ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	**EXIBA - European Extruded Polystyrene Insulation Board Association**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-EXI-20140155-IBE1-EN
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Valid to	11.11.2019

Extruded Polystyrene (XPS) Foam Insulation with alternative flame retardant

EXIBA - European Extruded Polystyrene Insulation Board Association

Institut Bauen und Umwelt e.V.

www.bau-umwelt.com / https://epd-online.com

1. General Information

EXIBA - European Extruded Polystyrene Insulation Board Association

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

Declaration number
EPD-EXI-20140155-IBE1-EN

This Declaration is based on the Product Category Rules:
Insulating materials made of foam plastics, 07.2014
(PCR tested and approved by the independent expert committee)

Issue date
12.11.2014

Valid to
11.11.2019

Prof. Dr.-Ing. Horst J. Bossenmayer
(President of Institut Bauen und Umwelt e.V.)

Dr. Burkhart Lehmann
(Managing Director IBU)

Extruded Polystyrene (XPS) Foam Insulation

Owner of the Declaration
EXIBA - European Extruded Polystyrene Insulation Board Association
Avenue E. van Nieuwenhuyse, 4
1160 Brussels
Belgium

Declared product / Declared unit
XPS (extruded polystyrene foam) boards produced by the EXIBA members. The EPD applies to 1 m^2 of 100 mm thick XPS board, i.e. 0.1 m^3, with an average density of 33.7 kg/m^3.

Scope:

The companies contributing to the data collection produce more than 90% of the extruded polystyrene foam boards containing alternative flame retardant sold by the members of the EXIBA association in Europe. The data have been provided by 19 factories out of six companies (BASF, Dow Building Solutions, Fibran, Jackon Insulation, Knauf Insulation and Ursa) for the year 2012.

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.

Verification

The CEN Norm EN 15804 serves as the core PCR
Independent verification of the declaration according to ISO 14025
☐ internally ☒ externally

Prof. Dr. Birgit Grahl
(Independent tester appointed by SVA)

2. Product

2.1 Product description

Extruded polystyrene foam (XPS) is a thermoplastic insulation foam produced according to /EN 13164/ and available in board shape with a density range from 20 to 50 kg/m^3. The boards can be delivered in various compressive strength values from 150 to 700 kPa. To meet the need of various applications the boards are produced with different surfaces: with the extrusion skin, planed, grooved or with thermal embossing. XPS boards are supplied with different edge treatments such as butt edge, ship lap and tongue and groove. The EPD is related to unlaminated XPS products only; lamination and additional product treatment are not considered.
The declared product reflects the European average of the association members.

2.2 Application

The variety of the performance properties of XPS thermal insulation foams make them suitable for use in a large number of applications such as: perimeter insulation, inverted insulation for terrace roofs, insulation of pitched roofs, floor insulation including insulation of highly loaded industrial floors, insulation of thermal bridges for exterior walls, ETICS, insulation of cavity walls, agricultural building ceiling insulation, prefabricated elements e.g. building sandwich panels, insulation for building equipment and industrial installations (pipe sections, …).

2.3 Technical Data

Acoustic properties are not relevant for XPS. For fire performance these products except in Scandinavia achieve the fire classification Euroclass E according to /EN 13501-1/.

Constructional data

Name	Value	Unit
Gross density	20 - 50	kg/m^3
Calculation value for thermal conductivity acc. to /EN 12667/ and /EN 13164/ Annex C	0.03 - 0.041	W/(mK)

Water vapour diffusion resistance factor acc. to /EN 12086/	50 - 250	-
Water absorption after diffusion acc. to /EN 12088/	3 - 5	Vol.-%
Deformation under compressive load and temperature acc. to /EN 1605/	≤ 5	%
Compressive stress or strength at 10% deflection acc. to /EN 826/	150 - 700	kPa
Compressive modulus of elasticity acc. to /EN 826/	10000 - 40000	kPa
Tensile strength perpendicular to faces acc. to /EN 826/	100 - 400	kPa
Compressive creep/long-term comppressive strength acc. to /EN 1606/	< 250	kPa
Freeze-thaw resistance acc. to /EN 12091/	≤ 2	Vol.-%
Dimensional stability acc. to /EN 1604/	≤ 5	%

2.4 Placing on the market / Application rules

XPS foams are labeled with the CE-mark according to EN 13164. These products are additionally approved for use in specific applications under mandatory or voluntary agreement or certification schemes at the national level. These products are controlled and certified by Notified Bodies. A large number of the manufacturing plants are certified according to ISO 9001 and/or ISO 14001.

2.5 Delivery status

Length: 1000-3000 mm; Width: 600-1200 mm;
Thickness: 20-200 mm (320 mm multilayer product)
For the LCA a thickness of 100 mm was considered.

2.6 Base materials / Ancillary materials

XPS foams are mostly made of Polystyrene (90 to 95% by weight – CAS 9003-53-6), blown with carbon dioxide (CAS 124-38-9) and halogen-free co-blowing agents altogether up to 8% by weight.

Basic material	Mass portion
Polystyrene	90 - 95 %
Blowing agents	5 - 8 %
Carbon Dioxide	40 - 80 %
Co-blowing Agents	20 - 60 %
Flame retardant	0.5 - 3 %
Additives (e.g. pigments)	Less than 1%

The alternative flame retardant is used to enable the foam to meet fire performance standards. The foam no longer contains HBCD nor any other /REACH/ SVHC. Other additives are used, e.g. color pigments and processing aids in minor quantity.
Polystyrene is produced from oil and gas therefore it is linked to the availability of these raw materials. Polystyrene is mostly transported by road or sometimes produced on the same site.

2.7 Manufacture

XPS is produced by a continuous extrusion process using electricity as the main power source: polystyrene granules are melted in an extruder and a blowing agent is injected into the extruder under high pressure. The drop in pressure at the exit die causes the polystyrene to foam into a board with homogeneous and closed cell structure.
Then the boards' edges are trimmed, and the product is cut to dimensions. The smooth foam skin resulting from the extrusion process remains on the boards or is removed mechanically for particular board types to achieve better adhesive strength in combination with e.g. concrete, mortar, or construction adhesives. Some boards receive special surface patterns or grooves. Most of XPS foams off-grade material or scrap from production is recycled in the production process of XPS.
A large number of the manufacturing plants are certified according to /ISO 9001/.

2.8 Environment and health during manufacturing

No further health protection measures beyond the regulated measures for manufacturing firms are necessary during all production steps. A large number of the manufacturing plants are certified according to /ISO 14001/.

2.9 Product processing/Installation

Handling recommendations for XPS foams can be found in product and application literature, brochures and data sheets provided directly by suppliers or available from the internet. There are no special required instructions regarding personal precautions and environmental protection during the product handling and installation.

2.10 Packaging

The polyethylene-based packaging film is recyclable and actually recycled in those countries having a return system.

2.11 Condition of use

Water pick-up by capillarity does generally not occur with XPS foams due to their closed cell structure. The thermal insulation performance of XPS is practically not affected by exposure to water or water vapour. Usually maintenance will not be required, if the XPS boards are installed according to handling installation requirements (see: Installation description).

2.12 Environment and health during use

XPS product is in most applications not in direct contact with the environment nor with the indoor air. There is no significant release of substances from the product as installed during its service life, as confirmed by the best possible ratings obtained in existing VOC emission schemes; e. g. /AgBB/.

2.13 Reference service life

The durability of XPS foam is normally at least as long as the lifetime of the building in which it is used. This is explained by the superior mechanical and water resistance properties of these products.

2.14 Extraordinary effects

Fire

XPS products except in Scandinavia achieve the fire classification Euroclass E according to EN 13501-1. If the contact with the external flame stops, neither further burning nor smouldering can be observed. Ignition of the foam can only be observed after longer small flame exposures.

Fire performance

Name	Value
Building material class	E
Burning droplets	-
Smoke gas development	-

Water
Water pick-up by capillarity does generally not occur with XPS foams due to their closed cell structure. The thermal insulation performance of XPS is practically not affected by exposure to water or water vapour.

Mechanical destruction
Not relevant for XPS products that have superior mechanical properties.

2.15 Re-use phase
In order to maximize the potential to re-use XPS boards, one must avoid that they are damaged or glued. Instead separation layers between the insulation and the concrete should be used or mechanical fixation should be applied.
In the inverted roof application XPS boards are installed loose laid and therefore can be easily removed and reused on another roof. For existing conventional flat-roofs the XPS boards can stay in place when for example the existing roof construction is thermally upgraded as a plus-roof. Recovered XPS boards from mechanically fixed applications can be reused for insulation of basement walls and foundations.
Due to the high calorific value of polystyrene, energy embedded in XPS boards can be recovered in municipal waste incinerators equipped with energy recovery units for steam and electricity generation and district heating.

2.16 Disposal
XPS boards that cannot be easily retrieved from the building are usually landfilled. The material is assigned to the waste category: 17 06 04 insulation materials other than those mentioned in 17 06 01 (insulation materials containing asbestos) and 17 06 03 (other insulation materials consisting of or containing dangerous substances).

2.17 Further information
Additional information can be found at the following Webpages:
www.exiba.org
www.austrotherm.com/en
www.styrodur.de
www.dowbuildingsolutions.eu
www.fibran.com
www.jackon-insulation.com/en
www.knaufinsulation.com
www.ediltec.com
www.sirapinsulation.com
www.ursa.es

3. LCA: Calculation rules

3.1 Declared Unit
The declared unit is 1 m² with a thickness of 100 mm, e.g. 0.1 m³. The declared product reflects the European average of the association members weighted for market share.
Corresponding conversion factors are listed in the table below.

Declared unit

Name	Value	Unit
Declared unit with thickness 100 mm	1	m^2
Conversion factor to 1 kg	0.3	-
Gross density	33.7	kg/m^3
Declared unit	0.1	m^3

For XPS products with densities or thickness different from the reference density of 33.7 kg/m^3 the environmental impacts may be calculated using the following equation:

$$I_{adap} = I_{ref} \times \frac{\rho_{adap}}{\rho_{ref}} \times \frac{d_{adap}}{d_{ref}}$$

Iadap – adapted LCIA indicator or LCI parameter
Iref – LCIA indicator or LCI parameter for reference density of 33.7kg/m^3
ρradap – adapted density
ρref – reference density 33.7 kg/m^3
dadap – adapted board thickness
dref – thickness of reference board (100 mm)

Exceptions are categories, which are not mainly driven by raw material consumption respective mass. That applies to acidification potential and ozone depletion potential. These two categories do not correlate with the mass of the product and cannot be evaluated that way.

3.2 System boundary
Type of EPD: cradle-to-gate (A1 - A3) – with options
The following modules are considered in the Life Cycle Assessment:
- Raw material supply (A1),
- Transport to manufacturer (A2),
- Manufacturing (A3),
- Transport to construction site (A4)
- Transport to EoL (C2),
- Disposal (C4) with two scenarios (landfill (sc. 1) and thermal treatment (sc. 2)
- Reuse, recovery or recycling potential (D) - beyond system boundary.

3.3 Estimates and assumptions
The environmental profile of the flame retardant is based on valid estimations, based on literature data, basically /Ullmanns/.

3.4 Cut-off criteria
In the assessment, all available data from production process are considered, i.e. all raw materials used, utilised thermal energy, and electric power consumption using best available LCI datasets.
A few additives with low mass ratio were not addressed in the questionnaire. These filler materials and pigments underrun a ratio of 5 mass-% of total material input. Used fillers are e. g. talc and citric acid, which do not have relevant impacts in regard to the considered categories. Pigments, which are generally used in all XPS products are included in the declared mass of polystyrene already. The PS granulate is often already coloured. Only environmentally non-hazardous

pigments are applied. The missing filler amount is calculative filled up by polystyrene; thus an under-counting is avoided.

3.5 Background data

Background data is taken from the GaBi software /GaBi 2013/, see www.gabi-software.com/databases.

3.6 Data quality

The foreground data, mainly the raw material and energy consumption during the production process is measured data.
Most of the necessary life cycle inventories are available in the GaBi database. The last update of the database was 2013.

3.7 Period under review

The foreground data collected by the manufacturers are based on yearly production amounts and extrapolations of measurements on specific machines and plants. The production data refer to an average of the year 2012.

3.8 Allocation

There are no co-products generated during the XPS-production. Allocations in the foreground system are done for waste respective recycling materials only.

Allocation for waste materials:
Post-industrial XPS waste from extrusion lines, which does not get reused in the process, is sent to a waste incineration plant.
All applied incineration processes are displayed via a partial stream consideration for the combustion process, according to the specific composition of the incinerated material. For the waste incineration plant an R1-value of 0.6 is assumed.

Resulting electrical and thermal energy is looped inside module A1-A3. The quality of the recovered energy is assumed to be the same as that of the input energy.
In the software model the environmental burdens of the supply chain are displayed via aggregated datasets. Due to this fact thermal energy resulting from incineration processes are credited with a GaBi-process of thermal energy from natural gas (EU-27), integrated in module A1-A3.
Environmental burden of the incineration the product in the EoL-scenario are assigned to the system (C4); resulting benefits for thermal and electrical energy are declared in module D.
Benefits are given according European average data for electrical and thermal energy generated from natural gas.

Allocation for upstream data
For all refinery products, allocation by mass and net calorific value has been applied. The manufacturing route of every refinery product is modelled and the product-specific effort associated with their production is calculated.
For other materials' inventory used in the production process calculation the most suitable allocation rules are applied. Information on single LCIs is documented on http://database-documentation.gabi-software.com/support/gabi/.

3.9 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.

4. LCA: Scenarios and additional technical information

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).
The values refer to the declared unit of 1 m² XPS.

Transport to the building site (A4)

Name	Value	Unit
Payload of truck	5	t
Litres of fuel diesel with maximum load	0.018	l/100km
Transport distance (market-weighted average)	528	km
Capacity utilisation (including empty runs)	70	%
Gross density of products transported	33.7	kg/m³
Capacity utilisation volume factor	1	-

End of life (C1-C4; C2 and C4)

For the End of Life stage two different scenarios are considered. One scenario with 100% landfill (sc. 1) and one scenario with 100% incineration (sc. 2) are calculated. The incineration of XPS results in benefits, beyond the system boundary, for thermal energy and electricity under European conditions.

Name	Value	Unit
Collected separately XPS	3.37	kg
Collected as mixed construction waste	0	kg
Reuse	0	kg
Recycling	0	kg
Landfilling Scenario 1	3.37	kg
Energy recovery Scenario 2	3.37	kg

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

Module D includes the credits of the incineration process C4 (incineration of XPS boards). A waste incineration plant with R1-value < 0.6 is assumed.

5. LCA: Results

The following tables display the environmental relevant results according to EN 15804 for 1 m² XPS board. The two EoL Scenarios are represented in modules C4 and D. C4/1 and D1 reflect the landfilling of XPS, C4/2 and D2 shows the environmental results in case of thermal treatment of XPS-boards.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARYS
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement[1)]	Refurbishment[1)]	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m² XPS board with thickness of 100 mm

Parameter	Unit	A1 - A3	A4	C2	C4/1	C4/2	D/1	D/2
GWP	[kg CO_2-Eq.]	9.444	0.283	0.026	0.241	11.190	0.000	-5.292
ODP	[kg CFC11-Eq.]	1.250E-9	1.350E-12	1.259E-13	9.398E-12	2.913E-11	0.000E+0	-1.678E-9
AP	[kg SO_2-Eq.]	2.661E-2	7.779E-4	7.235E-5	7.488E-4	6.857E-4	0.000E+0	-1.376E-2
EP	[kg $(PO_4)^{3-}$- Eq.]	2.068E-3	1.605E-4	1.493E-5	8.977E-4	1.358E-4	0.000E+0	-9.336E-4
POCP	[kg Ethen Eq.]	2.294E-2	-2.000E-4	-1.860E-5	9.332E-5	8.089E-5	0.000E+0	-1.109E-3
ADPE	[kg Sb Eq.]	4.290E-6	1.066E-8	9.913E-10	4.817E-8	1.502E-7	0.000E+0	-4.359E-7
ADPF	[MJ]	274.000	3.902	0.363	3.480	1.226	0.000	-74.120

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 - RESOURCE USE: 1 m² XPS board with thickness of 100 mm

Parameter	Unit	A1 - A3	A4	C2	C4/1	C4/2	D/1	D/2
PERE	[MJ]	7.218	-	-	-	-	-	-
PERM	[MJ]	0.000	-	-	-	-	-	-
PERT	[MJ]	7.218	0.154	0.014	0.182	0.141	0.000	-7.977
PENRE	[MJ]	152.200	-	-	-	-	-	-
PENRM	[MJ]	134.600	-	-	-	-	-	-
PENRT	[MJ]	286.800	3.915	0.364	3.643	1.427	0.000	-89.900
SM	[kg]	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RSF	[MJ]	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NRSF	[MJ]	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FW	[m^3]	4.395E-2	1.085E-4	1.009E-5	-3.226E-3	2.157E-2	0.000E+0	-1.980E-2

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 – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² XPS board with thickness of 100 mm

Parameter	Unit	A1 - A3	A4	C2	C4/1	C4/2	D/1	D/2
HWD	[kg]	7.332E-3	8.918E-6	8.294E-7	1.209E-4	4.385E-6	0.000E+0	-6.047E-3
NHWD	[kg]	3.771E-2	4.923E-4	4.579E-5	3.357E+0	7.718E-2	0.000E+0	-1.982E-2
RWD	[kg]	5.062E-3	5.126E-6	4.767E-7	6.441E-5	8.320E-5	0.000E+0	-6.285E-3
CRU	[kg]	0.000	0.000	0.000	0.000	0.000	-	-
MFR	[kg]	0.000	0.000	0.000	0.000	0.000	-	-
MER	[kg]	0.000	0.000	0.000	0.000	0.000	-	-
EEE	[MJ]	0.000	0.000	0.000	0.000	0.000	-	-
EET	[MJ]	0.000	0.000	0.000	0.000	0.000	-	-

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; EEE = Exported thermal energy

6. LCA: Interpretation

Overall most of the impact categories and LCI parameters are dominated by the polystyrene (PS) production.
Another very important driver is the electricity consumption during XPS production with 25% contributing to the acidification potential (AP) and even more than 50% to the ozone depletion potential (ODP). Reasons for the acidification potential are the combustion of fossil fuels for power generation with emissions of nitrogen oxides and sulfur oxide. The

ozone depletion is determined by the used cooling agents during nuclear electricity generation.
Emissions of blowing agents during the manufacturing process are of relevant influence within the photochemical ozone creation potential with 85% share rate. In general the transports, the production of blowing agents and flame retardant have low relevance regarding the considered impact categories.
The chosen EoL scenario has a high influence on the results.
Moreover the Eutrophication (EP) is driven to one third by the end of life in case of scenario landfill. But it must be stated that in total the nutrient contamination during XPS production is on a low level. That is one reason for the dominance of the landfill process, another one is rooted in limitations of the LCA landfill model. The deposit of plastics is a very extreme situation, due to the fact, that actually there is no release or depletion within a period of 100 years. This conflicts with background standard values, which consider leakage from a municipal waste landfill body.
The landfill process seems to “generate” fresh water; a negative fresh water use is detectable regarding the fresh water use (FW) in module C4/1 . This is a flow characterization issue due to the fact that the rain water input in contrast to river water output is not considered in regard to fresh water use.
There is a difference detectable regarding primary energy renewable between A1-A3 and the benefit in D/2 (plus 10%). In this study renewable energy is only consumed via the electricity grid mix. Due to the high heating value of XPS the benefit of electricity generated in the waste incineration plant is higher than the requested electricity during manufacturing.
Moreover the additional benefit is caused by the use of different electricity datasets on input and output side. In A1-A3 country-specific electricity data sets are used on base of the market share. In D the model refers to an average EU electricity dataset with higher renewable energy content.

The following figures reflect the global warming potential (GWP) and the primary energy consumption (PENRT) with its contribution to the life cycle stages.

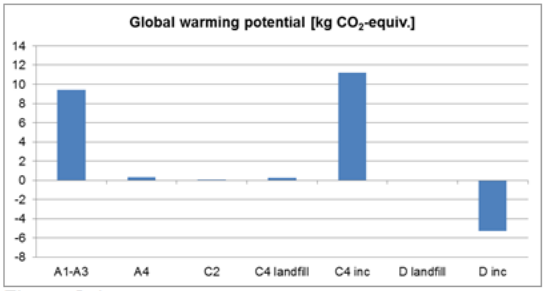

Figure 6-1

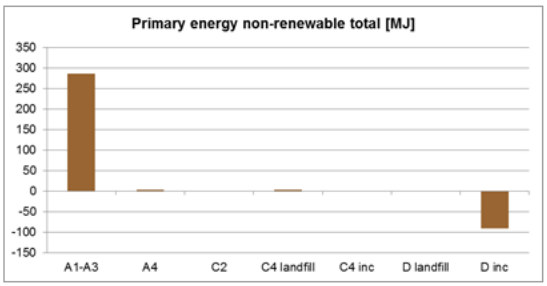

Figure 6-2

7. Requisite evidence

7.1 VOC Emissions

XPS products can be used indoor however they are generally not exposed to the indoor air but covered by a finishing element or system.
The emissions of 14 samples of XPS products from 9 different EXIBA members have been tested by Eurofins Product Testing A/S, Denmark in July 2011. The emission testing meets the requirements of the AgBB/DIBt method.
The tested products all comply with the requirements of DIBt (October 2008) and AgBB (May 2010) for the use in the indoor environment.

VOC Emissions

Name	Value	Unit
Overview of Results (28 days)	-	µg/m³
TVOC (C6 - C16)	0 - 1000	µg/m³
Sum SVOC (C16 - C22)	0 - 100	µg/m³
R (dimensionless)	0 - 1	-
VOC without NIK	0 - 100	µg/m³
Carcinogenic Substances	not detected	µg/m³

7.2 Leaching performance

Leaching behaviour is not relevant for extruded polystyrene foam products.

8. References

Institut Bauen und Umwelt
Institut Bauen und Umwelt e.V., Berlin (pub.): Generation of Environmental Product Declarations (EPDs);

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

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

AgBB
German Committee for Health-Related Evaluation of Building Products, Berlin

DIBt
German Institute for Construction Technology, Berlin

www.dibt.de

PCR 2013, Part A
PCR - Part A: Calculation rules for the Life Cycle Assessment and Requirements on the Background Report, Version 1.2, Institut Bauen und Umwelt e.V., 2013
www.bau-umwelt.com

PCR 2013, Part B
Product category rules for construction products Part B: Requirements of the EPD for foam plastic insulation materials, version 1.5, 2013
www.bau-umwelt.de

ISO 9001
Quality management systems - Requirements

ISO 14001
Environmental management systems - Requirements with guidance for use

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

EN 1604
EN 1604:2013-05: Thermal insulating products for building applications – Determination of dimensional stability under specified temperature and humidity conditions

EN 1605
EN 1605:2013-05: Thermal insulating products for building applications – Determination of deformation under specified compressive load and temperature conditions

EN 1606
2013-05: Thermal insulating products for building applications – Determination of compressive creep

EN 1607
2013-05 Thermal insulating products for building applications – Determination of tensile strength perpendicular to face

EN 12086
2013-06: Thermal insulation products for building applications – Determination of water vapour transmission properties

EN 12088
2013-06: Thermal insulation products for building applications – Determination of long-term water absorption by diffusion

EN 12091
2013-06: Thermal insulation products for building applications – Determination of freeze-thaw resistance

EN 826
2013-05: Thermal insulation products for building applications – Determination of compression behaviour

EN 13501-1
2010-01: Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

EN 12667
2001-05: Thermal performance of buildings materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance

EN 13164
2013-03, Thermal insulation products for buildings – Factory-made extruded polystyrene foam (XPS) products – Specification

AVV
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GaBi 2013
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