ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	**Pavatex SA**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PAV-2014197-CBG2-EN
Issue date	19/11/2014
Valid to	18/11/2019

Woodfibre insulation materials produced in the dry process
110-210 kg/m^3

PAVATEX SA

Institut Bauen und Umwelt e.V.

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

1. General Information

PAVATEX SA

Woodfibre insulation materials produced in the dry process 110-210 kg/m³

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

Declaration number
EPD-PAV-2014197-CBG2-EN

This Declaration is based on the Product Category Rules:
Wood based panels, 07.2014
(PCR tested and approved by the independent expert committee)

Issue date
19/11/2014

Valid to
18/11/2019

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

Dr. Burkhart Lehmann
(Managing Director IBU)

Owner of the Declaration
PAVATEX SA
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CH-1701 Fribourg

Declared product / Declared unit
The declaration refers to 1 m3 softboard

Scope:
The EPD refers to woodfibre insulation boards (dry process), which are manufactured in the PAVATEX works in Golbey (France). The calculation of the life cycle assessment refers to a product with a density of 210 kg/m³. The life cycle assessment results can be translated linearly to the products listed below.

- ISOLAIR 210 kg/m³
- DIFFUBOARD 200 kg/m³
- PAVATHERM 110 kg/m³
- PAVATHERM-COMBI 145 kg/m³
- PAVATHERM-FORTE 140 kg/m³
- PAVAWALL-BLOC 130 kg/m3
- PAVAWALL 130 kg/m³

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

Patricia Wolf
(Independent verifier appointed by SVR)

2. Product

2.1 Product description

PAVATEX woodfibre insulation materials are vapour permeable, thermal insulation materials in board form for buildings pursuant to /EN 13171/. The boards are manufactured using the so-called dry process. The wood fibres produced from forest wood chips are thereby glued and pressed into boards.

2.2 Application

The products mentioned in the scope of validity are pressure-resistant woodfibre insulation boards. PAVAWALL-BLOC as well as PAVAWALL are insulation elements that can be plastered over for thermal insulation composite systems for exterior walls made of masonry and timber constructions.

PAVATHERM, PAVATHERM-COMBI and PAVATHERM-FORTE are versatilely usable woodfibre insulating boards for roof, wall and floor.
ISOLAIR sarking boards can be exposed to the weather for three months, and are "waterproof" according to the European standard /EN 14964/ for sarking boards. ISOLAIR sarking boards are simultaneously also insulation boards and can therefore be included in the calculation of the heat transfer.
DIFFUBOARD is an optimised insulation element, suitable for rendering, that is particularly suitable for cladding prefabricated timber elements.

2.3 Technical Data

Building-related technical data

The following data refer to the product ISOLAIR.
Data for the other products of this EPD can be viewed at www.pavatex.com.

Name	Value	Unit
Gross density pursuant to /EN 13171/	210	kg/m^3
Material dampness at delivery	7	%
Declared thermal conductivity pursuant to /EN 13171/	0.044	W/(mk)
Rated value of the thermal conductivity for Germany	0.047	W/(mk)
Specific thermal capacity	2100	J/(kgK)
Water vapour diffusion resistance factor pursuant to /EN 13171/	3	-
Fire behaviour pursuant to /EN 13501-1/	Klasse E	
Compressive stress at 10% compressive deformation pursuant to /EN 13171/	0.25	N/mm²

2.4 Placing on the market / Application rules

Placing on the market in the EU/EEA is governed by the EU regulation no. 305/2011 of 9 March 2011, or in Switzerland the equivalent building product legislation consisting of the Building Product Act (SR 933.0) and the Building Product Regulation (SR 933.01). The products require a performance declaration taking into consideration /EN 13171:2012
Thermal insulation products for buildings - Factory made wood fibre products (WF) - Specification/ and the CE-mark (CE-mark not in Switzerland).

The respective national regulations apply to the use of the products; in Germany this is the /General Building Authority Approval Z-23.15-1429/ issued by the German Institut für Bautechnik, Berlin.

Further regulations
• DIN 4108-10:2008-06, Thermal protection and the saving of energy in buildings - Part 10: Application-related requirements for thermal insulation materials - factory-made thermal insulation materials
• EN 622-4:2009, Fibreboards - Specifications - Part 4: Requirements for permeable boards
• EN 14964:2006, Sarking boards for roof cladding - Definitions and characteristics
• Datasheet SIA 2001:2013, Thermally insulating building materials - declared values for the thermal conductivity and further data for building physics calculations
• ACERMI: Association pour la certification des matériaux isolants
• ÖNORM B 6000:2010, Factory-made insulation materials for thermal and/or sound insulation in building construction/BBA: BBA: British Board of Agrément, technical approvals for construction

2.5 Delivery status

ISOLAIR boards are delivered in the following dimensions:

Length x width (cm)	Thicknesses (mm)
77 x 250	35/52/60

2.6 Base materials / Ancillary materials

Composition of ISOLAIR

Name	Value	Unit
Softwood	95,2	% abs.dry
Polyurea	4	% abs.dry
Paraffin	0,7	% abs.dry
Aqueous polymer concentrate	0,14	% abs.dry

2.7 Manufacture

The dry process for the manufacture of the PAVATEX softboards is divided into the following process steps:

1. Heating of the wood chips under vapour pressure
2. Defibration
3. Drying the fibres in a flash tube dryer
4. Spraying the fibre with resin adhesive
5. Scattering the fibres to form an even fibre mat
6. Fibre mat passes through a continuous preliminary press
7. Fibre mat passes through the calibration and hardening unit
8. Cutting to size and profiling, depending on the make
9. Stacking and packaging

All residues (trimming and milling residues) accumulating during production are put without exception to energetic use.

The following systems are implemented for quality assurance:
• CE-marking pursuant to EN 13171 - Notified Body MPA - Stuttgart, D
• Forest Stewardship Council (FSC), Chain of Custody SQS-COC-021707
• /ISO 9001:2008/ - SQS 14086
• /ISO 14001:2009/ - SQS 14086

2.8 Environment and health during manufacturing

Health protection
Due to the manufacturing conditions, no health protection measures extending beyond the legal and other regulations are necessary. The TLV values (MAK in Switzerland) are met in each part of the plant.

Environmental protection
Air: The production-related exhaust air is cleaned in accordance with the legal regulations. Emissions lie below the national requirements.
Water/soil: There is no direct pollution of water and soil.

2.9 Product processing/Installation

PAVATEX fibreboards can be processed with conventional construction tools and machines such as insulation knives, electric saw, circular or band saws. Circular saws with a large number of teeth and high cutting speeds are recommended up to 80 mm; a reciprocating saw is preferable for greater thicknesses. Respiratory protection should be worn when using manual tools without dust extraction.
No environmental pollution is caused by the processing/installation of the PAVATEX insulation

materials. It is not necessary to take any special environmental protection precautions.

2.10 Packaging

Inserts, cardboard boxes, PE films, plastic or metal straps and wood are used for the packaging of the PAVATEX insulation materials. If sorted properly, all packaging can be recycled; otherwise it can be energetically utilised. External disposal can be agreed in individual cases with the manufacturer.

2.11 Condition of use

The ingredients of the PAVATEX boards correspond in their proportions to the raw material composition. Around 338 kg CO2 are stored over the lifetime of the ISOLAIR fibreboards (at 210 kg/m3).

2.12 Environment and health during use

Environmental protection: According to today's level of knowledge, water, air and soil cannot be endangered if the products described are used as intended (see proofs).

Health protection: Health aspects: no damage or impairments to health are to be expected if the PAVATEX boards are used for their intended purpose. Of course, ingredients inherent to the wood can be given off. Health-relevant emissions of pollutants are not detectable (see proofs).

2.13 Reference service life

Due to the many different usage possibilities of PAVATEX softboards, no reference service life is declared.
Durability in the usage condition is defined for the PAVATEX boards via the application classes pursuant to EN 13171 and EN 622-4. The average service life lies in the order of magnitude of the building.

2.14 Extraordinary effects

Fire

Specifications pursuant to EN 13501-1

Fire protection

Name	Value
Building material class	E

Water

No ingredients that could pollute water are washed out (see proofs). Woodfibre boards are not resistant to the permanent influence of water. Damaged points can be locally exchanged.

Mechanical destruction

PAVATEX woodfibre insulation materials can be mechanically stressed (compressive and tensile stress). In case of damage, a soft break occurs at which the fibres are unevenly torn off.

2.15 Re-use phase

In the case of reconstruction or the end of the usage phase of a building in the case of selective demolition, and provided they are untreated and not damaged, PAVATEX woodfibre boards can easily be collected separately and reused or used further for the same application.
Provided that no contamination with foreign products or damage has taken place, the PAVATEX insulation materials can be put to material uses without problems.

2.16 Disposal

As the conclusion of the cascade utilisation, PAVATEX woodfibre boards can be used as renewable energy carriers with the high calorific value of 16.22 MJ/kg (at u=20%) in wood waste burning plants or waste incineration/refuse incineration plants for the generation of process energy and electricity.
European waste code: 03 0105.

2.17 Further information

Detailed information and processing recommendations are available in the technical brochures at www.pavatex.com.

3. LCA: Calculation rules

3.1 Declared Unit

1 m^3 softboard with a density of 210kg/m3 is declared.

Specification of the declared unit

Name	Value	Unit
Declared unit	1	m^3
Conversion factor to 1 kg	0.00476	-
Mass reference	210	kg/m^3

The life cycle assessment results can be translated linearly via the density to the products listed in chapter 1.

3.2 System boundary

Type of EPD: Cradle to factory gate - with options

The modules A1 - A3 of the production stage encompasses the manufacture of the products, i.e. the raw material production and processing, the energy generation, the production of the auxiliary materials and ingredients, transport and the actual manufacturing of the softboards and their packaging at PAVATEX Company. The forestry processes are thereby balanced according to Schweinle (2000) as they are implemented in ecoinvent 2.2 (Werner et al. 2007).
Wastes and by-products or secondary fuels are classified in accordance with /EN 15804/ and balanced accordingly.
For recycled materials or energetically used wastes (without wood) from the production, the disposal processes are conservatively balanced due to the small amounts, but the resulting credits are neglected.
Accumulating waste wood is accounted for in accordance with PCR as a “loop” within the modules A1-A3; the amount exceeding that is used for the

generation of energy and the energy generated is looped within modules A1-A3.
The resource aspect of wood is balanced via the inherent characteristics of the material as a resource withdrawal of CO_2 from the atmosphere and the lower calorific value as the consumption of renewable energy carriers. The content of biogenous CO_2 is similarly balanced when using waste wood.

Module A5 encompasses the transport and the disposal of the packaging materials in a refuse incineration plant, whereby the cardboard is recycled. The credits from the recovered energy are declared in module D.

The end-of-waste status for the demolished softboards is determined at the point at which they are ready for energy recovery as sorted waste wood. The transport to a biomass power station, the actual combustion process as well as the credits from the substitution of fossil energy carriers and electricity from the grid are declared accordingly in module D.

3.3 Estimates and assumptions
No further assumptions or estimations have been made that are not listed in this EPD.

3.4 Cut-off criteria
All data from the operating data acquisition, i.e. all raw materials used in accordance with the recipe, the thermal energy used, the internal fuel and electricity consumptions, all direct production wastes and all available emission measurements, are accounted for in the balance. Assumptions were made regarding transport expenditures for all inputs and outputs considered. Expenditures for management, research and development, administration and marketing - as far as these are known - are not taken into account. The manufacture of any packaging for the fillers employed or for some material flows treated as waste was neglected.
This approach also allows the balancing of those material and energy flows that make up less than 1 per cent of the total material or total energy flows arising in the production of softboards.
Beyond that, in the context of the life cycle assessment, no material or energy flows were neglected of which those responsible for the project would be aware and which would be expected to have a significant environmental effect with regard to the listed indicators. It can thus also be assumed that the sum of the neglected processes does not exceed 5 % of the impact categories.

3.5 Background data
The data records from ecoinvent 2.2, which was last updated in 2010, were exclusively used as the database for the background data. Beyond that the data in /ecoinvent 2.2/ were updated with the processes available at www.lc-inventories.ch. Amongst other things, this concerns the power mixes with which the data used were last updated in 2013.

3.6 Data quality
The life cycle assessment is based on an extensive analysis of the Golbey works of the PAVATEX Company and the material and energy flows arising from the production of softboards. All production data were specifically acquired in the PAVATEX works. The works data were checked independently for plausibility and linked to data records from an internationally recognised database that was last updated in 2013. The process data and the background data employed are consistent. The data quality can therefore be described as very good. From the data point of view, therefore, there are no limitations to the use of the data in an environmental product declaration pursuant to EN 15804.

The life cycle assessment was modelled in accordance with the specifications of EN 15804 or IBU PCR Part A respectively; beyond that no methodical assertions had to be made. Hence, from the methodical point of view, there are no limitations to the use of the data in an environmental product declaration pursuant to EN 15804.

3.7 Period under review
The data for the manufacture of the softboards illustrate the production conditions in the calendar year 2013 for the months April, marking the commencement of production, to December.

3.8 Allocation
The provision of the industrial residual wood used is inventoried using processes already existing in ecoinvent. The processes in the wood chain are thus economically allocated (Werner et al. 2007) which, in comparison with forest wood, leads to a lesser environmental impact of the raw materials for the sawmill wastes used.
The data acquired during operation are apportioned to all products via the density; the fillers are balanced in accordance with the recipe.
During production or from the provision of energy, no by-products result that would have to be allocated.
The disposal of packaging in a refuse incineration plant (including energy recovery) as well as the energy recovery from the softboards in a biomass power plant at end of life is balanced in the modules A5/D or in module D.

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 forms the basis for the declared modules A5 and D:

Installation in the building (A5)
It is assumed that the softboards are installed as a component without further auxiliary materials.

An average Swiss refuse incineration plant with representative heat recovery and electricity production (overall efficiency: 53 %, 8 % electricity, 92 % heat) is taken for the calculation of the credits from the thermal utilisation of the packaging materials. (no data is available for corresponding French plants). The

processes ‘Electricity, medium voltage, at grid/FR’ or respectively ‘Heat, natural gas, at boiler condensing modulating, >100 kw/RER’ are credited.

End of life (C1-C4)
The softboard is energetic utilised, wherein the system limit is drawn where the softboard is available in a properly sorted form; the softboard thus exits the product system in module C3 with an export of 338 kg CO_2 equivalent, -3546 MJ of renewable primary energy and -289.6 MJ of non renewable primary energy stored as an inherent characteristics of the material.

Re-use, recovery and recycling potential (D), relevant scenario specifications
The transport of the softboards as a secondary fuel to a biomass power plant by truck is assumed (default assumption 10 km). For the calculation of the credits, a biomass power plant is assumed similar to that on which other IBU declarations for wood products are based, i.e. with an overall efficiency of 93 %, wherein 9 % is used as electricity and 91 % as heat.
Waste wood is bought in for the manufacture whose quantity can, however, be saturated model-wise from production wastes (for details, see specific rules in IBU PCR Part A). The softboards are thus utilised energetically without further deductions for the saturation of the waste wood input in module D.

5. LCA: Results

The results of the life cycle assessment for softboards 110-210 kg/m³ with a balanced density of 210 kg/m³ are summarised below.

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 BOUNDARIES
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	MND	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: Softboard 210 kg/m³, per m³

Parameter	Unit	A1-A3	A5	D
Global warming potential	[kg CO_2-Eq.]	-255.90	8.27	-198.20
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.45E-6	3.85E-9	-2.31E-5
Acidification potential of land and water	[kg SO_2-Eq.]	0.45	0.00	-0.10
Eutrophication potential	[kg $(PO_4)^{3-}$- Eq.]	7.56E-2	2.92E-4	-4.58E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg Ethen Eq.]	1.73E-2	4.56E-5	-1.56E-2
Abiotic depletion potential for non fossil resources	[kg Sb Eq.]	1.46E-4	1.33E-7	-3.41E-5
Abiotic depletion potential for fossil resources	[MJ]	1362.00	1.00	-3769.00

RESULTS OF THE LCA - RESOURCE USE: Softboard 210 kg/m³, per m³

Parameter	Unit	A1-A3	A5	D
Renewable primary energy as energy carrier	[MJ]	2047.12	0.02	-63.00
Renewable primary energy resources as material utilization	[MJ]	3546.00	0.00	0.00
Total use of renewable primary energy resources	[MJ]	5593.12	0.02	-63.00
Non renewable primary energy as energy carrier	[MJ]	2889.08	0.91	-4500.61
Non renewable primary energy as material utilization	[MJ]	289.60	0.00	0.00
Total use of non renewable primary energy resources	[MJ]	3178.68	0.91	-4500.61
Use of secondary material	[kg]	0.00	0.00	0.00
Use of renewable secondary fuels	[MJ]	965.50	0.00	3546.00
Use of non renewable secondary fuels	[MJ]	29.90	0.00	289.60
Use of net fresh water	[m³]	4.83	0.01	-0.62

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: Softboard 210 kg/m³, per m³

Parameter	Unit	A1-A3	A5	D
Hazardous waste disposed	[kg]	9.16E-4	1.60E-6	-8.78E-4
Non hazardous waste disposed	[kg]	7.39	0.08	1.67
Radioactive waste disposed	[kg]	4.00E-2	1.41E-6	-2.21E-2
Components for re-use	[kg]	0.00	0.00	0.00
Materials for recycling	[kg]	0.15	0.79	0.00
Materials for energy recovery	[kg]	0.00	0.00	0.00
Exported electrical energy	[MJ]	0.00	3.96	0.00
Exported thermal energy	[MJ]	0.00	45.50	0.00

6. LCA: Interpretation

The results of the life cycle assessment for the product group 110-210 kg/m_3 with the balanced density of 210 kg/m³ are interpreted as follows:

The Global Warming Potential (GWP) is an indicator for the contribution to the climatic change and is calculated from the emissions of climatically relevant gases.
The GWP is mainly determined by the CO_2 flows. The emission of 87 kg CO2 from the use of fossil energy carriers during the manufacture is opposed by the storage of 338 kg CO_2 in the softboard over its lifetime. During the energetic use the 338 kg CO_2 stored in the softboard are released, whereby approximately 195 kg CO_2 emissions from fossil sources can be avoided by the substitution of fossil energy carriers.

The Ozone Depletion Potential (ODP) is calculated from the emissions of gases that can deplete the stratospheric ozone ('ozone hole').
Around 70 % of the ODP is caused by the provision of natural gas for the production of the boards. Further contributions originate from the generation of electricity, in particular from uranium preparation, the transformation of electricity and the extraction of crude oil, e.g. for the production of diesel fuel.
The ODP is caused in particular by halon 1211 (about

80 %) and halon 1301 (about 10 %), and to a small extent by CFC-114 (about 5 %).
The contributions to the ODP from the production of the softboard are compensated several times over by the recovery of energy from the board.

The Acidification Potential (AP) results from the transformation of air pollutants into acids, which amongst other things can impair soil fertility.
About 45 % of the AP is caused by SO_2 emissions and about 50 % by NOx emissions. These emissions are caused by a multitude of combustion processes, on the one hand directly at the location and on the other in the provision of energy and during the transport processes in the preliminary chains.
About 20% of the AP is compensated by the substitution of fossil energy carriers during the energetic utilisation of the board.

The over fertilisation potential (Eutrophication potential, EP) is calculated from the enrichment of nutrients in soils and bodies of water, which can lead to intensified alga growth and shifts in the spectrum of species.
About 70 % of the EP is caused by NOx emissions into the air, while the loads in the wastewater from production contribute approximately 25 % to the EP.
The NOx emissions are caused by a multitude of combustion processes, on the one hand directly at the location and on the other in the provision of energy and during the transport processes in the preliminary chains.
Approximately 6% of the EP is compensated by the substitution of fossil energy carriers during the energetic utilisation of the board.

The Photochemical Ozone Creation Potential (POCP) is calculated from emissions into the air that can contribute to the formation of ozone in summer.
A significant cause of the POCP is the production of the PMDI adhesive (approximately 40%). Contributions of the order of magnitude of about 20% are caused by the provision of electricity. Approximately 8% is caused by the direct process emissions (defibration/drying). Further low contributions of approximately 5 - 10% are caused by the provision of the packaging material, the manufacture of the sawmill wood residues and the transport of the wood to the works.
The largest contributions to the POCP are caused by sulphur dioxide (about 30%), carbon monoxide (about 20%), methane (about 12%) and other alkanes.
Approximately 90% of the POCPs caused by the production of the softboard are compensated by the substitution of fossil energy carriers by the energetic use at end of life.

The Abiotic Depletion Potential for fossil resources (ADP-fossil) reflects the use of scarce fossil resources such as crude oil or natural gas.
Around 45% of the ADP-fossil is caused by the manufacture of the PMDI adhesive. Contributions of about 10% to 15% each are caused by the provision of electricity, the use of natural gas and by transport.
The natural gas used is the most relevant resource for the ADP-fossil, followed by crude oil and Hard coal.
Through the substitution of fossil energy carriers in the energetic use of the softboard, more than twice as many fossil resources are saved as were used for the manufacture of the board.

The Abiotic Depletion Potential for non-fossil resources (ADP-non-fossil) is calculated from the use of scarce mineral resources such as ores and other mineral raw materials.
The ADP-non-fossil of the balanced softboards is dominated by expenditures for the infrastructure that is required for the production of the fillers. Expenditures for the provision of the infrastructure of power lines and vehicles (trucks) are also incorporated to a small extent in the ADP-non-fossil.
The ADP-non-fossil is caused by the use of various metallic resources, including lead, copper, gold, zinc and chrome. These expenditures are partially compensated again through the recovery of energy from the softboard.

The use of renewable primary energy is dominated by the use of wood, which is used on the one hand as a fuel (approximately 5 %), but mainly as a material, wherein the energy stored in the wood can be used for the substitution of fossil energy carriers in the recovery of energy. A comparatively small amount of renewable primary energy is balanced as water for the generation of electricity.

Around 40% of the use of non-renewable primary energy is caused by the use of fossil energy carriers during production (natural gas) and also during the manufacture of the fillers, and by diesel consumption for transport. About 60% is balanced as nuclear power for the provision of electricity.

The indicator values for Wastes refer to wastes that are dumped following a possible waste treatment. Inert wastes, i.e. those from infrastructure processes, constitute the major part. Dumped dangerous wastes come from various processes in the provision of energy carriers and the production of fillers; the radioactive wastes result from the generation of electricity in nuclear power plants.

The net use of fresh water is caused amongst other things by the provision of electricity for the manufacture of the softboard (30%) and in particular in the manufacture of the adhesive (55%).

The further indicators of the life cycle inventory analysis are individual values that result from the balance of waste flows into thermal waste treatment or recycling.

7. Requisite evidence

7.1 Formaldehyde

No adhesives containing formaldehyde are used in the manufacture of PAVATEX woodfibre insulation materials in the dry process. The following test applies to PAVATEX woodfibre insulation materials in the dry process in the gross density range of 110-210 kg/m^3.

Measuring body: BREMER UMWELTINSTITUT, Gesellschaft für Schadstoffanalysen und Begutachtung mbH, Fahrenheitstr. 1, 28359 Bremen, accredited test laboratory.

Test report: H 8161 FM of 20/12/2013

Result: Formaldehyde concentration after 28 days pursuant to DIN EN 717-1:

· ISOLAIR: not detectable

7.2 MDI

PMDI is used as a binding agent in the manufacture of PAVATEX woodfibre insulation materials in the dry process. The majority of the PMDI reacts in production with water to form polyurea.

7.3 Check for the pretreatment of the materials used

No waste wood is used in the manufacture of PAVATEX woodfibre insulation materials.

7.4 VOC emissions

Measuring body: BREMER UMWELTINSTITUT, Gesellschaft für Schadstoffanalysen und Begutachtung mbH, Fahrenheitstr. 1, 28359 Bremen, accredited test laboratory.

Test report: H 8161 FM of 20/12/2013

AgBB result overview (28 days)

Name	Value	Unit
TVOC (C6 - C16)	294	µg/m^3
Sum SVOC (C16 - C22)	n.d.	µg/m^3
R (dimensionless)	0,241	-
Carcinogenic Substances KMR-VOC	n.d.	µg/m^3
VOC without NIK	18	µg/m^3

n.d. = not detectable

7.5 Lindan/PCP

No additives containing pesticides are used in the production of PAVATEX woodfibre insulation materials in the dry process. The following test applies to PAVATEX woodfibre insulation materials in the dry process in the gross density range of 110-210 kg/m3.

Measuring body: BREMER UMWELTINSTITUT, Gesellschaft für Schadstoffanalysen und Begutachtung mbH, Fahrenheitstr. 1, 28359 Bremen, accredited test laboratory.

Test report: H 8161 FM of 20/12/2013

Result: Lindan and pentachlorophenol (PCP) lie below the detection limits of 0.005 mg/kg and 0.1 mg/kg respectively.

8. References

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

General principles
for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2013/04
www.bau-umwelt.de

PCR, Part A
Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. 2013/04
www.bau-umwelt.de

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

ISO 9001
SN EN ISO 9001:2008, Quality management systems - success through quality.

ISO 14001
SN EN ISO 14001:2009, Environmental management systems - requirements with instructions for application (ISO 14001:2004 + Cor. 1:2009).

EN 13171
SN EN 13171:2012. Thermal insulation products for buildings - Factory-made wood fibre products (WF) - Specifications.

EN 717-1

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