	5,96E-03	9,89E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	8,74E-03	0,00E+00	1,19E-04	8,86E-03
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	5,80E-03	2,88E-04	1,76E-04	6,27E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	5,49E-01	0,00E+00	1,03E-02	5,59E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	191,81	3,05	5,45	200,31
Environmental aspects on resource use: (1 m^2 EPS 12 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	0,88	INA	0,20	1,09
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	215,86	INA	5,99	221,85
Use of secondary material	[kg]	1,13	0,00	8,15E-05	1,13
Use of renewable secondary fuels	[MJ]	2,39	0,00	0,00	2,39
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	4,03	0,031	0,17	4,23
Other environmental information describing waste categories: (1 m^2 EPS 12 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	5,76E-04	0,00	9,61E-06	5,86E-04
Non-hazardous waste disposed	[kg]	3,62E-01	4,98E-03	3,01E-01	0,67
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	1,73E-03	1,73E-03
Materials for recycling	[kg]	5,17E-03	0,00	5,19E-02	5,71E-02
Materials for energy recovery	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ]	0,00	0,00	0,00	0,00

VISAGE ETICS

1 m^2, EPS 15 cm

Environmental impacts: (1 m^2, EPS 15 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO_2 eq.] (100 years)	15,9	0,43	0,23	16,5
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	5,91E-07	5,45E-05	7,32E-07	5,58E-05
Acidification potential of soil and water	[kg SO_2 eq.]	1,27E-01	1,63E-03	5,96E-03	1,35E-01
Formation potential of tropospheric ozone	[kg Ethene eq.]	1,22E-02	0,00E+00	1,19E-04	1,23E-02
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	7,99E-03	2,88E-04	1,76E-04	8,45E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	6,82E-01	0,00E+00	1,03E-03	6,83E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	267,7	3,05	5,45	276,2
Environmental aspects on resource use: (1 m^2 EPS 15 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	1,11	INA	0,20	1,31
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	299,35	INA	5,99	305,34
Use of secondary material	[kg]	1,19	0,00	8,15E-05	1,19
Use of renewable secondary fuels	[MJ]	2,99	0,00	0,00	2,99
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	5,20	0,031	0,17	5,40
Other environmental information describing waste categories: (1 m^2 EPS 15 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	7,20E-04	0,00	9,61E-06	7,30E-04
Non-hazardous waste disposed	[kg]	4,53E-01	4,98E-03	3,01E-01	0,76
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	1,73E-03	1,73E-03
Materials for recycling	[kg]	6,47E-03	0,00	5,19E-02	5,84E-02
Materials for energy recovery	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ]	0,00	0,00	0,00	0,00

VISAGE ETICS

1 m^2, EPS 20 cm

Environmental impacts: (1 m^2, EPS 20 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO_2 eq.] (100 years)	23,31	0,43	0,23	24,0
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	8,03E-07	5,45E-05	7,32E-07	5,60E-05
Acidification potential of soil and water	[kg SO_2 eq.]	1,87E-01	1,63E-03	5,96E-03	1,95E-01
Formation potential of tropospheric ozone	[kg Ethene eq.]	1,79E-02	0,00E+00	1,19E-04	1,80E-02
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	1,16E-02	2,88E-04	1,76E-04	1,21E-02
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	9,04E-01	0,00E+00	1,03E-04	9,04E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	394,2	3,05	5,45	402,7
Environmental aspects on resource use: (1 m^2 EPS 20 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	1,47	INA	0,20	1,68
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	0,87	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	438,50	INA	5,99	444,49
Use of secondary material	[kg]	1,29	0,00	8,15E-05	1,29
Use of renewable secondary fuels	[MJ]	3,99	0,00	0,00	3,99
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	7,15	0,031	0,17	7,35
Other environmental information describing waste categories: (1 m^2 EPS 20 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	9,60E-04	0,00	9,61E-06	9,70E-04
Non-hazardous waste disposed	[kg]	6,04E-01	4,98E-03	3,01E-01	0,91
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	1,73E-03	1,73E-03
Materials for recycling	[kg]	8,62E-03	0,00	5,19E-02	6,05E-02
Materials for energy recovery	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ]	0,00	0,00	0,00	0,00

Verification

The process of verification of this EPD is in accordance with EN ISO 14025and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 & 8.3.1. ☒ external ☐ internal
External verification of EPD: PhD. Eng. Halina Prejzner LCA, LCI audit and input data verification: M.Sc. Eng. Dominik Bekierski, d.bekierski@itb.pl Verification of LCA: PhD Eng. Michał Piasecki, m.piasecki@itb.pl

Normative references

- ITB PCR A- General Product Category Rules for Construction Products
- ISO 14025:2006, Environmental management – Type III environmental declarations – Principles and procedure
- ISO 21930:2007, Sustainability in building and construction – Environmental declaration of building products
- ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2000, Buildings and constructed assets — Service life planning — Part 1: General principles
- ISO 15686-8:2008, Buildings and constructed assets – Service life planning – Part 8: Reference service life
- EN 15804:2012+A1:2013, Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
- EN15942:2011, Sustainability of construction- Environmental product declarations. Communication format business-to-business

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