ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	**JACKON Insulation GmbH**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-JAI-20200164-IBC1-EN
Issue date	16.03.2021
Valid to	15.03.2026

JACKODUR Plus - Extruded Polystyrene (XPS)
with HFO 1234ze

JACKON Insulation GmbH

Institut Bauen und Umwelt e.V.

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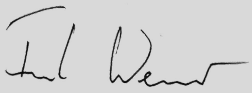
ECO PLATFORM EPD EN 15804 VERIFIED

1. General Information

JACKON Insulation GmbH	XPS insulation panel JACKODUR Plus
Programme holder IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** JACKON Insulation GmbH Carl-Benz-Str. 8 33803 Steinhagen Germany
Declaration number EPD-JAI-20200164-IBC1-EN	**Declared product / declared unit** JACKODUR Plus (extruded polystyrene foam) boards produced by JACKON Insulation GmbH. The EPD applies to 1 m^3 XPS board, with an average density of 35,54 kg/m^3.
This declaration is based on the product category rules: Insulating materials made of foam plastics, 06.2017 (PCR checked and approved by the SVR)	**Scope:** JACKON Insulation as data provider produces the extruded polystyrene foam boards JACKODUR Plus containing HFO 1234ze as blowing agent. The data have been provided by one factory in Arendsee/Germany for the year 2019.
Issue date 16.03.2021	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+A1*. In the following, the standard will be simplified as *EN 15804*.
Valid to 15.03.2026	**Verification** The standard *EN 15804* serves as the core PCR Independent verification of the declaration and data according to *ISO 14025:2010* ☐ internally ☒ externally
 Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)	 Dr. Frank Werner (Independent verifier appointed by SVR)
 Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))	

2. Product

2.1 Product description/Product definition

JACKODUR Plus is an extruded polystyrene foam (XPS) produced according to *EN 13164* and available in board shape with a density range from 30 to 50 kg/m^3, 35,54 kg/m^3 in average (measured). It has specifically low values of thermal conductivity by using Hydrofluoroolefins (HFO)1234 ze as blowing agent. The boards are also called Super XPS in Scandinavia. The boards can be delivered in various compressive strength values from 300 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. JACKODUR Plus boards are supplied with different edge treatments such as butt edge, ship-lap and tongue and groove. The EPD is related to an unlaminated product only; lamination and additional product treatment are not considered.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration *EN 13164*. Thermal Insulation products for buildings and the CE-marking. For the application and use the respective national provisions apply.

2.2 Application

The variety of the performance properties of JACKODUR Plus make it suitable for use in a large number of applications such as: perimeter insulation, inverted roof insulation, insulation of pitched roofs, floor insulation including insulation of highly loaded industrial floors, insulation of thermal bridges for exterior walls, External Thermal Insulation Composite Systems (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 JACKODUR Plus. 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	30 - 50	kg/m³
Calculation value for thermal conductivity acc. to EN 12667 and EN 13164 Annex C	0.025 - 0.027	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	300 - 700	kPa
Compressive modulus of elasticity acc. to EN 826	10000 - 40000	kPa
Tensile strength perpendicular to faces acc. to EN 1607	100 - 400	kPa
Compressive creep/long-term compressive strength acc. to EN 1606	< 250	kPa
Freeze-thaw resistance acc. to EN 12091	≤ 2	Vol.-%
Dimensional stability acc. to EN 1604	≤ 5	%

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 13164*:2012+A1:2015 Thermal Insulation products for buildings.

2.4 Delivery status

Length: 1000-3000 mm; Width: 600-1500 mm; Thickness: 20-320 mm.

2.5 Base materials/Ancillary materials

JACKODUR Plus is mostly made of polystyrene (90 to 95% by weight in the final product – CAS 9003-53-6), blown with fluorinated olefin (HFO1234ze), carbon dioxide (CAS 124-38-9) and halogen-free co-blowing agents altogether up to 8.5% by weight in relation to the material input. The blowing agents are partly emitted during the production process.

Basic material	Mass portion
Polystyrene	90 - 91 %
Blowing agents	8,5 %
HFO 1234ze	~ 70 %
CO2, and Co-blowing Agents	~ 30 %
Flame retardant	0 - 2 %
Additives (e.g. pigments)	< 0,5%

The brominated flame retardant is used to enable the foam to meet fire performance standards. Other additives are used, e. g. colour pigments and processing aids in minor quantity, less than 0.5%. Polystyrene is produced from oil and gas. Therefore it is linked to the availability of these raw materials. Polystyrene is transported by road.

This product contains substances listed in the candidate list of substances of very high concern (REACH Regulation, date:15.01.2019) exceeding 0.1 percentage by mass: **no**
This product contains other Carcinogenic, Mutagenic, Reptrotoxic (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

JACKODUR Plus 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.
JACKODUR Plus foams off-grade material or scrap from production is recycled in the production process of extruded polystyrene foam XPS.
The manufacturing plant in Arendsee/Germany is certified according to *ISO 9001* and *ISO 50001*.

2.7 Environment and health during manufacturing

No further health protection measures beyond the regulated measures for manufacturing firms are necessary during all production steps. The manufacturing plant in Arendsee/Germany is certified according to *ISO 14001*.

2.8 Product processing/Installation

Handling recommendations for JACKODUR Plus 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 instructions required regarding personal precautions and environmental protection during product handling and installation.

2.9 Packaging

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

2.10 Condition of use

Water pick-up by capillarity does generally not occur with JACKODUR plus 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).

2.11 Environment and health during use

JACKODUR Plus is in most applications not in direct contact with the environment nor with the indoor air.

2.12 Reference service life

A reference service life (RSL) according to *ISO 15686* cannot be declared.
The durability of JACKODUR Plus is normally at least as long as the lifetime of the building in which it is used.

2.13 Extraordinary effects

Fire

JACKODUR Plus except in Scandinavia achieves the fire classification Euroclass E according to *EN 13501-1*. If 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

Water

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

Mechanical destruction

Not relevant for JACKODUR Plus.

2.14 Re-use phase

In order to maximize the potential to re-use JACKODUR Plus boards, one must avoid that it is 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 JACKODUR Plus is installed loose laid and therefore can be easily removed and reused on another roof. For existing conventional flat-roofs JACKODUR Plus can stay in place when for example the existing roof construction is thermally upgraded as a Plus-roof. Recovered JACKODUR Plus 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 JACKODUR Plus can be recovered in municipal waste incinerators equipped with energy recovery units for steam and electricity generation and district heating.

2.15 Disposal

JACKODUR Plus 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) European Waste Catalogue, *AVV*.

2.16 Further information

Additional information can be found at the web page www.jackon-insulation.com.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 m^3 XPS.
Corresponding conversion factors are listed in the table below.

Declared unit

Name	Value	Unit
Declared unit	1	m^3
Gross density	35.54	kg/m^3
Conversion factor to 1 kg	35.54	-

JACKODUR Plus is available in several densities and thicknesses. For a product with a density or thickness different from the reference density of 35.54 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 Life Cycle Impact Assessment LCIA indicator or LCI parameter
Iref – LCIA indicator or LCI parameter for reference density of 35.54 kg/m^3
ρradap – adapted density
ρref – reference density 35.54 kg/m^3
dadap – adapted board thickness
dref – thickness of reference board 100mm

3.2 System boundary

Type of EPD: cradle-to-gate (A1 - A3) – with options.
The following modules are considered in the Life Cycle Assessment:

- The raw material supply (A1) comprises the production of polysterene granulate, blowing agents and flame retardants.
- The transport to manufacturer is considered in module A2.
- The manufacturing of XPS (A3) comprises the energy consumption, packaging of the product and auxilliaries.
- Transport to construction site is calculated with 500 km via truck (A4).
- Incineration of packaging materials are considered in module A5.
- Transport to disposal (EoL) is calculated with 50 km via truck (C2).
- For the End-of-Life stage two different scenarios are considered in the LCA. One scenario with 100% landfill (module C4) and one scenario with 100% incineration (module C3) are calculated. The incineration of XPS results in credits for thermal energy and power under European boundary conditions (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 the production process are considered, i.e. all raw materials used, utilised electric power consumption using best available LCI datasets.
The amount of pigments, which underruns a ratio of 0.5 mass-%, is included in the declared mass of polystyrene.

3.5 Background data

Background data is taken from the GaBi software *GaBi ts*, see http://documentation.gabi-software.com/. Additionally, a life cycle inventory (LCI) of an existing study on behalf of Honeywell, covering the impacts of the manufacturing process of HFO1234ze blowing agent, has been used. The LCI is based on the *ecoinvent database*. The producing Honeywell facility is located in the US.

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 *GaBi ts*. The last update of the database was 2020.

3.7 Period under review

The foreground data collected by JACKON Insulation are based on the yearly production amount and extrapolations of measurements on specific machines and plants. The production data refer to an average of the year 2019 in the JACKON plant Arendsee/Germany.

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 is directly reused in the process.
In the End-of-Life scenario, 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.

The environmental burden of the incineration of the product in the EoL-scenario are assigned to the system (C3); resulting potential benefits for thermal and electrical energy are declared in module D. Potential benefits are given according to the 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://documentation.gabi-software.com/.

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.

The used background database is *GaBi ts*.

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 m^3 XPS.

Transport to the building site (A4)

Name	Value	Unit
Payload of truck	5	t
Litres of fuel diesel with maximum load	0.18	l/100km
Transport distance	500	km
Capacity utilisation (including empty runs)	20	%
Gross density of products transported	35.5	kg/m^3
Capacity utilisation volume factor	0.26	-

Installation phase (Module A5)

Packaging waste treatment has been included as incineration of plastics (A5). The incineration of the packaging materials results in benefits, beyond the system boundary, for thermal energy and electricity under European conditions (D).

End of life (C1-C4)

For the End of Life stage, two different scenarios are considered. One scenario with 100% incineration (C3, sc. 1) and one scenario with 100% landfill (C4, sc. 2) are calculated. The incineration of XPS results in potential benefits, beyond the system boundary, for thermal energy and electricity under European conditions.

Name	Value	Unit
Collected separately XPS	35.5	kg
Collected as mixed construction waste	0	kg
Reuse	0	kg
Recycling	0	kg
Energy recovery Scenario 1	35.5	kg
Landfilling Scenario 2	35.5	kg

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

Module D includes the potential benefits beyond system boundaries of the incineration process C3 (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 m³ XPS board. The two EoL scenarios are declared in modules C3/1 + D/1 (Sc. 1) and C4/2 + D/2 (Sc. 2). C3/1 represents the thermal treatment of XPS-boards and C4/2 the landfilling of XPS. Module D/1 includes benefits and loads beyond the system boundary for the incineration of packaging materials and the burning of the product during its EoL (scenario 1). Module D/1 includes only benefits and loads beyond the system boundary of the packaging materials incineration.

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 m³ Jackodur Plus XPS board

Parameter	Unit	A1-A3	A4	A5	C2	C3/1	C4/2	D/1	D/2
GWP	[kg CO_2-Eq.]	1.21E+2	5.96E+0	7.49E-1	8.83E-1	1.19E+2	2.35E+0	-4.98E+1	-3.83E-1
ODP	[kg CFC11-Eq.]	5.02E-6	9.79E-16	2.91E-16	1.45E-16	1.08E-14	7.77E-15	-7.14E-13	-5.46E-15
AP	[kg SO_2-Eq.]	6.86E-1	1.44E-2	1.74E-4	2.13E-3	6.75E-3	6.50E-3	-6.34E-2	-4.87E-4
EP	[kg $(PO_4)^{3-}$-Eq.]	3.82E-2	3.50E-3	1.38E-5	5.18E-4	1.44E-3	6.80E-3	-7.89E-3	-6.06E-5
POCP	[kg ethene-Eq.]	1.87E-1	-5.09E-3	6.50E-6	-7.54E-4	6.79E-4	7.34E-4	-5.77E-3	-4.43E-5
ADPE	[kg Sb-Eq.]	1.94E-4	4.95E-7	5.14E-8	7.33E-8	7.75E-7	4.64E-7	-9.39E-6	-7.20E-8
ADPF	[MJ]	3.16E+3	8.12E+1	2.62E-1	1.20E+1	1.18E+1	3.58E+1	-7.01E+2	-5.40E+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 - RESOURCE USE according to EN 15804+A1: 1 m³ Jackodur Plus XPS board

Parameter	Unit	A1-A3	A4	A5	C2	C3/1	C4/2	D/1	D/2
PERE	[MJ]	2.17E+2	4.57E+0	5.94E-2	6.77E-1	2.65E+0	2.59E+0	-1.90E+2	-1.45E+0
PERM	[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
PERT	[MJ]	2.17E+2	4.57E+0	5.94E-2	6.77E-1	2.65E+0	2.59E+0	-1.90E+2	-1.45E+0
PENRE	[MJ]	1.86E+3	8.14E+1	1.32E+1	1.21E+1	1.43E+3	3.69E+1	-8.65E+2	-6.65E+0
PENRM	[MJ]	1.43E+3	0.00E+0	-1.29E+1	0.00E+0	-1.42E+3	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	3.29E+3	8.14E+1	2.92E-1	1.21E+1	1.38E+1	3.69E+1	-8.65E+2	-6.65E+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
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
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
FW	[m³]	2.87E+1	5.29E-3	1.86E-3	7.84E-4	2.28E-1	4.53E-4	-2.20E-1	-1.68E-3

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 according to EN 15804+A1: 1 m³ Jackodur Plus XPS board

Parameter	Unit	A1-A3	A4	A5	C2	C3/1	C4/2	D/1	D/2
HWD	[kg]	1.14E-6	3.79E-6	9.88E-10	5.61E-7	1.17E-8	1.35E-7	-3.45E-7	-2.65E-9
NHWD	[kg]	7.97E-1	1.25E-2	7.25E-2	1.85E-3	6.84E-1	3.54E+1	-4.01E-1	-3.08E-3
RWD	[kg]	3.85E-2	1.01E-4	1.20E-5	1.49E-5	8.03E-4	4.45E-4	-6.49E-2	-4.97E-4
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
MFR	[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
MER	[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
EEE	[MJ]	0.00E+0	0.00E+0	1.66E+0	0.00E+0	2.16E+2	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	3.00E+0	0.00E+0	3.84E+2	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; EEE = Exported thermal energy

6. LCA: Interpretation

Regarding the production of JACKODUR Plus, polystyrene dominates the impact categories global warming potential (GWP), resource depletion fossil (ADPF) and the corresponding primary energy non-renewable (PENRT) with 61%, 77% and 75% contribution as compared to the production stage.

The direct emissions are comparably marginal regarding GWP, since CO2 as blowing agent is used only in a small amount (0.7% of raw material input) and the co-blowing agent has no influence on GWP from the scientific perspective.
The mainly used halogenated blowing agent has a low GWP value as well.

Resource depletion elements (ADPE), acidification (AP) and ozone depletion potential (ODP) are mainly driven by the production of blowing agents, primarily HFO1234ze, with shares of 82%, 75% and 89%, although this is only used in a small amount in the XPS product with 5% of the raw material input. The high contribution of HFO is in parts unexpected and strongly related to the provided Life Cycle Inventory (LCI) and the used *Ecoinvent* background data.

The summer smog potential (POCP) is less related to raw materials. The direct emissions during production generate half of the impact in this category (45% from DME, 55% from HFO).
Moreover, polystyrene is relevant for the summer smog with 10%, the production of blowing agents with another 10%.

Transport processes and flame retardant production are of low relevance within the considered indicators.

Regarding the whole life cycle (LC) with the inclusion of the End of Life scenarios, the results differ strongly between these two scenarios: landfill and incineration with energy recovery. Landfill has low impacts on most of the categories.
The energy recovery from thermal treatment of the used XPS-boards generates a relevant amount of energy.

7. Requisite evidence

7.1 VOC Emissions

JACKODUR Plus can be used indoor however it is generally not exposed to the indoor air but covered by a finishing element or system.
The emissions of JACKODUR Plus have been tested by TÜV Rheinland, Germany in March 2015 following *EN ISO 16000*.

The emission testing met the requirements of the Committee for Health-related Evaluation of Building Products/German Institute for Structural Engineering (*AgBB*) method. The tested products all complied with the requirements of *AgBB* (May 2010) for the use in the indoor environment. The tested products also all achieved the A+ rating of the French Volatile Organic Compound (VOC) labelling scheme *(TÜV report)*.

AgBB overview of results (28 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	0	µg/m³
Sum SVOC (C16 - C22)	0	µg/m³
R (dimensionless)	0	-
VOC without NIK	0	µg/m³
Carcinogenic Substances	0	µg/m³

AgBB overview of results (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	21	µg/m³
Sum SVOC (C16 - C22)	0	µg/m³
R (dimensionless)	0.022	-
VOC without NIK	7	µg/m³
Carcinogenic Substances	0	µg/m³

7.2 Leaching performance

Leaching behaviour is not regulated for extruded polystyrene foam products.

8. References

EN 15804
EN 15804:2012-04+A1 2013, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

IBU 2019
Institut Bauen und Umwelt e.V.: General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V., version 1.8, Berlin: Institut Bauen und Umwelt e.V., 2019, http://www.ibu-epd.com

ISO 14025
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