SOLTHERM W external thermal insulation composite system (ETICS)

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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 an external auditor. It contains the information on the impacts of the declared construction materials on the environment. Their aspects were 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 analysis (LCA): A1-A3 modules in accordance with EN 15804 (Cradle to Gate)
The year of preparing the EPD: 2017
Declared durability: Under normal conditions, SOLTHERM W ETICS has reference service life (RSL) of 25 years according to ETAG 004
PCR: ITB PCR A (PCR based on EN 15804)
Declared unit: 1 m^2 of complete SOLTHERM W ETICS
Reasons for performing LCA: B2B
Representativeness: Polish product

Manufacturer and Product Information

BOLIX is a producer of building chemistry, specializing in the production of facade systems. The company have implemented an Integrated Quality and Environmental Management System, which has been granted an ISO certificate for the conformity with the EN-ISO 9001and EN-ISO 14001 standards by GLOBAL GROUP BOLIX mission is to supply building materials and solutions of the highest quality to the European market.

SOLTHERM W according to ETA-13/0933 is a mineral wool based external thermal insulation composite system which consists of fixing thermal insulation – mineral wool boards with a base coat layer incorporating reinforcement mesh and a decorative finish.

The SOLTHERM W system comprises of:

- surface preparation of masonry or concrete substrate;
- full system beads and render only beads;
- insulation in form of mineral wool;
- cementitious base coat with reinforcement;
- decorative finish (, mineral, silicone, or silicate);
- mechanical fixings;
- adhesive fixings;
- weather tight joints;
- provision for limiting cold bridging at external wall/floor junctions in compliance with Acceptable Construction Details published by the DECLG;
- provision for fire stopping at external compartment walls and floors.

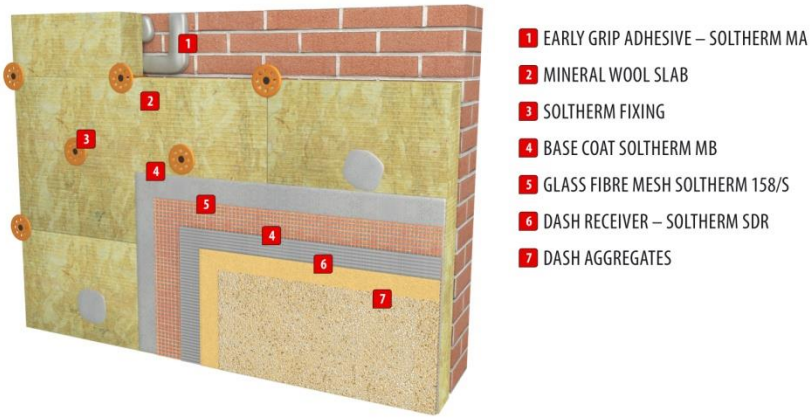

Fig. 1. Application scheme for SOLTHERM W system

The list of SOLTHERM W components is presented in Table 1.

Table 1. List of SOLTHERM W components

Component	Product
1. Adhesive	SOLTHERM MB – mineral wool adhesive/base coat SOLTHERM MA – mineral wool adhesive
2. Insulation material with associated methods of fixing	Mineral wool in accordance with EN 13162 with thickness from 4 cm up to 25 cm
3. Base coats	SOLTHERM MB – mineral wool adhesive/base coat
4. Glass fibre meshes	Standard and reinforced glass fibre meshes SOLTHERM 145 SOLTHERM 160 SOLTHERM 174 SOLTHERM 335
5. Primers	SOLTHERM AP – paint primer SOLTHERM AP colour – mineral and acrylic renders primer SOLTHERM STP – silicate renders and paints primer

	SOLTHERM STP colour - coloured primer for silicate renders SOLTHERM SNP – silicone renders and paints primer SOLTHERM SNP colour - coloured primer for silicone renders
6. Finishing coats (renders)	**Mineral plasters:** SOLTHERM MTC 15 SOLTHERM MTC 15g SOLTHERM MTC 20 SOLTHERM MTC 30 SOLTHERM MTC 25wt SOLTHERM MTC 25wt g SOLTHERM SDR **Silicone plasters:** SOLTHERM SFC-P 15 SOLTHERM SFC-P 20 SOLTHERM SFC-P 25wt **Silicate plasters:** SOLTHERM STF 10 SOLTHERM STF 15 SOLTHERM STF 20 SOLTHERM STF 25wt
7. Finishing coats (paints)	**Silicate top coats:** SOLTHERM STPT – ready to use liquid **Silicone top coats:** SOLTHERM STC-P – ready to use liquid SOLTHERM STC-P+ –HD ready to use liquid

The SOLTHERM W system is dedicated for the external insulation of:

- existing concrete or masonry dwelling;
- new concrete or masonry commercial or industrial buildings, which are designed in accordance with the Building Regulations 1997 to 2011.

The system can be applied on a variety of existing external surfaces such as concrete, brick or rendered masonry walls. It can also be fixed on surfaces of horizontal or tilted structural elements provided that they are not directly exposed to precipitation. These may include ceilings over passageways, internal walls and roofs (on the ceiling side) of garages or cellars adjacent to heated rooms.

The system is suitable for use up to a maximum of six storeys (18m) in height in purpose groups 1(a), 1(b), 1(c), 2(a), 2(b), 3, 4(a) and 4(b) as defined in Part B of the Building Regulations 1997 to 2011.

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

- kind of finishing coat: ,silicone, silicate, mineral and
- thickness of mineral wool boards for reference ranging from 4cm up to 25cm

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Allocation

The allocation rules used for this EPD are based on general ITB-PCR A. The SOLTHERM W system products production is a line process with multiple co-products. 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 SOLTHERM W system ETICS production. 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 SOLTHERM W components production come from local suppliers and more distant locations. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Means of transport include trucks and Polish and European fuel averages are applied.

A3: Production

The Fig. 2 and 3. show the working process during the production of SOLTHERM W system wet and dry products. 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.

Manufacture covers all processes linked to production, which comprises various related operations besides on-site activities, including SOLTHERM W 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 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.

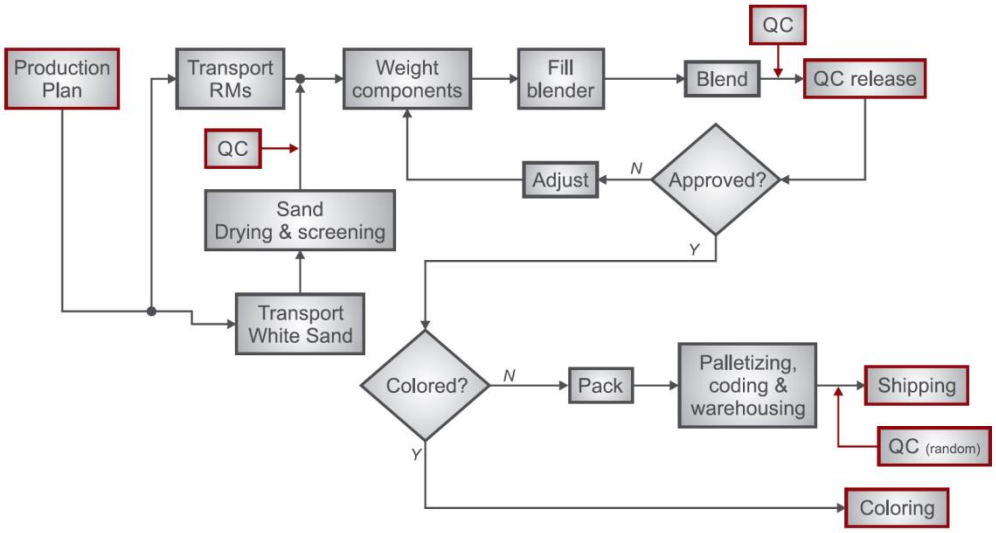

Fig. 2 Wet components production scheme for SOLTHERM W system

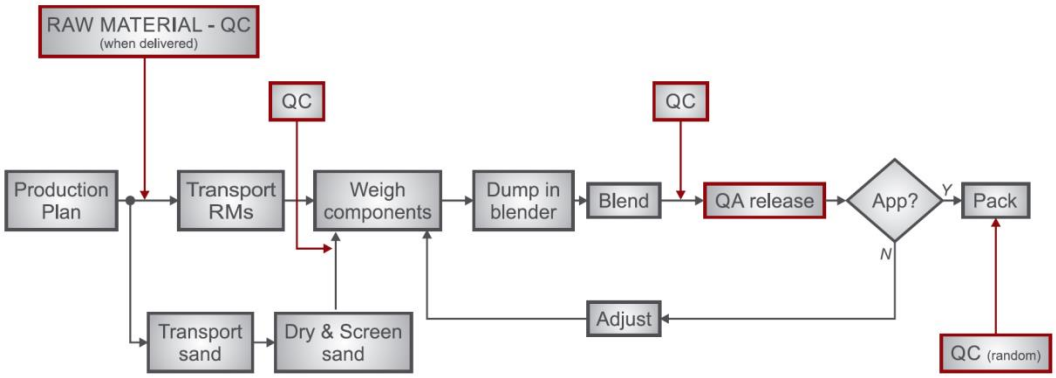

Fig. 3 Dry components production scheme for SOLTHERM W system

Data collection period

The data for manufacture of the examined products refer to period between 01.01.2015-31.12.2015. The life cycle assessments were prepared for Poland as reference area.

Data quality

The values determined to calculate the LCA originate from verified BOLIX S.A. inventory data.

Assumptions and estimates

The impacts of the representative BOLIX S.A. products for each SOLTHERM W layer were aggregated using weighted average. The weighted average method was used according to the percentage of each product in SOLTHERM W 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 with PCR A document.

Databases

The data for the processes come from the following databases: Ecoinvent, ITB-Data. Specific data quality analysis was a part of external ISO 14001 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 SOLTHERM W ETICS insulated with mineral wool.

Table 2. System boundaries for environmental characteristic for SOLTHERM W

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

SOLTHERM W ETICS with Silicone Plasters

1 m^2 of ETICS with 4cm MW insulation

Environmental impacts: (1 m^2, MW 4 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	15,94	0,60	0,47	17,01
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	8,93E-07	4,27E-06	6,19E-07	5,78E-06
Acidification potential of soil and water	[kg SO_2 eq.]	5,59E-02	4,23E-03	1,40E-03	6,15E-02
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	7,58E-03	3,15E-04	4,84E-06	7,90E-03
Formation potential of tropospheric ozone	[kg Ethene eq.]	2,71E-03	7,46E-04	1,66E-04	3,62E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	9,62E-02	0,00	1,75E-02	1,14E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	122,20	2,68	5,05	129,93
Environmental aspects on resource use: (1 m^2, MW 4 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]	1,05	0,13	0,25	1,44
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]	126,77	2,95	5,56	135,28
Use of secondary material	[kg]	0,34	0,00	0,00	0,34
Use of renewable secondary fuels	[MJ]	0,26	0,00	0,00	0,26
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	4,05	0,25	0,06	4,36
Other environmental information describing waste categories: (1 m^2, MW 4 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	3,23E-03	0,00	9,39E-04	4,17E-03
Non-hazardous waste disposed	[kg]	6,17E-01	3,88E-03	1,52E-02	6,36E-01
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,21E-02	5,21E-02
Materials for recycling	[kg]	5,32E-02	0,00	5,33E-01	5,87E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicone Plasters

1 m² of ETICS with 5cm MW insulation

Environmental impacts: (1 m², MW 5 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	17,49	0,60	0,47	18,6
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	9,07E-07	4,27E-06	6,19E-07	5,80E-06
Acidification potential of soil and water	[kg SO_2 eq.]	6,23E-02	4,23E-03	1,40E-03	6,80E-02
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	8,71E-03	3,15E-04	4,84E-06	9,03E-03
Formation potential of tropospheric ozone	[kg Ethene eq.]	2,94E-03	7,46E-04	1,66E-04	3,85E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	9,68E-02	0,00	1,75E-03	9,86E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	139,24	2,68	5,05	146,97
Environmental aspects on resource use: (1 m², MW 5 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]	1,32	0,13	0,25	1,70
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]	145,51	2,95	5,56	154,03
Use of secondary material	[kg]	0,40	0,00	0,00	0,40
Use of renewable secondary fuels	[MJ]	0,31	0,00	0,00	0,31
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	4,46	0,25	0,06	4,78
Other environmental information describing waste categories: (1 m², MW 5 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	3,87E-03	0,00	9,39E-04	4,81E-03
Non-hazardous waste disposed	[kg]	7,40E-01	3,88E-03	1,52E-02	7,59E-01
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,21E-02	5,21E-02
Materials for recycling	[kg]	6,38E-02	0,00	5,33E-01	5,97E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicone Plasters

1 m² of ETICS with 10cm MW insulation

Environmental impacts: (1 m², MW 10 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	33,01	0,60	0,47	34,08
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,05E-06	4,27E-06	6,19E-07	5,94E-06
Acidification potential of soil and water	[kg SO_2 eq.]	1,27E-01	4,23E-03	1,40E-03	1,32E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,00E-02	3,15E-04	4,84E-06	2,03E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	5,25E-03	7,46E-04	1,66E-04	6,17E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,03E-01	0,00	1,75E-04	1,03E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	309,62	2,68	5,05	317,36
Environmental aspects on resource use: (1 m², MW 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]	2,63	0,13	0,25	3,02
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]	332,94	2,95	5,56	341,45
Use of secondary material	[kg]	1,00	0,00	0,00	1,00
Use of renewable secondary fuels	[MJ]	0,39	0,00	0,00	0,39
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	6,81	0,25	0,06	7,13
Other environmental information describing waste categories: (1 m², MW 10 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	4,84E-03	0,00	9,39E-04	5,78E-03
Non-hazardous waste disposed	[kg]	0,92475	3,88E-03	1,52E-02	9,44E-01
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,21E-02	5,21E-02
Materials for recycling	[kg]	7,97E-02	0,00	5,33E-01	6,13E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicone Plasters

1 m² of ETICS with 15cm MW insulation

Environmental impacts: (1 m², MW 15 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	36,89	0,60	0,47	37,96
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,09E-06	4,27E-06	6,19E-07	5,98E-06
Acidification potential of soil and water	[kg SO_2 eq.]	1,43E-01	4,23E-03	1,40E-03	1,48E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,28E-02	3,15E-04	4,84E-06	2,32E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	5,83E-03	7,46E-04	1,66E-04	6,75E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,04E-01	0,00	1,75E-05	1,04E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	352,2	2,68	5,05	360,0
Environmental aspects on resource use: (1 m², MW 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]	3,95	0,13	0,25	4,33
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]	379,80	2,95	5,56	388,31
Use of secondary material	[kg]	1,15	0,00	0,00	1,15
Use of renewable secondary fuels	[MJ]	0,52	0,00	0,00	0,52
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	7,63	0,255	0,06	7,95
Other environmental information describing waste categories: (1 m², MW 15 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	6,45E-03	0,00	9,39E-04	7,39E-03
Non-hazardous waste disposed	[kg]	1,233	3,88E-03	1,52E-02	1,25E+00
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,21E-02	5,21E-02
Materials for recycling	[kg]	1,06E-01	0,00	5,33E-01	6,40E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicone Plasters

1 m² of ETICS with 20cm MW insulation

Environmental impacts: (1 m², MW 20 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	39,45	0,60	0,47	40,5
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,11E-06	4,27E-06	6,19E-07	6,00E-06
Acidification potential of soil and water	[kg SO_2 eq.]	1,53E-01	4,23E-03	1,40E-03	1,59E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,47E-02	3,15E-04	4,84E-06	2,50E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	6,22E-03	7,46E-04	1,66E-04	7,13E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,05E-01	0,00	1,75E-05	1,05E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	380,33	2,68	5,05	388,07
Environmental aspects on resource use: (1 m², MW 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]	5,26	INA	0,25	5,51
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]	410,72	2,95	5,56	419,23
Use of secondary material	[kg]	1,25	0,00	0,00	1,25
Use of renewable secondary fuels	[MJ]	0,66	0,00	0,00	0,66
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	7,77	0,255	0,06	8,08
Other environmental information describing waste categories: (1 m², MW 20 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	8,07E-03	0,00	9,39E-04	9,01E-03
Non-hazardous waste disposed	[kg]	1,54E+00	3,88E-03	1,52E-02	1,56
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,21E-02	5,21E-02
Materials for recycling	[kg]	1,33E-01	0,00	5,33E-01	6,66E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicone Plasters

1 m² of ETICS with 25cm MW insulation

Environmental impacts: (1 m², MW 25 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	41,39	0,60	0,47	42,5
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,13E-06	4,27E-06	6,19E-07	6,02E-06
Acidification potential of soil and water	[kg SO_2 eq.]	1,61E-01	4,23E-03	1,40E-03	1,67E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,61E-02	3,15E-04	4,84E-06	2,64E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	6,51E-03	7,46E-04	1,66E-04	7,42E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,06E-01	0,00	1,75E-05	1,06E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	401,63	2,68	5,05	409,37
Environmental aspects on resource use: (1 m², MW 25 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]	6,58	INA	0,25	6,83
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]	434,15	2,95	5,56	442,66
Use of secondary material	[kg]	1,32	0,00	0,00	1,32
Use of renewable secondary fuels	[MJ]	0,79	0,00	0,00	0,79
Use of non-renewable secondary fuels	[MJ]	7,63	0,00	0,00	7,63
Net use of fresh water	[dm^3]	8,16	0,255	0,06	8,47
Other environmental information describing waste categories: (1 m², MW 25 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	9,68E-03	0,00	9,39E-04	1,06E-02
Non-hazardous waste disposed	[kg]	1,85E+00	3,88E-03	1,52E-02	1,87E+00
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,21E-02	5,21E-02
Materials for recycling	[kg]	1,59E-01	0,00	5,33E-01	6,93E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Mineral Plasters

1 m² of ETICS with 4cm MW insulation

Environmental impacts: (1 m², MW 4 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	15,77	0,59	0,53	16,89
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	8,95E-07	3,27E-06	8,29E-07	3,44E-05
Acidification potential of soil and water	[kg SO_2 eq.]	5,73E-02	4,18E-03	1,72E-03	6,32E-02
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	7,64E-03	3,11E-04	2,56E-05	7,98E-03
Formation potential of tropospheric ozone	[kg Ethene eq.]	2,78E-03	7,37E-04	2,20E-04	3,73E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	8,00E-02	0,00	1,81E-02	9,80E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	121,62	2,65	5,25	129,52
Environmental aspects on resource use: (1 m², MW 4 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]	1,02	0,13	0,76	1,91
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]	126,08	2,92	5,77	134,77
Use of secondary material	[kg]	0,34	0,00	0,00	0,34
Use of renewable secondary fuels	[MJ]	0,52	0,00	0,00	0,52
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	4,24	0,25	0,06	4,56
Other environmental information describing waste categories: (1 m², MW 4 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	3,48E-03	0,00	9,70E-04	4,45E-03
Non-hazardous waste disposed	[kg]	4,52E-01	4,21E-03	1,56E-02	4,72E-01
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,36E-02	5,36E-02
Materials for recycling	[kg]	4,78E-02	0,00	5,49E-01	5,97E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Mineral Plasters

1 m² of ETICS with 5cm MW insulation

Environmental impacts: (1 m², MW 5 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	17,32	0,59	0,53	18,4
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	9,09E-07	3,27E-06	8,29E-07	3,44E-05
Acidification potential of soil and water	[kg SO_2 eq.]	6,37E-02	4,18E-03	1,72E-03	6,96E-02
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	8,77E-03	3,11E-04	2,56E-05	9,11E-03
Formation potential of tropospheric ozone	[kg Ethene eq.]	3,01E-03	7,37E-04	2,20E-04	3,97E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	8,06E-02	0,00	1,81E-03	8,24E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	138,66	2,65	5,25	146,56
Environmental aspects on resource use: (1 m², MW 5 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]	1,28	0,13	0,76	2,17
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]	362,06	2,92	5,77	370,75
Use of secondary material	[kg]	0,40	0,00	0,00	0,40
Use of renewable secondary fuels	[MJ]	0,62	0,00	0,00	0,62
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	4,66	0,252	0,06	4,97
Other environmental information describing waste categories: (1 m², MW 5 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	4,17E-03	0,00	9,70E-04	5,14E-03
Non-hazardous waste disposed	[kg]	5,43E-01	4,21E-03	1,56E-02	0,56
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,36E-02	5,36E-02
Materials for recycling	[kg]	5,73E-02	0,00	5,49E-01	6,06E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Mineral Plasters

1 m² of ETICS with 10cm MW insulation

Environmental impacts: (1 m², MW 10 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	32,84	0,59	0,53	33,95
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,05E-06	3,27E-06	8,29E-07	3,46E-05
Acidification potential of soil and water	[kg SO_2 eq.]	1,28E-01	4,18E-03	1,72E-03	1,34E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,01E-02	3,11E-04	2,56E-05	2,04E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	5,33E-03	7,37E-04	2,20E-04	6,28E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	8,64E-02	0,00	1,81E-04	8,66E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	309,05	2,65	5,25	316,95
Environmental aspects on resource use: (1 m², MW 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]	2,56	0,13	0,76	3,45
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]	332,25	2,92	5,77	340,94
Use of secondary material	[kg]	1,00	0,00	0,00	1,00
Use of renewable secondary fuels	[MJ]	0,78	0,00	0,00	0,78
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	6,97	0,25	0,06	7,28
Other environmental information describing waste categories: (1 m², MW 10 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	5,22E-03	0,00	9,70E-04	6,19E-03
Non-hazardous waste disposed	[kg]	6,78E-01	4,21E-03	1,56E-02	6,98E-01
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,36E-02	5,36E-02
Materials for recycling	[kg]	7,16E-02	0,00	5,49E-01	6,21E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Mineral Plasters

1 m² of ETICS with 15cm MW insulation

Environmental impacts: (1 m², MW 15 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	36,72	0,59	0,53	37,83
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,09E-06	3,27E-06	8,29E-07	3,46E-05
Acidification potential of soil and water	[kg SO_2 eq.]	1,44E-01	4,18E-03	1,72E-03	1,50E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,29E-02	3,11E-04	2,56E-05	2,32E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	5,90E-03	7,37E-04	2,20E-04	6,86E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	8,79E-02	0,00	1,81E-05	8,79E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	351,6	2,65	5,25	359,5
Environmental aspects on resource use: (1 m², MW 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]	3,84	0,13	0,76	4,73
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]	379,11	2,92	5,77	387,80
Use of secondary material	[kg]	1,15	0,00	0,00	1,15
Use of renewable secondary fuels	[MJ]	1,04	0,00	0,00	1,04
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	7,79	0,25	0,06	8,11
Other environmental information describing waste categories: (1 m², MW 15 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	6,95E-03	0,00	9,70E-04	7,92E-03
Non-hazardous waste disposed	[kg]	9,04E-01	4,21E-03	1,56E-02	9,24E-01
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,36E-02	5,36E-02
Materials for recycling	[kg]	9,55E-02	0,00	5,49E-01	6,45E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Mineral Plasters

1 m² of ETICS with 20cm MW insulation

Environmental impacts: (1 m², MW 20 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	39,28	0,59	0,53	40,4
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,11E-06	3,27E-06	8,29E-07	3,46E-05
Acidification potential of soil and water	[kg SO_2 eq.]	1,55E-01	4,18E-03	1,72E-03	1,60E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,48E-02	3,11E-04	2,56E-05	2,51E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	6,29E-03	7,37E-04	2,20E-04	7,24E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	8,89E-02	0,00	1,81E-05	8,89E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	379,76	2,65	5,25	387,66
Environmental aspects on resource use: (1 m², MW 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]	5,12	0,13	0,76	6,01
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]	410,03	2,92	5,77	418,72
Use of secondary material	[kg]	1,25	0,00	0,00	1,25
Use of renewable secondary fuels	[MJ]	1,29	0,00	0,00	1,29
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	7,92	0,25	0,06	8,23
Other environmental information describing waste categories: (1 m², MW 20 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	8,69E-03	0,00	9,70E-04	9,66E-03
Non-hazardous waste disposed	[kg]	1,13E+00	4,21E-03	1,56E-02	1,15E+00
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,36E-02	5,36E-02
Materials for recycling	[kg]	1,19E-01	0,00	5,49E-01	6,68E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Mineral Plasters

1 m² of ETICS with 25cm MW insulation

Environmental impacts: (1 m², MW 25 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	41,22	0,59	0,53	42,3
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,13E-06	3,27E-06	8,29E-07	3,47E-05
Acidification potential of soil and water	[kg SO_2 eq.]	1,63E-01	4,18E-03	1,72E-03	1,69E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,62E-02	3,11E-04	2,56E-05	2,65E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	6,58E-03	7,37E-04	2,20E-04	7,53E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	8,96E-02	0,00	1,81E-05	8,96E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	401,06	2,65	5,25	408,96
Environmental aspects on resource use: (1 m², MW 25 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]	6,40	0,13	0,76	7,29
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]	433,46	2,92	5,77	442,15
Use of secondary material	[kg]	1,32	0,00	0,00	1,32
Use of renewable secondary fuels	[MJ]	1,55	0,00	0,00	1,55
Use of non-renewable secondary fuels	[MJ]	7,79	0,00	0,00	7,79
Net use of fresh water	[dm^3]	8,31	0,25	0,06	8,62
Other environmental information describing waste categories: (1 m², MW 25 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	1,04E-02	0,00	9,70E-04	1,14E-02
Non-hazardous waste disposed	[kg]	1,36E+00	4,21E-03	1,56E-02	1,38E+00
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	5,36E-02	5,36E-02
Materials for recycling	[kg]	1,43E-01	0,00	5,49E-01	6,92E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicate Plasters

1 m² of ETICS with 4cm MW insulation

Environmental impacts: (1 m², MW 4 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	16,72	0,49	0,41	17,63
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	9,33E-07	6,17E-06	8,17E-07	7,92E-06
Acidification potential of soil and water	[kg SO_2 eq.]	5,94E-02	3,52E-03	1,22E-03	6,41E-02
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	7,80E-03	2,62E-04	4,22E-06	8,06E-03
Formation potential of tropospheric ozone	[kg Ethene eq.]	2,90E-03	6,20E-04	1,45E-04	3,67E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,00E-01	0,00	1,53E-02	1,15E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	125,82	2,23	4,41	132,46
Environmental aspects on resource use: (1 m², MW 4 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]	1,23	0,11	0,64	1,99
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]	136,02	2,46	4,85	143,33
Use of secondary material	[kg]	0,34	0,00	0,00	0,34
Use of renewable secondary fuels	[MJ]	0,27	0,00	0,00	0,27
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	4,06	0,21	0,05	4,33
Other environmental information describing waste categories: (1 m², MW 4 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	4,13E-03	0,00	8,22E-04	4,95E-03
Non-hazardous waste disposed	[kg]	5,24E-01	4,32E-03	1,33E-02	5,41E-01
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	4,54E-02	4,54E-02
Materials for recycling	[kg]	5,76E-02	0,00	4,65E-01	5,23E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicate Plasters

1 m² of ETICS with 5cm MW insulation

Environmental impacts: (1 m², MW 5 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	18,27	0,49	0,41	19,2
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	9,48E-07	6,17E-06	8,17E-07	7,94E-06
Acidification potential of soil and water	[kg SO_2 eq.]	6,58E-02	3,52E-03	1,22E-03	7,05E-02
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	8,93E-03	2,62E-04	4,22E-06	9,19E-03
Formation potential of tropospheric ozone	[kg Ethene eq.]	3,13E-03	6,20E-04	1,45E-04	3,90E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,01E-01	0,00	1,53E-03	1,02E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	142,85	2,23	4,41	149,50
Environmental aspects on resource use: (1 m², MW 5 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]	1,54	0,11	0,64	2,30
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]	154,77	2,46	4,85	162,07
Use of secondary material	[kg]	0,40	0,00	0,00	0,40
Use of renewable secondary fuels	[MJ]	0,32	0,00	0,00	0,32
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	4,48	0,21	0,05	4,75
Other environmental information describing waste categories: (1 m², MW 5 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	4,95E-03	0,00	8,22E-04	5,77E-03
Non-hazardous waste disposed	[kg]	6,28E-01	4,32E-03	1,33E-02	6,46E-01
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	4,54E-02	4,54E-02
Materials for recycling	[kg]	6,91E-02	0,00	4,65E-01	5,35E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicate Plasters

1 m² of ETICS with 10cm MW insulation

Environmental impacts: (1 m², MW 10 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	33,79	0,49	0,41	34,70
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,09E-06	6,17E-06	8,17E-07	8,08E-06
Acidification potential of soil and water	[kg SO_2 eq.]	1,30E-01	3,52E-03	1,22E-03	1,35E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,02E-02	2,62E-04	4,22E-06	2,05E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	5,45E-03	6,20E-04	1,45E-04	6,22E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,07E-01	0,00	1,53E-04	1,07E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	313,24	2,23	4,41	319,88
Environmental aspects on resource use: (1 m², MW 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]	3,08	0,11	0,64	3,84
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]	342,19	2,46	4,85	349,50
Use of secondary material	[kg]	1,00	0,00	0,00	1,00
Use of renewable secondary fuels	[MJ]	0,40	0,00	0,00	0,40
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	6,83	0,21	0,05	7,09
Other environmental information describing waste categories: (1 m², MW 10 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	6,19E-03	0,00	8,22E-04	7,01E-03
Non-hazardous waste disposed	[kg]	7,85E-01	4,32E-03	1,33E-02	8,03E-01
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	4,54E-02	4,54E-02
Materials for recycling	[kg]	8,64E-02	0,00	4,65E-01	5,52E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicate Plasters

1 m² of ETICS with 15cm MW insulation

Environmental impacts: (1 m², MW 15 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	37,67	0,49	0,41	38,57
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,13E-06	6,17E-06	8,17E-07	8,12E-06
Acidification potential of soil and water	[kg SO_2 eq.]	1,46E-01	3,52E-03	1,22E-03	1,51E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,31E-02	2,62E-04	4,22E-06	2,33E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	6,03E-03	6,20E-04	1,45E-04	6,79E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,08E-01	0,00	1,53E-05	1,08E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	355,8	2,23	4,41	362,5
Environmental aspects on resource use: (1 m², MW 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]	4,63	0,11	0,64	5,38
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]	389,05	2,46	4,85	396,35
Use of secondary material	[kg]	1,15	0,00	0,00	1,15
Use of renewable secondary fuels	[MJ]	0,53	0,00	0,00	0,53
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	7,65	0,212	0,05	7,91
Other environmental information describing waste categories: (1 m², MW 15 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	8,25E-03	0,00	8,22E-04	9,08E-03
Non-hazardous waste disposed	[kg]	1,05E+00	4,32E-03	1,33E-02	1,06E+00
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	4,54E-02	4,54E-02
Materials for recycling	[kg]	1,15E-01	0,00	4,65E-01	5,81E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicate Plasters

1 m² of ETICS with 20cm MW insulation

Environmental impacts: (1 m², MW 20 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	40,23	0,49	0,41	41,1
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,15E-06	6,17E-06	8,17E-07	8,14E-06
Acidification potential of soil and water	[kg SO_2 eq.]	1,57E-01	3,52E-03	1,22E-03	1,61E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,49E-02	2,62E-04	4,22E-06	2,52E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	6,41E-03	6,20E-04	1,45E-04	7,18E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,09E-01	0,00	1,53E-05	1,09E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	383,95	2,23	4,41	390,59
Environmental aspects on resource use: (1 m², MW 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]	6,17	0,11	0,64	6,92
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]	419,97	2,46	4,85	427,28
Use of secondary material	[kg]	1,25	0,00	0,00	1,25
Use of renewable secondary fuels	[MJ]	0,66	0,00	0,00	0,66
Use of non-renewable secondary fuels	[MJ]	2,87	0,00	0,00	2,87
Net use of fresh water	[dm^3]	7,78	0,212	0,05	8,05
Other environmental information describing waste categories: (1 m², MW 20 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	1,03E-02	0,00	8,22E-04	1,11E-02
Non-hazardous waste disposed	[kg]	1,31E+00	4,32E-03	1,33E-02	1,33E+00
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	4,54E-02	4,54E-02
Materials for recycling	[kg]	1,44E-01	0,00	4,65E-01	6,09E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

SOLTHERM W ETICS with Silicate Plasters

1 m² of ETICS with 25cm MW insulation

Environmental impacts: (1 m², MW 25 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO2 eq.]	42,17	0,49	0,41	43,1
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,17E-06	6,17E-06	8,17E-07	8,16E-06
Acidification potential of soil and water	[kg SO_2 eq.]	1,65E-01	3,52E-03	1,22E-03	1,69E-01
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	2,63E-02	2,62E-04	4,22E-06	2,66E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	6,70E-03	6,20E-04	1,45E-04	7,47E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1,10E-01	0,00	1,53E-05	1,10E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	405,25	2,23	4,41	411,89
Environmental aspects on resource use: (1 m², MW 25 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]	7,71	0,11	0,64	8,46
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]	443,40	2,46	4,85	450,71
Use of secondary material	[kg]	1,32	0,00	0,00	1,32
Use of renewable secondary fuels	[MJ]	0,80	0,00	0,00	0,80
Use of non-renewable secondary fuels	[MJ]	7,65	0,00	0,00	7,65
Net use of fresh water	[dm^3]	8,17	0,212	0,05	8,44
Other environmental information describing waste categories: (1 m², MW 25 cm)					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	1,24E-02	0,00	8,22E-04	1,32E-02
Non-hazardous waste disposed	[kg]	1,57E+00	4,32E-03	1,33E-02	1,59E+00
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	4,54E-02	4,54E-02
Materials for recycling	[kg]	1,73E-01	0,00	4,65E-01	6,38E-01
Materials for energy recover	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ per energy carrier]	0,00	0,00	0,00	0,00

Verification

The process of verification of this EPD is in accordance with EN ISO 14025, ISO 21930 and ECO checklist document. 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 PhD Eng. Justyna Tomaszewska, j.tomaszewska@itb.pl Verification of LCA: PhD Eng. Michał Piasecki, m.piasecki@itb.pl

References

- ITB PCR A- General Product Category Rules for Construction Products
- ISO 14025:2006, Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures
- ISO 21930:2017, Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services
- ISO 14044:2006, Environmental management -- Life cycle assessment -- Requirements and guidelines
- ISO 15686-1:2011, Buildings and constructed assets -- Service life planning -- Part 1: General principles and framework
- ISO 15686-8:2008, Buildings and constructed assets -- Service-life planning -- Part 8: Reference service life and service-life estimation
- EN 15804:2012+A1:2013, Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.
- EN15942:2011, Sustainability of construction works. Environmental product declarations. Communication format business-to-business

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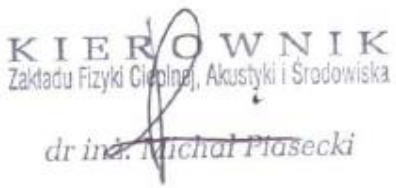

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CERTIFICATE № 056/2017
of TYPE III ENVIRONMENTAL DECLARATION

Product:

SOLTHERM W

thermal insulation system

Manufacturer:

BOLIX S.A.

34-300 Żywiec, Stolarska 8

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

PN-EN 15804+A1:2014-04

Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.

This certificate, issued for the first time on 9th February 2017 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics
and Environment Department
Michał Piasecki, PhD

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director
for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, February 2017