webertherm Family

External Thermal Insulation Composite System (ETICS)
by Weber, Saint-Gobain Construction Products Bulgaria EOOD

Date of issue: 20/12/2017
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EPD Program operator:
Building Research Institute (ITB)
1 Filtrowa Str.
00-611 Warsaw, Poland
www.itb.pl

Manufacturer:
Weber, Saint-Gobain Construction Products Bulgaria EOOD
Industrial zone, 13 Imperator Konstantin Veliki Str.
2230 Kostinbrod, Bulgaria
www.weber.bg

General Information

EPD owner:	**Weber, Saint-Gobain Construction Products Bulgaria EOOD**
Address:	Industrial zone, 13 Imperator Konstantin Veliki Str., 2230 Kostinbrod, Bulgaria
Website and e-mail:	www.weber.bg; office@weber.bg
Telephone:	+ 359 2 400 37 00
LCA and EPD prepared by:	**RAZ Consult EOOD**
Address:	65 Shipchenski prohod Blvd., 1574 Sofia, Bulgaria
Contact person:	Dr. Eng. Roumiana Zaharieva (roumiana.zaharieva@gmail.com)
	Dr. Eng. Yana Kancheva (ykancheva@gmail.com)

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 information about the impact of declared construction materials on 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

Life Cycle analysis (LCA): A1-A3 modules in accordance with EN 15804 (Cradle to Gate)
Declared durability: 70 years under normal conditions of use
Product standard: ETAG 004: External Thermal Insulation Composite Systems with Rendering, EC endorsement on 27-06-2013
PCR: EN 15804
Representativeness: Global

Declared unit: 1 m^2 EPS–based External Thermal Insulation Composite System
LCA scope: Product stage (modules A1-A3)
Year of preparing the EPD: 2017

Product Description

Webertherm Family is a trade name for an EPS-based External Thermal Insulation Composite System (ETICS) manufactured by Weber, Saint-Gobain Construction Products Bulgaria EOOD. Webertherm Family system is intended for installation on external walls of various building types (offices, residential buildings, public and commercial buildings, etc.).

Table 1: Components of ETICS webertherm Family

Layer	Product	Mass per m^2
Bonding mortar:	weberguard EPS-F Elastic 510P – for bonding the insulation with the substrate	5 kg/m^2
Insulation layer:	Expanded polystyrene (EPS) boards with thickness 8 cm/10 cm/12 cm	1.2/1.5/1.8 kg/m^2
Coating:	weberguard EPS-F Elastic 510P – coating of the insulation	3 kg/m^2
Reinforcing layer:	Glass fibre mesh P – R 117 A101	0.145 kg/m^2
Mechanical fixings:	Plastic anchors for fixing of ETICS to concrete substrate	0.25 kg/m^2 (6 items)

Primer:	Priming layer weberpas Acryl S700 for preparation of cementitious coating before laying the Render	0.2 kg/m^2
Render:	weberpas ActiveAir – Render with organic binders for external and internal application as a finishing layer of walls, columns, ceilings and partition walls.	2.6 kg/m^2
	Total mass of webertherm Family:	12.395/12.695/12.995 kg

Figure 1 represents the layers of the hereby certified External Thermal Insulation Composite System webertherm Family ETICS.

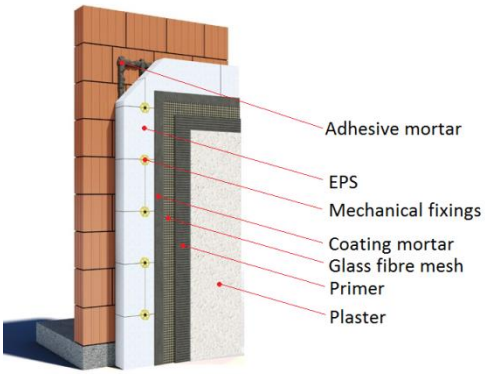

Figure 1: Product scheme of webertherm Family ETICS

Bonding mortar and coating

Weberguard EPS-F Elastic is a dry Bonding mortar based on cement and polymer additives used for adhesion and coating of EPS-based facade thermal insulation boards. The Bonding mortar is laid on both sides of the thermal insulation: on one side as a glue and on the other side – as a basecoat. The product is manufactured by Weber, Saint Gobain Construction Products Bulgaria EOOD. The Bonding mortar is manufactured as dry blend, which is further mixed with water before placing on the building wall.

Table 2: Technical characteristics of weberguard EPS-F Elastic

CE mark: BDS EN 998-1:2010	Value	Units
Adhesion to concrete	≥ 0.25	N/mm²
Adhesion to EPS	≥ 0.08	N/mm²
Thermal conductivity	≤ 0.5	W/(m·K)
Water absorption	W2	
Water vapour permeability	≤ 21.3	
Class of reaction to fire	E	

Thermal insulation layer

The expanded polystyrene (EPS) boards for the hereby declared insulating system are manufactured and delivered to Weber, Saint Gobain Construction Products Bulgaria EOOD by an external Bulgarian company. EPS insulation boards are used in the ETICS without any additional processing by Weber, Saint Gobain Construction Products Bulgaria EOOD. As per its Declaration of performance, the EPS is intended for external thermal insulation and three thickness options are considered for the ETICS – 8cm, 10 cm and 12 cm.

Table 3: Technical characteristics of the insulation board (EPS)

CE mark: EN 13163	Value	Units
Density	> 15	kg/m³
Thermal conductivity	≤ 0.35	W/m·K
Compressive strength	≥ 100	kPa
Bending strength	≥ 170	kPa
Water absorption	≤ 2%	
Water vapour permeability	30-70	
Class of reaction to fire	E	

Reinforcing layer

The glass fibre mesh P–R117 A101 is used as a reinforcing layer; it is manufactured by a Saint-Gobain factory situated in Czech Republic.

Table 4: Technical characteristics of the glass fibre mesh

Characteristics	Values	Technical specification
Class of reaction to fire	F	ETA no. 13/0392
Mesh size	(4,0 x 4,5) mm	
Organic compounds	(20 ± 4) %	
Tensile strength	Meets standard requirements	
Mass per unit area	≥ 145 g/m^2	
Thickness	(0.5 ± 0.2) mm	

Mechanical fixings

Plastic anchors are used for fixing the ETICS to the insulated substrate. The anchors are manufactured and delivered to Weber, Saint Gobain Construction Products Bulgaria EOOD by an external company located in Turkey. The anchors are intended for use in concrete substrate for thickness of the insulation board varying from 55 to 120 mm. The reference number of anchors for 1m^2 installed ETICS is 6 items. Mechanical fixings are used in the ETICS without any additional processing by Weber, Saint Gobain Construction Products Bulgaria EOOD.

Primer and Render

The priming (weberpas Acryl S700) and rendering layers (weberpas ActiveAir) are manufactured by a Weber Saint Gobain company located in Serbia and are delivered to Weber, Saint Gobain Construction Products Bulgaria EOOD.

Table 5: Technical characteristics of the Primer (weberpas Acryl S700)

Characteristics	Values	Technical specification
Class of reaction to fire	A1	BDS EN ISO-11925-2:2011 BDS EN 13823:2011 BDS EN 13501-1:2007 +A1:2009
Specific gravity	1500±0.050 g/m^3	BDS EN ISO 2811-1:2002
Brookfield viscosity	4000±500 mPa·s	BDS EN ISO 3104:1997

Table 6: Technical characteristics of the Render (weberpas ActiveAir)

Characteristics	Values	Technical specification
Class of reaction to fire	A2	BDS EN 15824:2009
Adhesion	≥ 1.0 MPa	
Water absorption	0.39 kg/m²min^{0,5}	
Water vapour permeability	80	

LCA Information

FUNCTIONAL UNIT 1 m^2 EPS–based External Thermal Insulation Composite System

SYSTEM BOUNDARIES Cradle to Gate: Modules A1-A3

DECLARED DURABILITY 70 years under normal conditions of use

CUT-OFF CRITERIA As per EN 15804, in the case that there is not enough information, the process energy and materials representing less than 1% of the whole energy and mass used can be excluded (if they do not cause significant impacts). The addition of all the inputs and outputs excluded is less than 5% of the whole mass and energy used, as well of the emissions to environment occurred.

Flows related to human activities such as employee transport are excluded.

In accordance with EN 15804 the construction of plants, production of machines and transportation systems are excluded.

Environmental burden of the administrative building is not considered.

Collected data about the glass fibre mesh, the mechanical fixings and the Render include only substantial composition and transportation to Weber, Saint Gobain Construction Products Bulgaria EOOD.

The primer is considered in terms of transportation to the production site as no information is available about its composition and production process. The share of the primer in the overall mass of the ETICS is around 1.5 %, so it falls under the criteria for exclusion.

Pigments used for colouring the Renders are excluded due to the minimal quantities used (0.1 %).

The total sum of omitted processes does not exceed 5% of the whole mass of inputs and outputs.

ASSUMPTIONS AND LIMITATIONS Generic data from ecoinvent v.3.3 database is used to model the ETICS components that are delivered by external suppliers and the manufacturer does not have influence on their production processes. These include the EPS boards, glass fibre mesh, mechanical fixings, Primer and Render.

The impact of the EPS board is calculated based on a referent production process (raw materials supply and energy consumption). The transport to the ETICS manufacturer's site is modelled with information from the manufacturer.

Packaging materials and packaging waste are considered in the assessment of all components of webertherm Family.

GEOGRAPHICAL COVERAGE AND TIME PERIOD

All data related to Bonding and Coating mortars is collected from Weber, Saint Gobain Construction Products Bulgaria EOOD and represents the manufacturing process in 2016.

Assessment of transport of all ETICS components covers all used transport types, external and internal transport activities.

DATA QUALITY

The information on the production process of the Bonding and Coating mortar is collected from Weber, Saint Gobain Construction Products Bulgaria EOOD.

Information on the transport and composition of glass fibre mesh, anchors and Render is also provided by Weber, Saint Gobain Construction Products Bulgaria EOOD.

Information on the production process of EPS and production processes of the components of Render, glass fibre mesh and anchors are accounted as presented in ecoinvent v.3.3 database.

Characterisation factors are from CML-IA v 4.1, 2012.

ALLOCATION

The factory of Weber, Saint Gobain Construction Products Bulgaria EOOD in Kostinbrod produces various Bonding mortars and coatings. The manufacturing process, however, is equivalent for all products, so the energy consumption, emissions and waste generation are considered to be the same per 1 kg of mortar powder produced. Environmental impacts, resource use and waste generation are calculated based on yearly data about the inputs/outputs and the yearly production of Bonding mortars for 2016.

Manufacturing process

Modules A1 and A2: Raw materials supply and transport

Cement, quartz sand, $CaCO_3$, lime and cellulose for the Bonding and Coating layers (weberguard EPS-F Elastic 510P) are delivered from local suppliers and are delivered in bulk. A polymer additive, as an exception, is delivered from abroad and is delivered in PP bags. The transportation data is collected and modelled by the LCA practitioners with the cooperation of the manufacturer. ETICS elements over whose production Weber, Saint Gobain Construction Products Bulgaria EOOD has no control are considered in the assessment by their substantial composition and transport to the ETICS manufacturer's site.

Module A3: Manufacturing

The Bonding and Coating mortar (weberguard EPS-F Elastic 510P) are the only components of ETICS that are produced by Weber, Saint Gobain Construction Products Bulgaria EOOD. The raw materials for weberguard EPS-F Elastic 510P are stored in silos. After the quartz sand is dried out, the components of the mortar are dosed and mixed with the prescribed proportions. The dry mix is homogenized and filled into paper bags for storage and is finally dispatched. LPG forklifts are used for factory internal transport and are taken into account in this assessment.

Figure 2 illustrates the production process of the Bonding and Coating mortar.

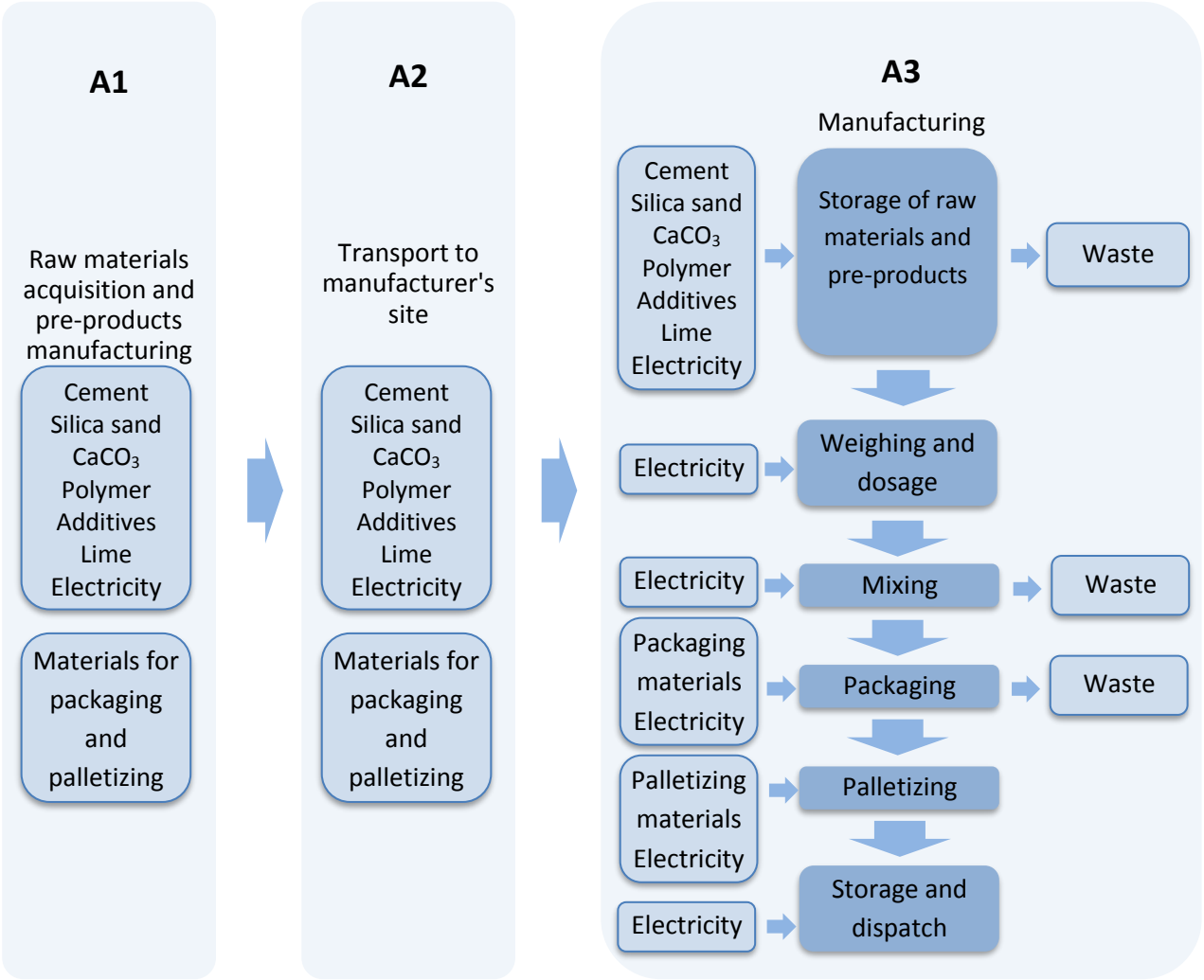

Figure 2: Input and output flows of the production process of weberguard EPS-F Elastic 510P

Figure 3 represents the ETICS manufacturer's facility.

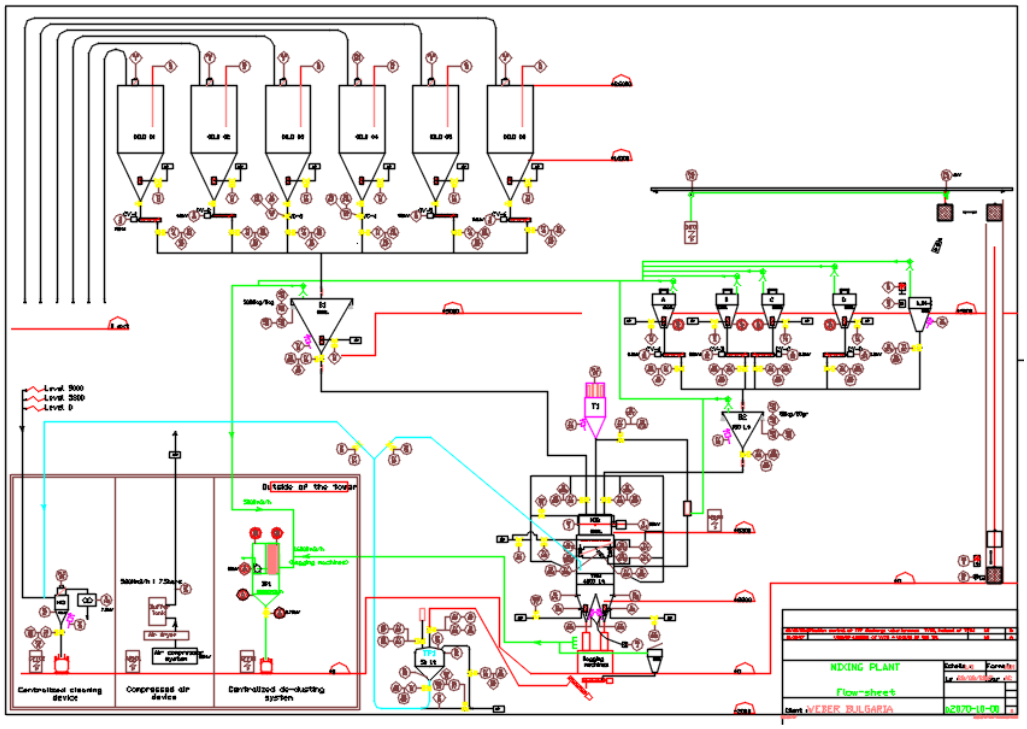

Figure 3: Production site of Weber Saint-Gobain Construction Products Bulgaria EOOD

The EPS, glass fibre mesh and plastic anchors experience no processing by the ETICS manufacturer. For the manufacturing of EPS a typical process of polystyrene expanding is considered in this EPD.

For the delivery and storage of Render the internal transport and energy consumption are taken into account. Part of the Render is coloured at the factory of Weber, Saint Gobain Construction Products Bulgaria EOOD and the energy consumption of this process is considered in the EPD.

LCA Results

Declared unit

The declaration refers to 1 m^2 of ETICS webertherm Family.

Table 7: Description of the system boundary

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

Table 8: Environmental information about 1 m² ETICS, EPS 8 cm

Environmental impacts (1m² ETICS, EPS 8 cm)		
Indicator	Unit	A1-A3
Global warming potential	kg CO_2–eq. (100 years)	11.62E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11–eq.	6.46E-07
Acidification potential of soil and water	kg SO_2–eq.	4.34E-02
Formation potential of tropospheric ozone	kg Ethene–eq.	9.51E-03
Eutrophication potential	kg $(PO_4)^{3-}$–eq.	5.04E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb–eq.	7.44E-05
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	218.46E+00

Resource use (1m² ETICS, EPS 8 cm)		
Indicator	Unit	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA
Use of renewable primary energy resources used as raw materials	MJ	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	13.07E+00
Use of non-renewable primary energy excluding nonrenewable primary energy resources used as raw materials	MJ	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	232.17E+00
Use of secondary material	kg	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00
Use of non-renewable secondary fuels	MJ	0.03E+00
Net use of fresh water	m^3	0.13E+00

Output flows and waste categories (1m² ETICS, EPS 8 cm)		
Indicator	Unit	A1-A3
Hazardous waste disposed	kg	0.00E+00
Non-hazardous waste disposed	kg	5.02E-02
Radioactive waste disposed	kg	0.00E+00
Components for re-use	kg	0.00E+00
Materials for recycling	kg	0.00E+00
Materials for energy recovery	kg	2.66E-06
Exported energy	MJ	0.00E+00

Table 9: Environmental information about 1 m^2 ETICS, EPS 10 cm

Environmental impacts (1m^2 ETICS, EPS 10 cm)		
Indicator	Unit	A1-A3
Global warming potential	kg CO_2–eq. (100 years)	12.98E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11–eq.	6.81E-07
Acidification potential of soil and water	kg SO_2–eq.	4.85E-02
Formation potential of tropospheric ozone	kg Ethene–eq.	1.16E-02
Eutrophication potential	kg $(PO_4)^{3-}$–eq.	5.47E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb–eq.	7.49E-05
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	248.75E+00

Resource use (1m^2 ETICS, EPS 10 cm)		
Indicator	Unit	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA
Use of renewable primary energy resources used as raw materials	MJ	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	13.62E+00
Use of non-renewable primary energy excluding nonrenewable primary energy resources used as raw materials	MJ	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	264.12E+00
Use of secondary material	kg	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00
Use of non-renewable secondary fuels	MJ	0.04E+00
Net use of fresh water	m^3	0.16E+00

Output flows and waste categories (1m^2 ETICS, EPS 10 cm)		
Indicator	Unit	A1-A3
Hazardous waste disposed	kg	0.00E+00
Non-hazardous waste disposed	kg	5.54E-02
Radioactive waste disposed	kg	0.00E+00
Components for re-use	kg	0.00E+00
Materials for recycling	kg	0.00E+00
Materials for energy recovery	kg	2.66E-06
Exported energy	MJ	0.00E+00

Table 10: Environmental information about 1 m² ETICS, EPS 12 cm

Environmental impacts (1m² ETICS, EPS 12 cm)		
Indicator	Unit	A1-A3
Global warming potential	kg CO_2–eq. (100 years)	14.33E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11–eq.	7.17E-07
Acidification potential of soil and water	kg SO_2–eq.	5.36E-02
Formation potential of tropospheric ozone	kg Ethene–eq.	1.36E-02
Eutrophication potential	kg $(PO_4)^{3-}$–eq.	5.90E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb–eq.	7.55E-05
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	279.04E+00

Resource use (1m² ETICS, EPS 12 cm)		
Indicator	Unit	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA
Use of renewable primary energy resources used as raw materials	MJ	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	14.16E+00
Use of non-renewable primary energy excluding nonrenewable primary energy resources used as raw materials	MJ	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	296.07E+00
Use of secondary material	kg	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00
Use of non-renewable secondary fuels	MJ	0.06E+00
Net use of fresh water	m^3	0.18E+00

Output flows and waste categories (1m² ETICS, EPS 12 cm)		
Indicator	Unit	A1-A3
Hazardous waste disposed	kg	0.00E+00
Non-hazardous waste disposed	kg	5.54E-02
Radioactive waste disposed	kg	0.00E+00
Components for re-use	kg	0.00E+00
Materials for recycling	kg	0.00E+00
Materials for energy recovery	kg	2.66E-06
Exported energy	MJ	0.00E+00

EPD verification

The process of verification of an EPD is in accordance with ISO14025, clause 8 and ISO 21930, clause 9. After verification this EPD is valid for a 5 years period. EPD does not have to be recalculated after 5 years if the underlying data has not changed significantly.

CEN standard EN 15804 serves as the core PCR
Independent verification corresponding to ISO 14025 & 8.3.1. ☒ external ☐ internal
External verification of EPD: PhD. Eng. Halina Prejzner LCI audit and input data verification: PhD. Eng. Justyna Tomaszewska, j.tomaszewska@itb.pl, LCA auditor: PhD. Eng. Michał Piasecki, m.piasecki@itb.pl

Literature

[1] EN 15804:2012+A1:2013, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

[2] ISO 14025:2006, Environmental labes and declarations – Type III environmental declarations – Principles and procedure.

[3] ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines.

[4] EN 15942:2011, Sustainability of construction works – Environmental product declarations. Communication format business-to-business.

[5] Declaration of Performance DoP-CPR-BG-510P-001 of weberguard EPS-F Elastic 510 P, 2017

[6] Declaration of Performance (DCCP 008) of weberpas Acryl S700, 2016

[7] Declaration of Performance DoP-RS-pasAA of weberpas ActiveAir, 2015

[8] Declaration of Performance DoP-R 117 A101 – 01 of P – R 117 A101, 2013

[9] Declaration of Performance No.002CPD of EPS boards, 2013

[10] Declaration of Performance of plastic anchors SP Star Euro La (90-160mm)

Instytut Techniki Budowlanej
00-611 Warsaw, Filtrowa 1

Thermal Physics, Acoustics and Environment Department
02-656 Warsaw, Ksawerów 21

CERTIFICATE № 065/2017
of TYPE III ENVIRONMENTAL DECLARATION

Product:

webertherm Family

ETICS system

Manufacturer:

Weber, Saint-Gobain Construction Poducts Bulgaria EOOD

Industrial zone, 13 Imperator Konstantin Veliki Str.
2230 Kostinbrod, Bulgaria

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 20th December 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, December 2017