

# ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A1

Owner of the Declaration	Stiferite
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-STF-20200243-CBA3-EN
Issue date	18.12.2020
Valid to	17.12.2025

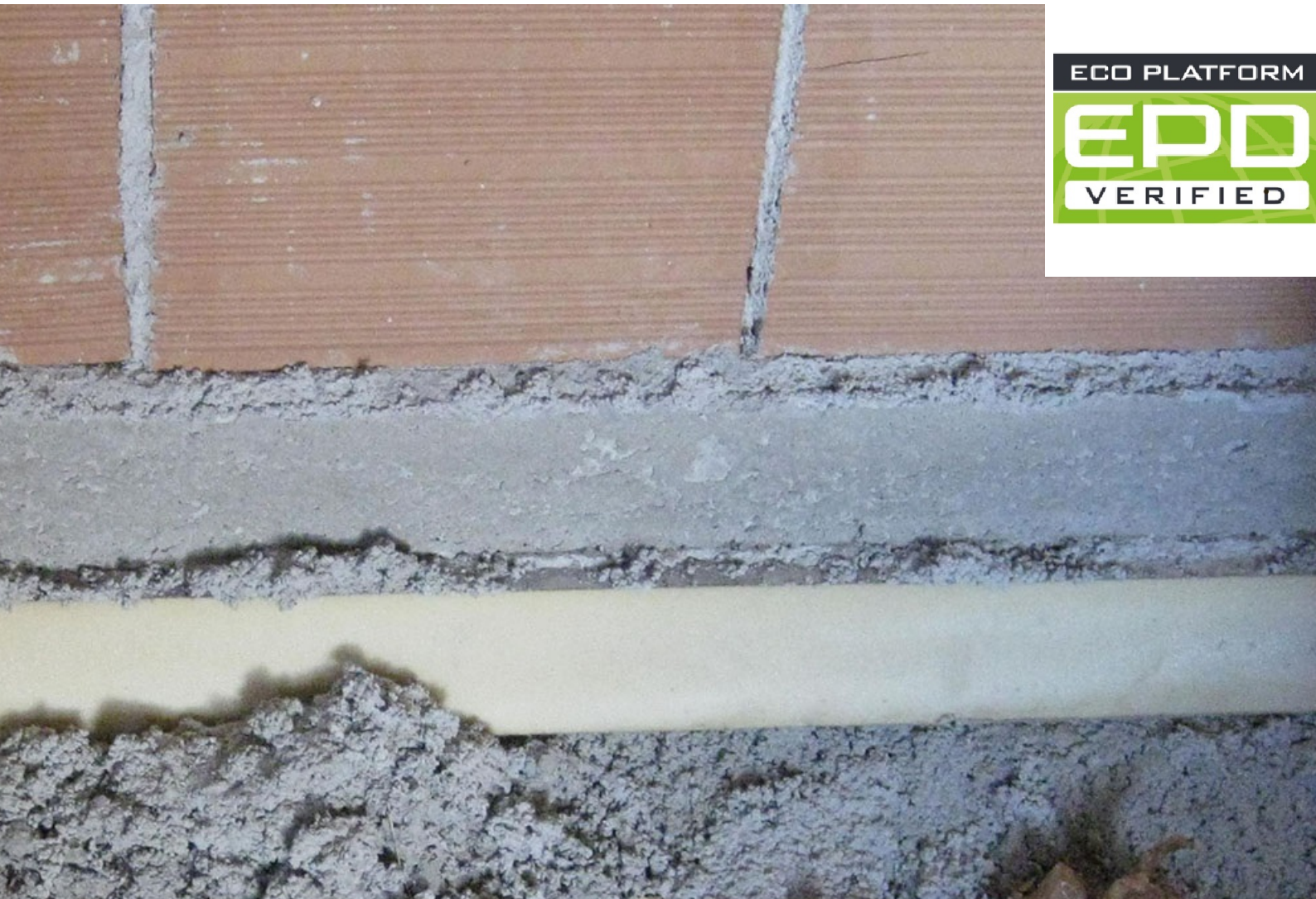
**Stiferite BB average thick panel**  
**Stiferite**

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ECO PLATFORM

**EPD**  
VERIFIED



## General Information

### Stiferite

#### Programme holder

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

#### Declaration number

EPD-STF-20200243-CBA3-EN

#### This declaration is based on the product category rules:

Insulating materials made of foam plastics, 01.08.2021  
(PCR checked and approved by the SVR)

#### Issue date

18.12.2020

#### Valid to

17.12.2025



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



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

### Stiferite BB average thick panel

#### Owner of the declaration

Stiferite  
Viale Navigazione Interna 54  
35129 Padova  
Italy

#### Declared product / declared unit

STIFERITE BB expanded rigid polyurethane foam, covered on both sides by bituminous paper facers, and produced by Stiferite. The EPD applies to 1 m<sup>2</sup> of an average 75 mm thick PIR sandwich board, i.e. 0.075 m<sup>3</sup>, with an average density between foam and facing of 31.3 kg/m<sup>3</sup>.

#### Scope:

Stiferite spa produces **STIFERITE BB** that is a high performance insulation board manufactured from closed cell expanded rigid polyurethane foam, covered on both sides by bituminous paper facers. The data have been provided by the only Stiferite factory that was located in Padova (Italy) for the year 2019. 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

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The EPD was created according to the specifications of EN 15804+A1. 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



Prof. Dr. Birgit Grahl,  
(Independent verifier)

## Product

### Product description/Product definition

STIFERITE'S thermo insulation panels are mainly used in the building/construction sector and that of industrial insulation.

The panels are made of thermo-setting closed cells polyurethane foam (PU) supplied with various types of flexible facers on both sides of the panel. The nature/type of facer contributes to the performance characteristics of the product and its application.

Expanded rigid polyurethane foam is distinguished by its' excellent thermo insulation performance, mechanical resistance, workability, lightness, and durability.

The performance of STIFERITE'S panels is determined based on the European norm *EN 13165:2012+A2:2016 Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products - Specification*.

This EPD refers to STIFERITE BB Average thick panel, made of an insulation component in polyurethane foam using blowing agent Pentane-based, covered on both sides by bituminous paper.

The panel is produced in standard dimensions of 600 x 1200 mm and straight finish borders. Upon request and for minimum quantities, the panels may be produced in various dimensions. STIFERITE BB Average thick panel is produced by a certified company with systems: *ISO 9001*, *ISO 45001*, *ISO 14001* in its entire line of products. For the placing on the market of the product 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 *EN 13165:2012+A2:2016 Thermal insulation products for building- factory made rigid polyurethane foam (PU) products - Specification* and the CE-marking. For the application and use the respective national provisions apply.

### Application

The STIFERITE BB panel is suited for walk-on roofs, paved roofs and floor insulation.

### Technical Data

The data provided by the Declaration of Performance apply. In this Life Cycle Assessment, a PU insulation board with the following properties has been regarded:

### Constructional data

Name	Value	Unit
Gross density	31.3	kg/m <sup>3</sup>
Declared average Thermal conductivity $\lambda_D$ acc. to /EN 13165/	0.027	W/mK
Compressive strength at 10% deformation acc. to /EN 826/	> 150	kPa
Tensile strength perpendicular to the face acc. to /EN 1607/	> 40	kPa
Water absorption by total immersion acc. to /EN 12087/	< 5	Vol.- %
Water absorption by partial immersion acc. to /EN 1609/	< 0.3	kg/m <sup>2</sup>
Water vapour diffusion resistance factor $\mu$ acc. to /EN 12086/	87	
Euroclass reaction to fire acc. to /EN 11925/	F	

## LCA: Calculation rules

### Declared Unit

This provides a thermal resistance  $R = 2.73 \text{ m}^2 \text{ k/W}$ .

### Base materials/Ancillary materials

**Core material** (about 78.8 % of the weight of the declared unit):

Closed-cell Polyiso (PIR) rigid foam made from MDI (50-65 %), polyols (20-30 %), pentane (4-5 %) and additives (4-7 %).

**Facing** (about 26,1 % of the weight of the declared unit): bituminous paper consisting of kraft paper (60-70%) and bitumen (40-30%).

The PU board for insulation:

- This product/article/at least one partial article contains substances listed in the candidate list (date: 17.11.2020) exceeding 0.1 percentage by mass: no
- This product/article/at least one partial article doesn't contain other 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

Additional declaration according to quoted law: The product is compliant with all requirements indicated at chapter 2.5.7 'Isolanti termici ed acustici' of the n.256 D.L. of the 23th June 2022 (CAM EDILIZIA):

- Any blowing agent with Ozone depletion potential  $>0$  is not used in production
- Any substances of Very High Concern-SVHC in concentration of more than 0,1 %w are not used in production (REACH n. 1907/2006). Any specific authorizations for use are eserved provided for by the same Regulation for the substances included in Annex XIV and specifications restrictions set out in Annex XVII of the Regulation.
- Catalysts lead-based are not used in production
- Flame retardants used in production (belonging to the Organophosphorus class) are not banned by any national or European regulation
- According to the raw materials declarations of suppliers the minimum amount of recycled raw materials based on the insulation board (PU foam and facers) weight is 3 %w and the minimum amount of recycled raw materials based on the PU insulation foam weight is 4 %w (note: this information is not explicitly considered in the LCA and not included in the EPD tables that only refer to recycling content in the foreground system).

### Reference service life

The durability of insulation panels is normally at least as long as the lifetime of the building in which it is used. The experimental data show that the reference life is longer than 50 years, *Clima 2019*.

The declared unit is  $1 \text{ m}^2$  with an average thickness of 75 mm, e. g.  $0.075 \text{ m}^3$ . Corresponding conversion factors are listed in the table below.



#### Declared unit

Name	Value	Unit
Declared unit	1	m <sup>2</sup>
Gross density	31.3	kg/m <sup>3</sup>
Volume	0.075	m <sup>3</sup>
Grammage	235	kg/m <sup>2</sup>
Declared average thermal conductivity λD	0.027	W/mK
Layer thickness	0.075	m
Conversion factor to 1 kg	2.35	kg/m <sup>2</sup>
Weight of declared unit	2.35	kg/m <sup>2</sup>

This provides a thermal resistance R = 2.73 m<sup>2</sup>K/W.

The LCI data used in this report refer to an average product having an average thickness (material in the repipes of different thicknesses are weighted according to the relative production in square meters). The type of declaration is 1 c - declaration of an average product from a manufacturer's plant.

#### System boundary

This life cycle assessment for the production of the polyurethane insulation board considers the life cycle from the supply of raw materials to the manufacturer's gate (cradle-to-gate with options). It also includes the transport to the

construction site, the installation and the end-of-life stage of the used PU thermal insulation board. The life cycle is split into the following individual phases:

- A1 - Raw material formulation
- A2 - Raw material transport
- A3 - Production of the insulation board and packaging material
- A4 - Transport to the construction site
- A5 - Emissions and cutting losses during installation and packaging disposal
- C2 - Transport to end of life
- C3/C4 - End-of-Life: waste management (thermal recovery, landfill)
- D - Benefits and loads beyond system boundary

#### Geographic Representativeness

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

#### 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. For life cycle modelling of the considered products, the *GaBi 9 2020* has been used.

### LCA: Scenarios and additional technical information

The following technical scenario information is required for the declared modules and optional for non-declared modules. Modules for which no information is declared can be deleted; additional information can also be listed if necessary.

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared (MND).

A5 is not declared including the disposal of the packaging material on the construction site, the amounts of packaging materials included in the LCA calculations must be declared as technical scenario information for Module A5.

#### Transport to the building site (A4)

The distances calculated are weighted average distances according to the overall sales distribution; such distribution is considered similar for all Stiferite products.

Name	Value	Unit
Truck with a capacity of 17.3 tons	270	km
Ferry with a capacity of 1200-10000 dwt payload capacity	124	km
Ship with a capacity of 27500 dwt payload capacity tons	11000	km
Plane with a capacity of 22 ton	0	km

#### Installation into the building (A5)

Name	Value	Unit
Material loss	0.0469	kg
VOC in the air Pentane	1.27E-06	kg

#### End of life (C1-C4)

The results for the end-of-life are declared for the 2 different scenarios:

Name	Value	Unit
Scenario No 1: Material Incineration	100	%
Scenario No 2: Landfill	100	%

C4: Disposal scenarios used is divided into the 2 sub-scenarios:

- 1) Incineration 100% (C4/1)
- 2) Landfilling 100% (C4/2)

D: Benefits and loads beyond system boundary is divided into the 2 sub-scenarios:

- 1) Incineration 100% (D1)
- 2) Landfilling 100% (D2)

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

Name	Value	Unit
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Module D includes credits from recycling materials of insulation panels and packaging, energy credits from thermal recovery of the packaging. The results are declared for the same 3 different scenarios described above.

## LCA: Results

The tables below show the results of the LCA. Basic information on all declared modules provides chapter 4.

There are two scenarios for the end-of-life (C3, C4 and D) analyzed: Scenario 1 considers 100% incineration, Scenario 2 considers 100% landfill disposal.

For SM, RSF, NRSF, CRU indicators only the foreground system is considered.

**DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE 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	X	X	MND	MND	MNR	MNR	MNR	MND	MND	MND	X	X	X	X

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m<sup>2</sup> BB insulation panel

Parameter	Unit	A1-A3	A4	A5	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
GWP	kg CO <sub>2</sub> eq	5.37E+00	4.44E-02	8.71E-01	1.1E-02	0	0	4.47E+00	3.58E+01	-2.01E+00	-1.46E+00
ODP	kg CFC11 eq	8.34E-06	9.77E-18	1.67E-07	2.74E-18	0	0	2.63E-15	1.32E-14	-4.25E-14	-4.28E-14
AP	kg SO <sub>2</sub> eq	1.21E-02	4.04E-04	5.27E-04	2.42E-05	0	0	1.88E-03	1.29E-02	-3.32E-03	-3.02E-03
EP	kg PO <sub>4</sub> <sup>3</sup> eq	2.38E-03	5.41E-05	1.34E-03	5.87E-06	0	0	4.53E-04	6.43E-02	-3.89E-04	-3.35E-04
POCP	kg Ethen eq	1.03E-02	-7.64E-06	3.85E-04	-7.79E-06	0	0	1.2E-04	8.86E-03	-2.66E-04	-2.17E-04
ADPE	kg Sb eq	1.12E-05	3.4E-09	2.44E-07	1.01E-09	0	0	1.13E-07	7.48E-07	-5.05E-07	-4.82E-07
ADPF	MJ	1.3E+02	5.89E-01	3.78E+00	1.49E-01	0	0	2.04E+00	5.27E+01	-2.63E+01	-1.67E+01

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

### RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 m<sup>2</sup> BB insulation panel

Parameter	Unit	A1-A3	A4	A5	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
PERE	MJ	2.34E+01	IND	6.11E-01	IND	IND	IND	6.48E-01	IND	IND	IND
PERM	MJ	2.21E+00	IND	0	IND	IND	IND	0	IND	IND	IND
PERT	MJ	2.56E+01	2.69E-02	6.11E-01	8.63E-03	0	0	6.48E-01	4.25E+00	-1.13E+01	-1.14E+01
PENRE	MJ	6.18E+01	IND	2.95E+00	IND	IND	IND	7.68E+01	IND	IND	IND
PENRM	MJ	7.6E+01	IND	-1.72E+00	IND	IND	IND	-7.43E+01	IND	IND	IND
PENRT	MJ	1.38E+02	5.92E-01	1.22E+00	1.5E-01	0	0	2.54E+00	5.47E+01	-3.6E+01	-2.65E+01
SM	kg	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0
FW	m <sup>3</sup>	6.01E-02	3.16E-05	1.43E-03	1.01E-05	0	0	1.07E-02	5.49E-03	-1.31E-02	-1.32E-02

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

### RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 m<sup>2</sup> BB insulation panel

Parameter	Unit	A1-A3	A4	A5	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
HWD	kg	1.08E-05	2.13E-08	2.2E-07	6.93E-09	0	0	2.79E-09	2.01E-07	-1.42E-08	-1.09E-08
NHWD	kg	1.23E-01	8.64E-05	9.13E-01	2.37E-05	0	0	2.25E-01	4.47E+01	-1.96E-02	-1.83E-02
RWD	kg	2.93E-03	9.94E-07	8.09E-05	2.76E-07	0	0	1.98E-04	7.93E-04	-3.85E-03	-3.88E-03
CRU	kg	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	1.37E-02	0	0	0	0	0	0	0
MER	kg	0	0	1.56E-02	0	0	0	2.35E+00	0	0	0
EEE	MJ	0	0	3.39E-01	0	0	0	1.25E+01	1.26E+01	0	0
EET	MJ	0	0	1.56E-01	0	0	0	7.85E+00	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, 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 as there is limited experience with the indicator.

## References

### Standards

#### EN 15804

EN 15804:2012-04+A1 2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

#### ISO 14025

EN ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

#### IBU 2016

Institut Bauen und Umwelt e.V.: General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V. Version 1., Berlin: Institut Bauen und Umwelt e.V., 2016.  
[www.ibu-epd.com](http://www.ibu-epd.com)

#### EN 13165

EN 13165:2012+A2:2016 Thermal insulation products for buildings - Factory made rigid polyurethane foam (PU) products - Specification

#### EN 826

EN 826:2013 Determination of Compression Behavior of Thermal Insulation Products

#### EN 1607

EN 1607: 2013 Thermal insulating products for building applications. Determination of tensile strength perpendicular to faces

#### EN 12087

EN 12087:2013 Thermal insulating products for building applications. Determination of long term water absorption by immersion.

#### EN 1609

EN 1609: Thermal insulating products for building applications. Determination of short term water absorption by partial immersion.

#### EN 12086

EN 12086: 2013 Thermal insulating products for building applications. Determination of water vapour transmission properties.

#### EN 11925

EN 11925:2010 Reaction to fire tests. Ignitability of products subjected to direct impingement of flame. Single-flame source test.

#### ISO 9001

ISO 9001:2015 Quality management

#### ISO 14001

ISO 14001: 2015 Environmental management systems

#### ISO 45001

ISO 45001: 2018 Occupational health and safety management systems

### Further References

#### BNB

Bewertungssystem Nachhaltiges Bauen (en: assessment system sustainable building)  
<https://www.bbsr.bund.de/BBSR/EN/RP/FutureBuilding/2SustainableBuilding/391866&notFirst=true&docId=390900>

#### Candidate List

<https://echa.europa.eu/it/candidate-list-table> (date 17.11.2020)

#### CLIMA 2019

CLIMA 2019 Paper Polyurethane 'Environmental Impacts for a Polyurethane Panel' E. Guolo, F. Cappelletti, P. Romagnoni, F. Raggiotto

#### GaBi 9 2020

GaBi 9: Documentation of GaBi 9: Software-System and Database for Life Cycle Engineering. Copyright, TM. Stuttgart, Leinfelden-Echterdingen, 1992-2020  
<http://www.gabi-software.com>

#### PANGPP 2017

Piano d' Azione Nazionale sul *Green Public Procurement* (PANGPP) – Gazzetta Ufficiale della Repubblica Italiana, Serie Generale n.17, 11-10-2017,  
[http://www.minambiente.it/sites/default/files/archivio/allegati/GPP/GPP\\_](http://www.minambiente.it/sites/default/files/archivio/allegati/GPP/GPP_)

#### PCR Part A

Rules for Building-Related Products and Services. Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. Version 06.2017

#### PCR Part B

PCR Guidance-Texts for Building-Related Products and Services; Part B: Requirements on the EPD for Insulating materials made of foam plastics; Institute Construction and Environment e.V. (IBU). Version 06.2017  
<https://epd-online.com>

#### REACH

REACH Registration, Evaluation, Authorization and Restriction of Chemical, 2007

#### CLIMA 2019\_PaperPolyurethane



## Publisher

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