

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Etex Building Performance International
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ETE-20230095-IBA2-EN
Issue date	14.06.2023
Valid to	13.06.2028

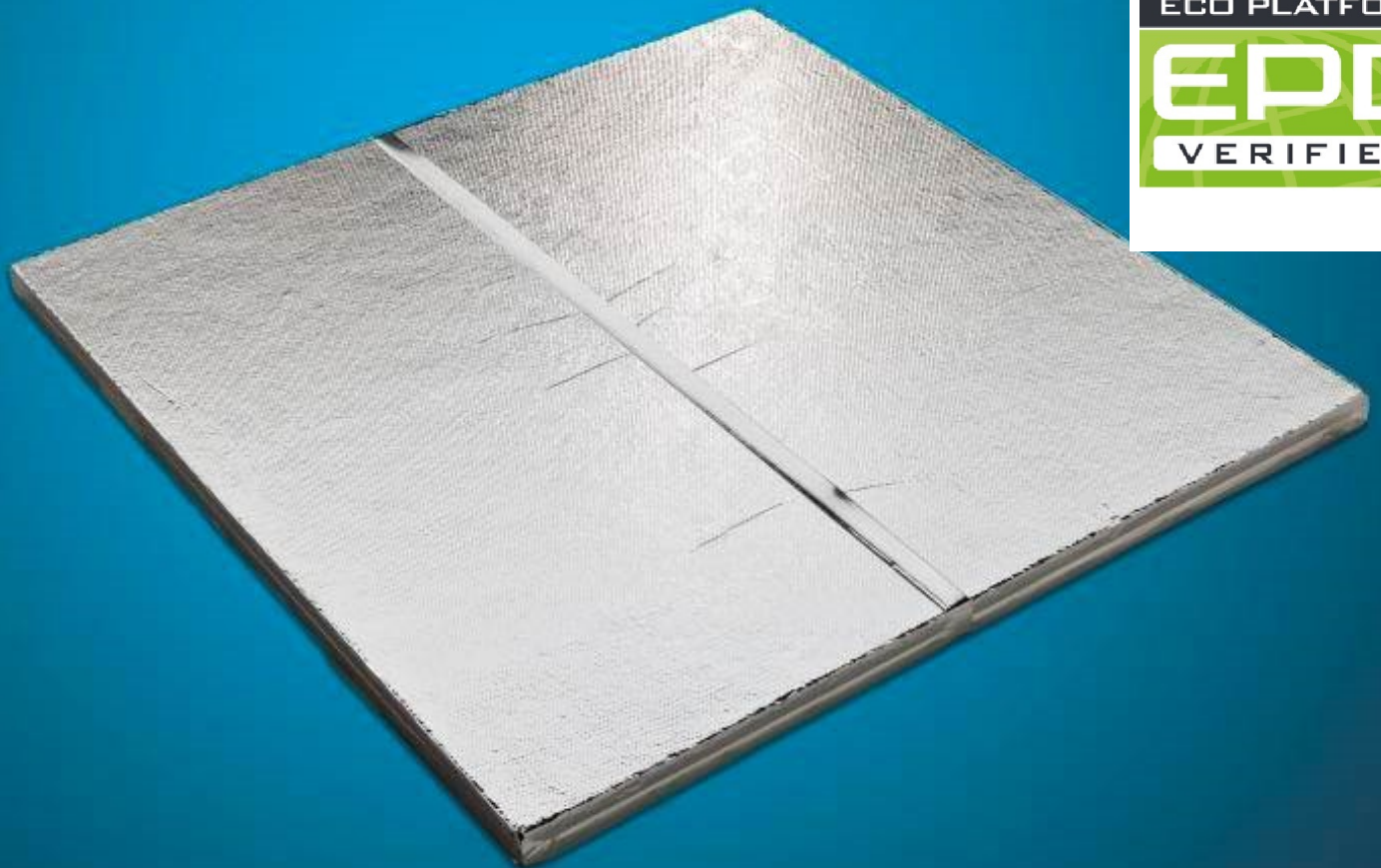
Promat ULTIMA® VIP
Etex

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ECO PLATFORM

EPD
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1. General Information

Etex

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-ETE-20230095-IBA2-EN

This declaration is based on the product category rules:

Vacuum insulation panels, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

14.06.2023

Valid to

13.06.2028



Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)



Dipl.-Ing. Hans Peters
(Managing Director Institut Bauen und Umwelt e.V.)

Promat ULTIMA® VIP

Owner of the declaration

Etex Building Performance International
Rue Marcel Demonque 500
84915 Avignon Cedex 9
France

Declared product / declared unit

1 m² ULTIMA® VIP vacuum insulation panel

Scope:

This is a specific EPD of the ULTIMA® VIP vacuum insulation panel produced by MICROTHERM® (part of the ETEX group) in Sint-Niklaas, Belgium.
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR	
Independent verification of the declaration and data according to ISO 14025:2011	
<input type="checkbox"/>	internally
<input checked="" type="checkbox"/>	externally



Vito D'Incognito,
(Independent verifier)

2. Product

2.1 Product description/Product definition

ULTIMA® VIP from Promat are high-performance microporous insulation panels covered in an impermeable polymer outer envelope which is heat-sealed under vacuum to optimize the thermal performance. The core of the ULTIMA® VIP panel insulation is a blend of filament-reinforced silica and an opacifier. The outer envelope is an ultra-low permeation barrier film that comprises multiple metallized polymer layers. Exact barrier film specification may vary according to the application. Promat ULTIMA® VIP core material is non-combustible and complies with the requirements of *DIN4102*.

Products according to the CPR based on an ETA. For the placing of the product on the market in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) the *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration *ETA no. 13/1026:23/08/2019*, 'Promat ULTIMA® VIP Vacuum insulation panel consisting of a microporous core of amorphous silica enclosed by a multi-layer film.' (with DoP-20200115-24 linked to it), and the CE-marking. For the application and use the respective national provisions apply.

2.2 Application

ULTIMA® VIP is used in multiple applications. Some typical applications:

- Building: Roof & terrace insulation, Interior wall insulation, External facade insulation, Floor insulation, Cold rooms, Doors, Thermal bridges;
- Refrigerators and freezers;
- Temperature controlled packaging;
- Refrigerated transport;
- Hot water boilers;

2.3 Technical Data

Constructional data

Name	Value	Unit
Gross density	160 - 210	kg/m ³
Compressive stress	0.15 - 0.20	MPa
Calculation value for thermal conductivity ETA13/1026 conform EAD 040011-00-1201	0.00587	W/mK
Thermal conductivity at center of the panel	0.0045	W/(mK)
R-value for 20 mm thickness	3.40	m ² K/W
R-value for 40 mm thickness	6.81	m ² K/W

Product according to the CPR, based on an ETA:

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to ETA no. 13/1026, 23/08/2019, 'Promat ULTIMA® VIP Vacuum insulation panel consisting of a micro-porous core of amorphous silica enclosed by a multi-layer film.'

2.4 Delivery status

Thickness: 20-50 mm

Dimensions (Length x Width in mm):

- 1300 x 600
- 1000 x 600
- 600 x 600
- 600 x 500
- 600 x 400

- 600 x 200
- 600 x 300
- 1200 x 600

2.5 Base materials/Ancillary materials

Composition:

- Fumed silica
- Silicon carbide
- Alu foil
- Others

This product/article/at least one partial article contains substances listed in the candidate list (date: 16.12.2022) exceeding 0.1 percentage by mass: no

his product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the *candidate list*, exceeding 0.1 percentage by mass: no

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) *Ordinance on Biocide Products No. 528/2012*): no

2.6 Manufacture

Vacuum panels are produced in a fully automated line. First the raw materials are mixed together in a mixer, in a next step a mould is filled with the mix and a mother board is pressed and on the sawing station it is automatically pressed in the right dimensions. These core boards go into a dryer to get rid of moisture and humidity and are immediately shrink wrapped. The boards are wrapped into an Aluminized PE barrier foil before they are pulled under vacuum into the vacuum clock. When they are vacuumed they are tested for internal pressure and then packed to be stored and sold to the customer.

2.7 Environment and health during manufacturing

Environmental, occupational health, safety and quality management at the Sint- Niklaas plant are in accordance with the following standards:

- ISO 14001;2015
- ISO 9001;2015
- ISO 45001;2018

2.8 Product processing/Installation

Not considered in the scope of the EPD, as a wide range of different applications and installation scenarios can be applied. The manuals are available online:

<https://www.promat.com/siteassets/industry/downloads/brochures/promat-ultima-vip-brochure.pdf?v=49d79c/Download>.

2.9 Packaging

A wooden pallet, carton and plastic packaging are used to pack the product for transport to the installation/customer.

2.10 Condition of use

No maintenance is needed.

2.11 Environment and health during use

Under normal conditions of use, ULTIMA VIP panels do not cause any adverse health effects or release of volatile organic compounds (VOCs) into indoor air. No environmental impact on water, air or soil is expected due to the extremely low metal release from the low maintenance requirements.

2.12 Reference service life

The RSL depends on the application. Under normal conditions of use, the product is supposed to retain its characteristics as long as the application lasts. For application in building a reference service life of 60 years (i.e. life time of the building) could be declared.

2.13 Extraordinary effects

Fire

The reaction to fire is not determined according to EN 13501-1, so as class it is stated NPD (No product data).

Fire protection

Name	Value
Building material class	NPD
Burning droplets	NPD
Smoke gas development	NPD

Water

Tests on the product performance including possible impacts on the environment following the unforeseeable influence of water, e.g. flooding showed that no risks are expected to occur in terms of environment and human health.

Mechanical destruction

In case of mechanical destruction, no risks are expected to occur in terms of environment and human health.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is defined as: 1 m² (thickness 20 mm) of a ULTIMA® VIP microporous insulation panel with a thermal conductivity of 0.00587 W/mK.

Declared unit

Name	Value	Unit
Declared unit	1	m ²
Grammage	3.7	kg/m ²
Thickness	0.02	m
Density	185	kg/m ³

The environmental impact of a product can be considered to be proportional to the weight of the product, so products with another density and/or thickness can be calculated by the below formula. Note that the barrier foil is not proportional to the thickness but to the surface area instead. However, as the barrier foil has little contribution to the environmental impact compared to the core, one can still use the formula below.

$$E = W * E_{ref} / W_{ref}$$

E = environmental impact of a product with density d and thickness t

$W = d * t$ = weight of 1 m² product with density d and thickness t

E_{ref} = environmental impact of the reference product with density 185 kg/m³ and thickness 20 mm

W_{ref} = weight of 1 m² reference product with density 185 kg/m³ and thickness 20 mm

3.2 System boundary

cradle to gate - with options, representative for the European market.

3.3 Estimates and assumptions

2.14 Re-use phase

It is possible to recycle the product. This is already applied to production waste. However, the recycling of post-consumer waste depends on the sorting and take-back of these waste streams at the demolition site. Therefore, no reuse/recycling has been considered in the EPD.

2.15 Disposal

Waste from these materials may be generally disposed off at a landfill, which has been licensed for this purpose. Please refer to the European list (Decision N° 2000/532/CE as modified) to identify your appropriate waste number, and ensure national and/or regional regulations are complied with.

Unless wetted, such a waste is normally dusty and so should be properly sealed in containers for disposal. At some authorised disposal sites, dusty waste may be treated differently in order to ensure they are dealt with promptly to avoid them being windblown. Check for any national and/or regional regulations, which may apply.

2.16 Further information

Additional information on ULTIMA® VIP can be found at: <https://www.promat.com/de-de/industry/technologien/mikroporoese-materialien/mikroporoese-produkte/ultima-vip/212740/>

No data record for fumed silica is available in Ecoinvent. Therefore, a customized model has been used, based on the stoichiometry of the chemical reaction and energy consumption provided by MICROTHERM®'s supplier. During the production of fumed silica, Hydrogen chloride (HCl) is produced as a coproduct. Impacts have been allocated on an economic basis to both end products (fumed silica and HCl).

3.4 Cut-off criteria

The following processes are considered below cut-off:

- Transport of packaging of raw materials
- Infrastructure and land use of the factory
- Ancillary materials used during the manufacturing
- Environmental impacts caused by the personnel of the production plants are not included in the LCA, e.g. waste from the cafeteria and sanitary installations, accidental pollution caused by human mistakes, or environmental effects caused by commuter traffic. Heating or cooling of the plants in order to ensure a comfortable indoor climate for the personnel for example is also neglected.

3.5 Background data

Ecoinvent 3.8 and Industry 2.0

3.6 Data quality

Company-specific data concern the data about the production of ULTIMA® VIP. All required data about the production process have been delivered to Enperas by MICROTHERM. Enperas uses publicly available generic data for all background processes (Ecoinvent 3.8 and Industry 2.0).

The composed datasets for this project are representative and relevant for ULTIMA® VIP produced by MICROTHERM® in Sint-Niklaas.

Data are as much as possible representative for the modern state-of-technology. As such, the period post 2008 is considered as the time coverage for the life cycle inventory data. The data collected by MICROTHERM® are based on data

from the year 2021.

The MICROTHERM® plant in Sint-Niklaas purchases hydropower from Norway, so the electricity consumption has been modelled using the *Ecoinvent 3.8* data record 'Electricity, high voltage {NO}| electricity production, hydro, reservoir, alpine region | Cut-off, U'.

3.7 Period under review

The data collected by MICROTHERM® are based on data from the year 2021.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Europe

3.9 Allocation

No co-products are produced.
No secondary raw materials are used.

The following allocations have been considered for the production data:

- For the energy consumption specific data per production step was available. The productions steps have been divided in steps that are common to all the products produced in the plant in Sint-Niklaas and steps that are specific to certain products. The energy consumption of the common production steps has been allocated to the individual product using the annual production volume of the products materials (physical relationship, kg). Besides, the energy consumption in the specific steps only used for ULTIMA® VIP, has been added to the energy consumption.
- Only facility-level data were available for the production waste and the packaging of the final product. The production waste has been allocated to the individual product using the annual production volume of the products materials (physical relationship, kg).

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. *Ecoinvent 3.8* and *Industry 2.0*

4. LCA: Scenarios and additional technical information

Characteristic product properties biogenic carbon

The product does not contain biogenic carbon. Its accompanying packaging contains biogenic carbon in the form of wooden pallets, core boards and carton. Note: 1 kg of biogenic Carbon is equivalent to 44/12 kg of CO₂.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.299	kg C

Installation into the building (A5)

Only packaging waste is included in module A5. As different applications and installation scenarios can be applied, the installation scenario itself is not included.

Name	Value	Unit
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End of life (C1-C4)

100% landfill scenario is considered as the average European scenario.

Name	Value	Unit
Collected separately	-	kg
Collected as mixed construction waste	3.7	kg
Reuse	-	kg
Recycling	-	kg
Energy recovery	-	kg
Landfilling	3.7	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

No benefits and loads regarding the product are allocated to module D, as the product is 100 % landfilled. However, some minor benefits and loads regarding the packaging of the product are allocated to module D.

Name	Value	Unit
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5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction 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
X	X	X	MND	X	MND	MND	MNR	MNR	MNR	MND	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² Promat ULTIMA® VIP

Parameter	Unit	A1-A3	A5	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO ₂ eq	1.78E+01	1.17E+00	4.82E-02	0	2.25E-02	-5.61E-01
Global Warming Potential fossil fuels (GWP-fossil)	kg CO ₂ eq	1.87E+01	1.37E-01	4.82E-02	0	2.24E-02	-2.04E-01
Global Warming Potential biogenic (GWP-biogenic)	kg CO ₂ eq	-8.77E-01	1.03E+00	1.72E-05	0	4.26E-05	-3.57E-01
Global Warming Potential luluc (GWP-luluc)	kg CO ₂ eq	2.49E-02	9.57E-06	1.93E-05	0	1.65E-05	-5.56E-04
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	8.35E-06	5.2E-09	1.12E-08	0	8.31E-09	-1.81E-08
Acidification potential of land and water (AP)	mol H ⁺ eq	9.07E-02	1.57E-04	1.37E-04	0	1.98E-04	-7.49E-04
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	9.27E-04	2.57E-07	3.44E-07	0	6.88E-07	-9.91E-06
Eutrophication potential aquatic marine (EP-marine)	kg N eq	1.41E-02	6.56E-05	2.72E-05	0	6.76E-05	-1.57E-04
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	1.58E-01	6.48E-04	3.03E-04	0	7.46E-04	-1.74E-03
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	4.71E-02	1.92E-04	1.17E-04	0	2.12E-04	-6.68E-04
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	1.27E-04	6.05E-08	1.31E-07	0	5.32E-08	-5.9E-07
Abiotic depletion potential for fossil resources (ADPF)	MJ	3.55E+02	3.61E-01	7.31E-01	0	6.41E-01	-4.78E+00
Water use (WDP)	m ³ world eq deprived	1.25E+01	2.04E-03	2.22E-03	0	3E-03	-7.86E-02

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² Promat ULTIMA® VIP

Parameter	Unit	A1-A3	A5	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	5.14E+01	2.96E+00	1.03E-02	0	3.31E-02	0
Renewable primary energy resources as material utilization (PERM)	MJ	9.37E+00	-5.87E+00	0	0	0	1.14E+01
Total use of renewable primary energy resources (PERT)	MJ	6.08E+01	-2.91E+00	1.03E-02	0	3.31E-02	1.14E+01
Non renewable primary energy as energy carrier (PENRE)	MJ	3.97E+02	1.91E+00	7.35E-01	0	6.58E-01	0
Non renewable primary energy as material utilization (PENRM)	MJ	4.8E+00	-2.93E+00	0	0	0	1.39E+00
Total use of non renewable primary energy resources (PENRT)	MJ	4.02E+02	-1.02E+00	7.35E-01	0	6.58E-01	1.39E+00
Use of secondary material (SM)	kg	0	0	0	0	0	4.17E-01
Use of renewable secondary fuels (RSF)	MJ	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	0
Use of net fresh water (FW)	m ³	4.93E-01	2.25E-04	5.38E-05	0	6.89E-04	-1.95E-03

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² Promat ULTIMA® VIP

Parameter	Unit	A1-A3	A5	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	2.97E-04	8.52E-07	1.91E-06	0	7.02E-07	-3.7E-06
Non hazardous waste disposed (NHWD)	kg	2.72E+00	3.13E-01	3.83E-02	0	3.7E+00	-1.49E-02
Radioactive waste disposed (RWD)	kg	1.63E-03	2.32E-06	4.94E-06	0	4.38E-06	-1.21E-05
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	1.76E-01	2.42E-01	0	0	0	-4.17E-01
Materials for energy recovery (MER)	kg	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ	1.93E-02	4.49E-01	0	0	0	-4.68E-01
Exported thermal energy (EET)	MJ	3.85E-02	8.97E-01	0	0	0	-9.36E-01

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² Promat ULTIMA® VIP

Parameter	Unit	A1-A3	A5	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	8.69E-07	2.63E-09	3.87E-09	0	3.84E-09	-1.15E-08
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	1.66E+00	1.59E-03	3.17E-03	0	3.27E-03	-1.33E-02
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	3.37E+02	3.38E-01	5.74E-01	0	3.68E-01	-1.58E+00
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	9.65E-09	8.43E-11	1.85E-11	0	1.07E-11	-7.53E-11

Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	1.79E-06	5.49E-10	5.8E-10	0	2.16E-10	-1.76E-09
Soil quality index (SQP)	SQP	1.64E+02	3.66E-01	5.09E-01	0	1.21E+00	-4.09E+01

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

6. LCA: Interpretation

For ULTIMA® VIP produced in Belgium, the raw materials used in the formulation mix has the highest contribution on all impact categories, and more specifically the fumed silica.

Manufacturing is the second most important life cycle stage (i.e.

energy consumption), but far less significant than the raw materials. Module D is not significant as the product is not recycled nor incinerated.

7. Requisite evidence

No evidence is required

8. References

Standards

DIN4102

DIN4102, Fire behaviour of building materials and elements - Classification of building materials - Requirements and testing

EN13501-1

EN13501-1, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

EN15804

EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

EN16757

EN 16757:2017, Sustainability of construction works— Environmental product declarations – Product Category Rules for concrete and concrete elements

ISO 9001

ISO 9001:2015: Quality management systems — Requirements

ISO 14025

EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 14040

ISO 14040:2006: Environmental management – Life cycle assessment – Principles and framework.

ISO 14044

ISO 14044:2006: Environmental management – Life cycle assessment – Requirements and guidelines.

ISO 14001

ISO 14001:2015: Environmental management systems — Requirements with guidance for use

ISO 45001

ISO 45001:2018: Occupational health and safety

management systems Requirements with guidance for use

PCR Part A

Calculation rules for the Life Cycle Assessment and Requirements on the Background Report, Institut Bauen und Umwelt e.V., www.bauumwelt.com.

PCR Part B

Institut Bauen und Umwelt e.V, Berlin (pub.): PCR Guidance-Texts for Building-Related Products and Services From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU) : Requirements on the EPD for Vacuum insulation panels

Further references

Biocide Products No. 528/2012

EU, REGULATION (EU) No 528/2012 OF THE EUROPEAN PARLIAMT

CPR

European Regulation N° 305/2011 (CPR)

Ecoinvent

Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at:<http://link.springer.com/10.1007/s11367-016-1087-8>.

Enperas Quadrant tool. 2022. Genk, Belgium.

ETA no. 13/1026:23/08/2019

ETA no. 13/1026:23/08/2019, 'Promat ULTIMA® VIP Vacuum insulation panel consisting of a micro- porous core of amorphous silica enclosed by a multi-layer film.'

IBU

IBU 2021. Institut Bauen und Umwelt e.V.: General

Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021 www.ibu-epd.com

Industry 2.0

Industry 2.0 (from PlasticsEurope, worldsteel and ERASM). LCA database as integrated in SimaPro 9.3.0.3.

PEFCR

European commission (2018). Product Environmental Footprint Category Rules PEFCR Guidance, version 6.3.

Pré Consultants (2021) SimaPro 9.2.0.1 [Computer Software]. Amersfoort, The Netherlands.

REACH candidate list

ECHA, REACH Candidate List of substances of very high concern for Authorisation



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