ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A1*

Owner of the Declaration	Isolparma
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ISL-20200306-CBA2-EN
Issue date	18.12.2020
Valid to	17.12.2025

ISOLPARMA Pendenzato RF8 average thick panel

Isolparma

Institut Bauen und Umwelt e.V.

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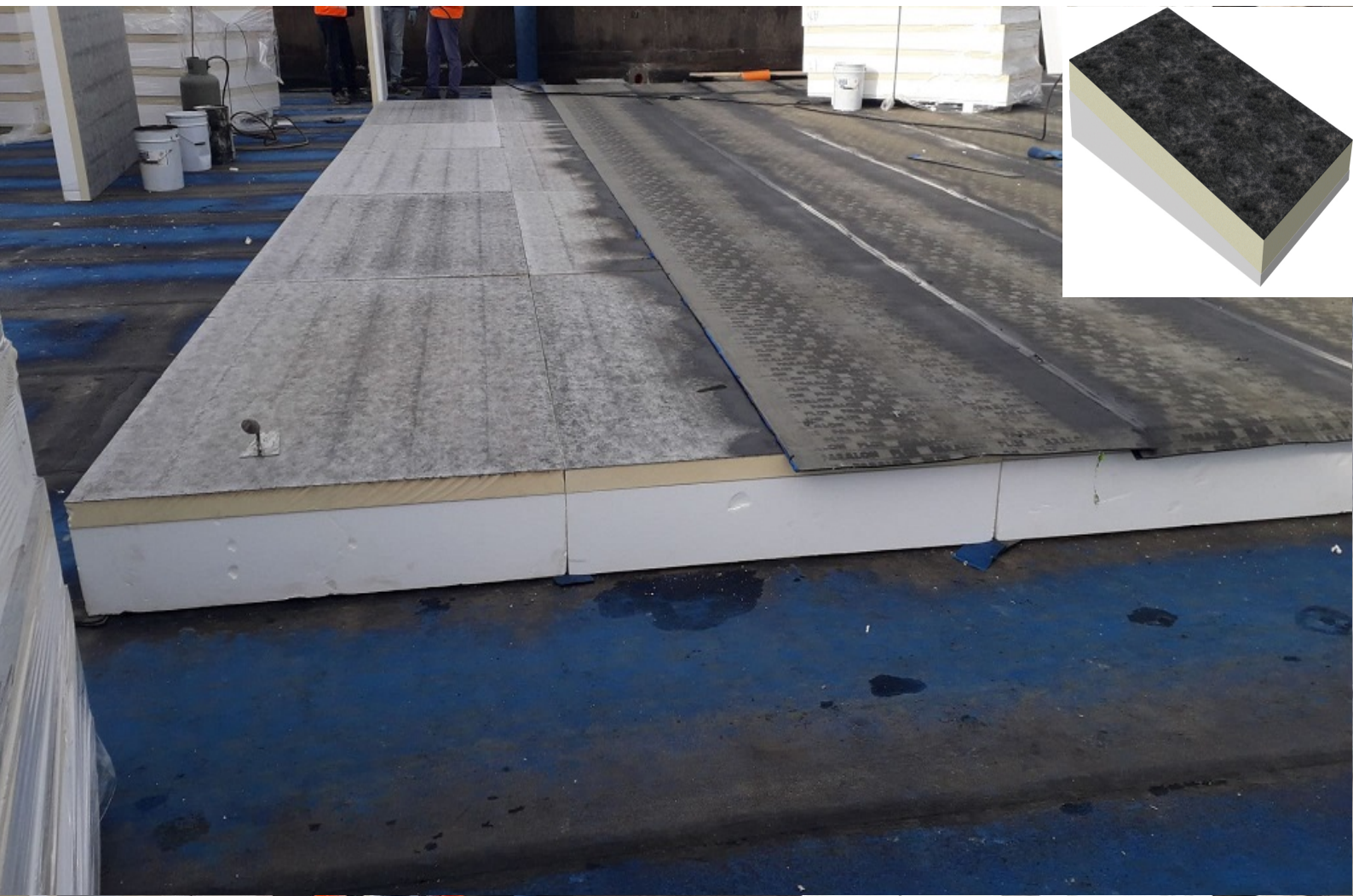

General Information

Isolparma

Programme holder
IBU – Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-ISL-20200306-CBA2-EN

This declaration is based on the product category rules:
Insulating materials made of foam plastics, 06.2017
(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.)

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.))

ISOLPARMA Pendenzato RF8 insulation panel

Owner of the declaration
Isolparma
Piazza L. Da Porto, n. 14

35131 | Padova | PD | Italy

Declared product / declared unit
ISOLPARMA Pendenzato RF8 is a composite panel made by a base side by EPS and a top side based on ISOLPARMA RF8, expanded rigid polyurethane foam, covered on top side by bituminous glass fibres, and produced by Isolparma. The EPD applies to 1 m^2 of a average 122 mm thick PUR sandwich board, i.e. 0.122 m^3, with an average density between foam and facing of 32.1 kg/m^3.

Scope:
Isolparma produces **ISOLPARMA Pendenzato RF8** is a composite panel made by a base side by EPS and a top side based on Isolparma RF8, expanded rigid polyurethane foam, covered on top side by bituminous glass fibres.The data have been provided by the only Isolparma 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 14025:2010*
☐ internally ☒ externally

Prof. Dr. Birgit Grahl
(Independent verifier)

Product

Product description/Product definition
Isolparma's thermo insulation panels are mainly used in the building/construction sector or 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 good thermo insulation performance, mechanical resistance, workability, lightness, and durability.

The performance of Isolparma'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*/ for polyurethane insulation board and on the European norm *EN 13163:2012+A2:2016 Thermal insultaion for building-factory made expanded polystyrene (EPS) products - Specification* for polystyrene insulation board.
This EPD refers to Isolparma PENDENZATO RF8 Average thick panel, made of an insulation component in polyurethane foam using blowing agent Pentane-

based, covered on top side by bituminous glass fibers, and on the bottom side of an insulation component in EPS with a slope shape.

The panel is produced in standard dimensions of as request by the customers and straight finish borders. The surface of the panel may be evened off by sandpaper in order to allow installation to uneven surfaces. Isolparma PENDENZATO RF8 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 EuropeanUnion/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of perfomance taking into consideration for polyurethane side *EU 13165:2012+A2:2016 Thermal insultaion for building-factory made rigid polyurethane foam (PU) products – Specification* and the CE marking, and for EPS side *EN 13163:2012+A2:2016 Thermal insultaion for building-factory made expanded polystyrene (EPS) products– Specification* and the CE marking. For the application and use the respective national provisions apply.

Application

The Isolparma Pendenzato RF8 panel is suited for roofs under bituminous waterproofing mantles and where high resistance to a flame torch is required.

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	32.1	kg/m³
Declared Average Thermal conductivity λD acc. to /EN 13165/	PU:0.027, EPS:0.033	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/	< 2	Vol.-%
Water absorption by partial immersion acc. to /EN 1609/	< 0.1	kg/m²
Water vapour diffusion resistance factor μ acc. to /EN 12086/	PU:33, EPS:30-70	
Euroclass reaction to fire acc. to /EN 11925/	F	

This provides a thermal resistance R = 4.14 m² k/W.

The LCI data used in this report refer to an average product having an average thickness (materials in the recipes 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.

Base materials/Ancillary materials

PU insulation panel (about 53,1 % 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%).
PU Facing (about 14,6 % of the weight of the declared unit): upper and lower facing consisting of bitumen (40-60 %), PP (4-10 %), urea-formaldehyde (1-5 %), calcium carbonate (1-5%) and glass fibre (30-40 %).
EPS insulation panels: about 32,3 %

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 2.4.2.9 of the *PANGPP 2017*:

- Any blowing agent with Ozone depletion potential >0 is not used in production
- 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*.

LCA: Calculation rules

Declared Unit
The declared unit is 1 m² with an average thickness of 122 mm, e. g. 0.122 m³. Corresponding conversion factors are listed in the table below.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Gross density	32.1	kg/m^3
Volume	0.122	m^3
Grammage	3.92	kg/m^2
Declared average thermal conductivity λD	PU:0.027, EPS:0.033	W/mK
Layer thickness	0.112	m
Conversion factor to 1 kg	3.92	kg/m^2
Weight of declared unit	3.92	kg/m^2

This provides a thermal resistance R = 4.14 m² /W.

The LCI data used in this report refer to an average product having an average thickness (materials in the recipes 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

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

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 Isolparma 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	0.0784	kg
VOC in the air Pentane	1.27E-06	kg

Use or application of the installed product (B1) see section 2.12 "Use"

Name	Value	Unit

Maintenance (B2)

Name	Value	Unit
Information on maintenance	-	-
Maintenance cycle	-	Number/ RSL
Water consumption	-	m^3
Auxiliary	-	kg
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg

Repair (B3)

Name	Value	Unit
Information on the repair process	-	-
Information on the inspection process	-	-
Repair cycle	-	Number/ RSL
Water consumption	-	m^3
Auxiliary	-	kg
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg

Replacement (B4) / Refurbishment (B5)

Name	Value	Unit
Replacement cycle	-	Number/ RSL
Electricity consumption	-	kWh
Litres of fuel	-	l/100km
Replacement of worn parts	-	kg

Reference service life

Name	Value	Unit
Reference service life	-	a
Life Span (according to BBSR)	-	a
Life Span according to the manufacturer	-	a
Declared product properties (at the gate) and finishes	-	-
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	-	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	-	-
Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	-	-
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	-	-
Usage conditions, e.g. frequency of use, mechanical exposure	-	-
Maintenance e.g. required frequency, type and quality and replacement of components	-	-

Operational energy use (B6) and Operational water use (B7)

Name	Value	Unit
Water consumption	-	m^3
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Equipment output	-	kW

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 are 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

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.
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 m² PENDENZATO RF8 average thickness panel

Parameter	Unit	A1-A3	A4	A5	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
GWP	[kg CO_2-Eq.]	9.72E+0	7.36E-2	2.51E-1	1.84E-2	0.00E+0	0.00E+0	7.88E+0	4.46E-1	-3.79E+0	-4.42E-2
ODP	[kg CFC11-Eq.]	1.00E-5	1.62E-17	2.00E-7	4.57E-18	0.00E+0	0.00E+0	5.53E-15	3.68E-15	-6.84E-14	-6.24E-16
AP	[kg SO_2-Eq.]	2.22E-2	6.69E-4	4.94E-4	4.04E-5	0.00E+0	0.00E+0	3.02E-3	8.86E-4	-5.61E-3	-5.47E-5
EP	[kg $(PO_4)^{3-}$-Eq.]	2.86E-3	8.97E-5	6.99E-5	9.81E-6	0.00E+0	0.00E+0	6.14E-4	3.24E-4	-6.74E-4	-7.35E-6
POCP	[kg ethene-Eq.]	1.25E-2	-1.27E-5	2.52E-4	-1.30E-5	0.00E+0	0.00E+0	1.77E-4	7.05E-5	-4.73E-4	-6.38E-6
ADPE	[kg Sb-Eq.]	3.39E-5	5.64E-9	6.87E-7	1.69E-9	0.00E+0	0.00E+0	3.82E-7	1.58E-7	-8.44E-7	-1.02E-8
ADPF	[MJ]	2.52E+2	9.77E-1	5.24E+0	2.49E-1	0.00E+0	0.00E+0	4.24E+0	3.35E+0	-5.14E+1	-1.06E+0

Caption	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 m² PENDENZATO RF8 average thickness panel

Parameter	Unit	A1-A3	A4	A5	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
PERE	[MJ]	1.16E+1	IND	2.66E-1	IND	IND	IND	1.32E+0	IND	IND	IND
PERM	[MJ]	0.00E+0	IND	0.00E+0	IND	IND	IND	0.00E+0	IND	IND	IND
PERT	[MJ]	1.16E+1	4.46E-2	2.66E-1	1.44E-2	0.00E+0	0.00E+0	1.32E+0	9.56E-1	-1.82E+1	-1.36E-1
PENRE	[MJ]	1.19E+2	IND	1.94E+0	IND	IND	IND	1.48E+2	IND	IND	IND
PENRM	[MJ]	1.44E+2	IND	-1.72E+0	IND	IND	IND	-1.43E+2	IND	IND	IND
PENRT	[MJ]	2.63E+2	9.81E-1	2.21E-1	2.50E-1	0.00E+0	0.00E+0	5.21E+0	4.04E+0	-6.70E+1	-1.14E+0
SM	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m^3]	6.09E-2	5.25E-5	1.36E-3	1.68E-5	0.00E+0	0.00E+0	1.97E-2	1.06E-3	-2.10E-2	-1.87E-4

Caption	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 m² PENDENZATO RF8 average thickness panel

Parameter	Unit	A1-A3	A4	A5	C2	C3/1	C3/2	C4/1	C4/2	D/1	D/2
HWD	[kg]	1.06E-3	3.53E-8	2.11E-5	1.16E-8	0.00E+0	0.00E+0	9.71E-9	1.52E-8	-2.65E-8	-3.77E-10
NHWD	[kg]	2.01E-1	1.43E-4	9.82E-2	3.97E-5	0.00E+0	0.00E+0	7.72E-1	3.88E+0	-3.36E-2	-3.58E-4
RWD	[kg]	4.39E-3	1.65E-6	9.96E-5	4.61E-7	0.00E+0	0.00E+0	3.82E-4	2.72E-4	-6.20E-3	-3.47E-5
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	1.37E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	1.56E-2	0.00E+0	0.00E+0	0.00E+0	3.92E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	8.65E-2	0.00E+0	0.00E+0	0.00E+0	2.06E+1	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	1.56E-1	0.00E+0	0.00E+0	0.00E+0	1.96E+1	0.00E+0	0.00E+0	0.00E+0

Caption	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

References

Standards

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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.

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EN 13163
EN 13163:2012+A2:2016 Thermal insultaion for building-factory made expanded polystyrene (EPS) products - Specification

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/2SustainableBuildingQuality/2009/ServiceLife/01_Start_dossier.html?nn=391866&notFirst=true&docId=390900

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

Clima 2019
Clima 2019 PaperPolyurethane
“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_CAM_Edilizia.pdf

PCR Part A
Product Category 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

Publisher
Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Programme holder
Institut Bauen und Umwelt e.V.
Panoramastr 1
10178 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Author of the Life Cycle Assessment
thinkstep Italy
Via Bovini 43
48123 Ravenna
Italy

Tel +39 0544 467132
Fax +39 0544 501464
Mail info@thinkstep.com
Web **www.thinkstep.com**

Owner of the Declaration
Isolparma srl
Piazza Luigi da Porto 14
35131 Padova
Italy

Tel 049 9126213
Fax 049 9129616
Mail info@isolparma.it
Web **www.isolparma.it**