Statement of Verification

BREG EN EPD No.: 000726 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

Recticel Insulation UK Ltd

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:

1 m² of Eurothane GP, Instafit, Eurowall+, Eurowall Cavity and Eurothane Eurodeck with a thickness of 100mm, an RD-value of 4.50 m²K/W and a weight of 3.164 kg/m² (including PU core and multilayer facing)

Company Address

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RECTICEL insulation

Signed for BRE Global Ltd	Hayley Thomson Operator	12 September 2025 Date of this Issue
12 September 2025 Date of First Issue		11 September 2030 Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: **000726**

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Global Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.1
Commissioner of LCA study	**LCA consultant/Tool**
Recticel Insulation UK Ltd Stoke-on-Trent Enterprise Way, Whittle Road, Meir Park Stoke-on-Trent, Staffordshire, ST3 7UN	Vandenbossche Arno OneClickLCA
Declared/Functional Unit	**Applicability/Coverage**
1 m² of Eurothane GP, Instafit, Eurowall+, Eurowall Cavity and Eurothane Eurodeck with a thickness of 100mm, an R_D-value of 4.50 m²K/W and a weight of 3.164 kg/m² (including PU core and multilayer facing)	Other (please specify): Product specific
EPD Type	**Background database**
Cradle to Gate with options	Ecoinvent 3.8

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
Third party verifier: Bala Subramanian
a: Product category rules

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance

Information modules covered

This the Cradle to Gate with options LCA and the study takes into account the mandatory life cycle stages of the BRE PN514 EN15804+A2 PCR V3.1, being modules A1, A2, A3, C1, C2, C3, C4 and D. Additionally, this study takes into account life cycle stages A4 and A5. These are below marked with a “check”.

Product			Construction		Use stage							End-of-life				Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building						
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑	☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Recticel Insulation

Enterprise Way, Whittle Road, Meir Park Stoke-on-Trent, Staffordshire, ST3 7UN

Construction Products:

This EPD contains the life cycle assessment results of Eurothane GP with a thickness of 100mm. This product is chosen as representative for the LCA analysis of a product group of insulation boards (100mm) with PU foam and a multilayer facing: Eurothane GP, Instafit, Eurowall+, Eurowall Cavity and Eurothane Eurodeck. They share the same manufacturing process and composition. The only differences between these boards could be how the boards are cut after production, the colour of the multilayer facing and the application.

The scope of the LCA is cradle-to-gate with options. The analysis has been conducted for Eurothane GP, and the results are also applicable to the following products: Instafit, Eurowall +, Eurowall Cavity and Eurothane Eurodeck, as they share the same composition, manufacturing process, and belong to the same product group. Each product is manufactured in different thicknesses depending on its application. Therefore, separate product descriptions are provided to help end users better understand the characteristics of each product.

1. Eurothane GP

Product Description

Eurothane GP is a thermal insulation board and its core consists of rigid polyisocyanurate (PIR) foam. The board is faced with a gas diffusion tight multilayer foil on both sides and has a λ_D-value of 0.022 W/mK. Eurothane GP is mainly used in pitched roofs, framed walls and floors (also with underfloor heating systems); and is available in thicknesses ranging from 25 mm to 160 mm. This EPD is calculated for 1 m² of Eurothane GP with an R_D-value of 4.50 m²K/W, a thickness of 100 mm and a weight of 3.164 kg/m². The impacts of the

PU foam and multilayer facing are calculated separately, because the foam increases (decreases) with an increasing (decreasing) board thickness, while the multilayer facing stays a constant.

Technical Information

Property	Value, Unit
Lambda (λ)	0.022 W/mK
R_D-value range	1.10 – 7.25 m²K/W
Thickness range	25-160 mm
Density	±30 kg/m³
Multilayer facing thickness	0.17 mm

2. Eurowall +

Product Description

Eurowall + is a thermal insulation board and its core consists of rigid polyisocyanurate (PIR) foam. The board is faced with a gas diffusion tight multilayer foil on both sides with a grid pattern on one side and has a λ_D-value of 0.022 W/mK. Eurowall + is mainly used in full fill cavity walls; and is available in thicknesses ranging from 75 mm to 140 mm.

Technical Information

Property	Value, Unit
Lambda (λ)	0.022 W/mK
R_D-value range	3.40 – 6.35 m²K/W
Thickness range	75 – 140 mm
Density	±30 kg/m³
Multilayer facing thickness	0.17 mm

3. Eurowall Cavity

Product Description

Eurowall Cavity is a thermal insulation board and its core consists of rigid polyisocyanurate (PIR) foam. The board is faced with a gas diffusion tight multilayer foil on both sides with a grid pattern on one side and has a λ_D-value of 0.022 W/mK. Eurowall Cavity is mainly used in partial fill cavity walls; and is available in thicknesses ranging from 20 mm to 160 mm.

Technical Information

Property	Value, Unit
Lambda (λ)	0.022 W/mK
R_D-value range	0.9 – 7.25 m²K/W
Thickness range	20 – 160 mm
Density	±30 kg/m³
Multilayer facing thickness	0.17 mm

4. Eurothane Eurodeck

Product Description

Eurothane Eurodeck is a thermal insulation board and its core consists of rigid polyisocyanurate PIR foam. The board is faced with a gas diffusion tight multilayer foil on both sides and a grid pattern on one side. Eurothane Eurodeck is mainly used warm flat roofs; and is available in thicknesses ranging from 30 mm to 160 mm.

Technical Information

Property	Value, Unit
Lambda (λ)	0.022 W/mK
R_D-value range	1.35-7.25 m²K/W
Thickness range	30 – 160 mm
Density	±30 kg/m³
Multilayer facing thickness	0.17 mm

5. Instafit

Product Description

Instafit is a thermal insulation board and its core consists of rigid polyisocyanurate (PIR) foam. The board is faced with a gas diffusion tight multilayer foil on both sides with a grid pattern on one side and has a λ_D-value of 0.022 W/mK. Instafit is mainly used in floor, internal wall & ceiling, pitched roof internal and cavity insulation; and is available in thicknesses ranging from 25 mm to 150 mm.

Technical Information

Property	Value, Unit
Lambda (λ)	0.022 W/mK
R_D-value range	1.10 – 6.80 m²K/W
Thickness range	25 – 150 mm
Density	±30 kg/m³
Multilayer facing thickness	0.17 mm

Main Product Contents

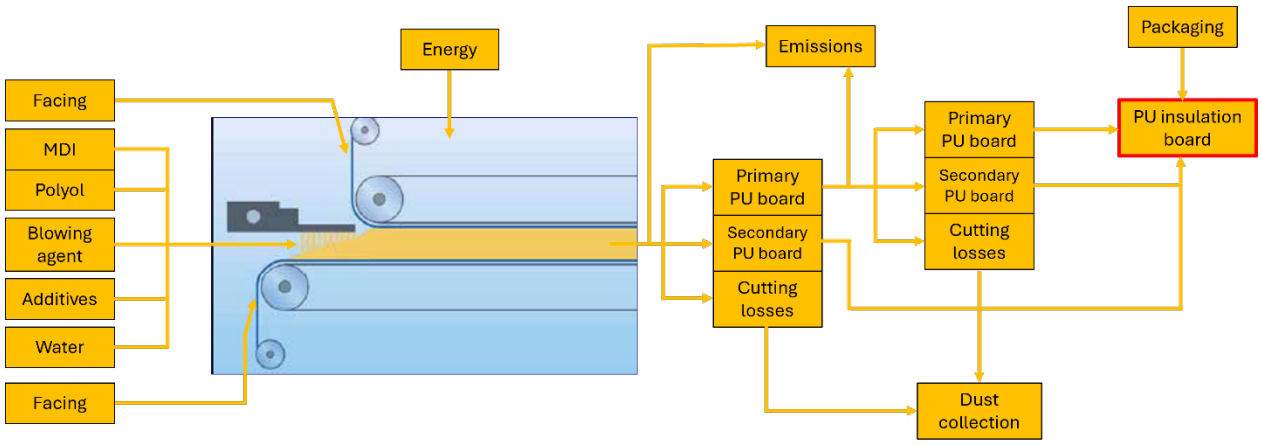
These values are based on Eurothane GP, which is representative for the products included in this EPD.

Material/Chemical Input	%
Metals	2.15
Minerals	1.30
Fossil materials	91.73
Bio-based materials	5.69
Other	0.42

Manufacturing Process

PIR is formed via the reaction of polyester polyol with an isocyanate (MDI). A blowing agent, a flame retardant and additives are also added during the production process. The insulation board is faced with a multilayer facing. PU boards are continuously produced and are cut in fixed large dimensions which is called the 'motherboard'. This process generates primary PU boards, secondary PU boards and cutting losses. Boards fit to go into the next stage are primary PU boards, while boards not deemed in "perfect shape" are secondary PU boards. In a second step, the big dimensions are cut into their final size. Also, this process generates primary PU boards, secondary PU boards and cutting losses. As a "motherboard", the 100mm Eurothane GP board has a density of 2.953 kg/m² (PU foam) and 0.355 kg/m² (multilayer facing). The "motherboards" are cut to size by automated saws in a controlled environment. After cutting, the final 100mm Eurothane GP board is obtained with a density of 2.824 kg/m² (PU foam) and 0.340 kg/m² (multilayer facing). The cutting losses (PU foam + multilayer facing) are captured and briquetted into high density blocks. These blocks are then distributed to third parties or waste treatment companies. The finished insulation boards are stacked on EPS blocks and wrapped in PE foil before being moved to storage. After a curation period, the boards are ready to be distributed to the customers.

Process flow diagram



Construction Installation

Different fixation methods are possible depending on the application. Most common options are with adhesive (type of glue), mechanical fixation or loose (with ballast). This is not considered in this EPD, since this is very case-dependent.

Use Information

In general, insulation material is not replaced during the lifetime of a building. Additionally, PIR insulation doesn't need any maintenance during its lifetime. Therefore, the use and maintenance stage is not relevant and left out of scope.

End of Life

It is assumed that the impact related to the demolition process (C1) is negligible. The transportation to a disposal/treatment area is assumed to be done by lorry over an estimated distance of 100 km (C2). The relatively high caloric value of PIR insulation material makes it suitable for incineration with energy recovery. That is why an end-of-life scenario of 100% incineration (C3) and 0% landfill (C4) is assumed (as prescribed by BRE type III EN15804+A2 PN514 PCR V3.1). The benefits of energy recovery from material incineration, namely electricity and heat production, are declared in module D. Additionally, the benefits and loads of the waste recycling of the packaging material (A5) are considered in module D.

Life Cycle Assessment Calculation Rules

The LCA analysis is done separately for the PU foam and the multilayer facing. As the thickness of the board increases or decreases, the only constant is the thickness of the multilayer facing. It is only the foam of the board which increases or decreases. Hence the reason why the impacts are calculated separately. For example, the impact of a 120mm board can be calculated as follows:

$X_{120mm} = X_{Facing} + (120mm/100mm * X_{Foam, 100mm})$

With,
X_{120mm}: The impact of a 120mm insulation board of this product group
X_{Facing}: The impact of the multilayer facing
$X_{Foam, 100mm}$: The impact of the foam of a 100mm insulation board of this product group
120mm/100mm: Ratio of the board thicknesses

This calculation is applicable for all the products included in the LCA analysis: Eurothane GP, Eurowall+, Eurowall Cavity, Eurothane Eurodeck and Instafit.

For more information on the individual product calculations please contact Recticel Insulation technical team.

Declared / Functional unit description

1 m² of Eurothane GP, Instafit, Eurowall+, Eurowall Cavity and Eurothane Eurodeck with a thickness of 100mm, an R_D-value of 4.50 m²K/W and a weight of 3.164 kg/m² (including PU core and multilayer facing).

System boundary

This is a Cradle-to-Gate with Options EPD, reporting the upstream processing stages A1 to A3, construction stages A4-A5, end-of-life stages C1-C4 and D in accordance with EN 15804:2012+A2:2019 and BRE 2023 Product Category Rules (PN 514 Rev 3.1).

Two separate LCA analysis has been conducted for the PU Foam and the multilayer facing, the system boundary of the PU Foam is Cradle to gate with modules C and D and the multilayer facing includes Cradle to Gate (A1-A3).

Data collection procedures

The life cycle inventory for this study is performed by Recticel insulation. Specific data have been collected for the processes under operational control of Recticel insulation (product manufacturing). The year round (2022) production data of a 100mm Eurothane GP insulation board is used for this LCA study, which means no averaging is done and the data is directly representative for 100mm Eurothane GP. This data is also representative for the product group: 100mm Eurowall +; 100mm Eurowall Cavity; 100mm Instafit and 100mm Eurothane Eurodeck. The chemical composition and formulation of the foam of these insulation boards is exactly the same. Additionally, the multilayer facing is also the same, apart from Eurowall + with a different colour.

Generic data have been used for all other up and downstream processes beyond the control of Recticel insulation.

Validation of data

The quality requirements for the life cycle assessment were set according to ISO 14040/14044 standard. The generic data used in modelling the input and output flows can be considered to be of good quality.

The quality of the specific data is consistent with the standards used. The data was examined carefully and clarification requested from the Manufacturer when necessary. All gathered data was used without excluding categories following the system boundaries set in earlier chapters.

The period for data represents **2022**, which is full year data.

Criteria for choosing generic data

One Click LCA tool and database was used to assess the upstream and downstream processes. One Click LCA -database represents the most recent data available in the form of EN 15804 compliant environmental product declarations (EPDs) as well as complementary data from Ecoinvent 3.8. Data source are specified for each data point in the following chapters.

Ecoinvent is a widely used database which is commonly referenced in published life cycle studies. The data follows ISO14040/14044 standards, and for One Click LCA it has been converted to be suitable for use with the Standards. The data collected from Ecoinvent represents mainly Europe and is thus well suited to model the countries studied in this assessment. The Ecoinvent 3.8 (2021) version of resources was chosen for calculations. It must be mentioned, that Ecoinvent does not provide year specific data, but the data represents a period of time, and thus the data can be considered to be temporally relevant.

Treatment of missing data

Whenever necessary, the missing data gaps are covered by making conservative and relevant assumptions. Where estimations/assumptions are made, these are reported in the dedicated modules description in the following chapters.

Data quality assessment

The overall quality of the inventory data and the environmental information from the database is reported in the table below according to the guidelines in Annex 2.

Data Category	Inventory data quality	Environmental data quality
Raw material	Good	Good
Packaging material	Very good	Very good
Transport	Very good	Very good
Energy	Very good	Very good
Waste treatment	Good	Good
End of life scenario	Good	Good

Allocation principles and procedures

At Recticel, PU boards are continuously produced and are cut in fixed large dimensions which is called the ‘motherboard’. This process generates primary PU boards, secondary PU boards and cutting losses. Boards fit to go into the next stage are primary PU boards, while boards not deemed in “perfect shape” are secondary PU boards. In a second step, the big dimensions are cut into their final size. Also, this process generates primary PU boards, secondary PU boards and cutting losses. The production line is metered in m².

Allocation of the inputs and outputs (emissions and waste) to primary and secondary PU boards has been done based on physical properties, the m^2 primary PU boards and secondary PU boards produced. The allocation has been done according to the provisions of BRE PCR PN514 and EN15804+A2 using the m² quantity produced. Also, the material inputs necessary to produce scrap and cutting losses are allocated to primary and secondary PU boards using physical properties (m^2 of primary and secondary PU produced). Primary and secondary PU are considered as one unit during the LCA, because both are used for the same purpose. Even though secondary PU boards are not “perfect shape”, they are still sold but just with a lower quality mark. But composition/content wise, primary and secondary boards are exactly the same.

These two cutting processes result in 95.59% primary PU, 0.43% secondary PU, 0.00% scrap and 3.98% cutting losses.

The production of 1m^2 primary PU board, requires a total material input of 3.308 kg (1 m^2 primary PU, 0.005 m^2 secondary PU, 0.000 m^2 scrap and 0,045 m^2 cutting losses).

Furthermore, different types of insulation materials are produced at Recticel. Only facility level data were available for electricity and the use of natural gas. The facility level data have been allocated to the individual product using the annual production volume of the insulation materials (physical relationship). Material inputs and outputs which were not available at the product level – waste, packaging, were allocated similarly.

Manufacturer uses the national grid electricity for production, so therefore the national grid electricity dataset has been used for the LCA modelling (Ecoinvent 3.8). The GWP carbon footprint for using 1 kWh of electricity, GB kWh is 0.31 kgCO2e/kWh and for the UK natural has carbon footprint for using 1 kWh is 0.186 kgCO2eq.

Cut-off criteria

The study does not exclude any modules or processes which are stated mandatory in the Standards and PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes for which data is available are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total excluded input and output flows do not exceed 5% of energy usage or mass.

The following processes are considered below cut-off: (i) losses during transport are considered to be below cut-off because breakage during transport only rarely occurs. The total of neglected input flows per module is less than 5% of energy usage and mass as prescribed by BRE type III EN15804+A2 PN514 PCR V3.1. (ii) emissions to water and soil are not considered, because the production process does not produce wastewater or any soil contamination.

LCA Results: PU foam + multilayer facing

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	7.90E+00	8.24E+00	-3.43E-01	6.35E-03	5.26E-06	2.17E-02	5.05E-04
	Transport	A2	4.91E-01	4.91E-01	0.00E+00	2.56E-04	1.07E-07	9.48E-03	2.45E-06
	Manufacturing	A3	6.83E-01	6.82E-01	3.53E-04	3.35E-04	2.55E-08	1.31E-03	6.81E-06
	Total	A1-3	9.08E+00	9.42E+00	-3.43E-01	6.94E-03	5.39E-06	3.24E-02	5.14E-04
Construction process stage	Transport	A4	4.72E-02	4.72E-02	0.00E+00	1.85E-05	1.09E-08	1.92E-04	3.31E-07
	Construction	A5	8.71E-01	8.71E-01	-3.53E-04	3.62E-04	2.75E-07	1.98E-03	2.61E-05
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	5.26E-02	5.26E-02	0.00E+00	2.06E-05	1.22E-08	2.13E-04	3.69E-07
	Waste processing	C3	8.13E+00	7.78E+00	3.43E-01	1.94E-04	7.08E-08	6.61E-03	6.03E-06
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.76E+00	-3.76E+00	0.00E+00	-1.37E-03	-4.96E-07	-5.64E-03	-2.20E-05

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
GWP-biogenic = Global warming potential, biogenic;
GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;
AP = Acidification potential, accumulated exceedance; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results: PU foam + multilayer facing (continued)

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing).

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral& metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	4.89E-03	5.21E-02	1.82E-02	2.11E-05	2.44E+02	-1.14E+01	2.42E-07
	Transport	A2	2.41E-03	2.68E-02	7.12E-03	8.99E-07	6.79E+00	2.54E-02	3.43E-08
	Manufacturing	A3	3.78E-04	3.97E-03	1.31E-02	7.88E-07	7.78E+00	1.28E-01	8.93E-09
	Total	A1-3	7.68E-03	8.29E-02	3.84E-02	2.28E-05	2.59E+02	-1.13E+01	2.85E-07
Construction process stage	Transport	A4	5.72E-05	6.31E-04	1.93E-04	1.67E-07	7.01E-01	3.24E-03	4.07E-09
	Construction	A5	5.69E-04	5.97E-03	2.34E-03	1.32E-06	1.32E+01	-5.53E-01	1.62E-08
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	6.38E-05	7.03E-04	2.15E-04	1.86E-07	7.81E-01	3.61E-03	4.54E-09
	Waste processing	C3	3.51E-03	3.45E-02	7.87E-03	2.72E-06	2.46E+00	1.99E-01	2.51E-08
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.40E-03	-1.60E-02	-4.86E-03	-3.72E-06	-7.25E+01	-3.09E-01	-2.44E-08

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results: PU foam + multilayer facing (continued)

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing).

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	2.75E-01	8.12E+01	3.32E-09	1.93E-07	4.23E+01
	Transport	A2	3.32E-02	4.96E+00	2.24E-10	4.37E-09	4.37E+00
	Manufacturing	A3	1.55E-01	3.95E+00	1.50E-10	2.63E-09	4.34E+00
	Total	A1-3	4.63E-01	9.01E+01	3.69E-09	2.00E-07	5.10E+01
Construction process stage	Transport	A4	3.67E-03	5.81E-01	1.80E-11	5.90E-10	4.91E-01
	Construction	A5	2.45E-02	5.97E+00	2.69E-10	1.09E-08	2.66E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	4.09E-03	6.48E-01	2.01E-11	6.58E-10	5.47E-01
	Waste processing	C3	1.57E-02	2.70E+01	1.51E-09	1.64E-08	5.51E-01
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-8.19E-01	-1.46E+01	-4.76E-10	-1.00E-08	-9.77E+00

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results: PU foam + multilayer facing (continued)

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing).

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	1.30E+01	2.64E+00	1.57E+01	1.62E+02	8.21E+01	2.44E+02
	Transport	A2	6.72E-02	0.00E+00	6.72E-02	6.79E+00	0.00E+00	6.79E+00
	Manufacturing	A3	1.13E+00	0.00E+00	1.13E+00	6.66E+00	1.06E+00	7.72E+00
	Total	A1-3	1.42E+01	2.64E+00	1.69E+01	1.76E+02	8.32E+01	2.59E+02
Construction process stage	Transport	A4	1.01E-02	0.00E+00	1.01E-02	7.01E-01	0.00E+00	7.01E-01
	Construction	A5	7.23E-01	0.00E+00	7.23E-01	9.00E+00	-1.06E+00	7.93E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	1.12E-02	0.00E+00	1.12E-02	7.81E-01	0.00E+00	7.81E-01
	Waste processing	C3	1.77E-01	-2.64E+00	-2.46E+00	2.46E+00	-8.21E+01	-7.97E+01
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4.34E+00	0.00E+00	-4.34E+00	-7.13E+01	0.00E+00	-7.13E+01

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results: PU foam + multilayer facing (continued)

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing).

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	2.19E-02	3.58E-03	0.00E+00	2.26E+00
	Transport	A2	2.37E-03	1.30E-05	0.00E+00	6.61E-04
	Manufacturing	A3	7.20E-03	6.84E-04	0.00E+00	3.03E-03
	Total	A1-3	3.15E-02	4.28E-03	0.00E+00	2.26E+00
Construction process stage	Transport	A4	2.35E-04	2.59E-06	0.00E+00	8.82E-05
	Construction	A5	1.77E-03	2.16E-04	0.00E+00	1.13E-01
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.62E-04	2.88E-06	0.00E+00	9.82E-05
	Waste processing	C3	1.58E-03	2.58E-05	0.00E+00	4.80E-03
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	2.84E-02	-7.57E-04	0.00E+00	-7.42E-03

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results: PU foam + multilayer facing (continued)

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing).

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.85E-01	3.12E+00	8.49E-05
	Transport	A2	7.93E-03	1.00E-01	4.75E-05
	Manufacturing	A3	1.24E-02	3.37E-01	3.96E-05
	Total	A1-3	2.05E-01	3.56E+00	1.72E-04
Construction process stage	Transport	A4	7.86E-04	1.40E-02	4.83E-06
	Construction	A5	1.07E-02	3.42E-01	9.22E-06
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	8.76E-04	1.56E-02	5.38E-06
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-6.01E-02	-8.73E-01	-2.26E-04

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results: PU foam + multilayer facing (continued)

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.47E-03	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	9.43E-03	1.55E-01	0.00E+00	0.00E+00	0.00E+00
	Total	A1-3	0.00E+00	9.43E-03	1.55E-01	0.00E+00	0.00E+00	0.00E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	2.80E-02	1.66E-01	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	0.00E+00	3.16E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

LCA Results: PU foam with the thickness of ~100 mm with the weight of 2.824 kg/m²

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	7.23E+00	7.28E+00	-6.29E-02	4.15E-03	5.21E-06	1.61E-02	4.59E-04
	Transport	A2	4.53E-01	4.53E-01	0.00E+00	2.38E-04	9.80E-08	8.99E-03	2.23E-06
	Manufacturing	A3	6.73E-01	6.73E-01	3.53E-04	2.80E-04	2.47E-08	1.26E-03	6.27E-06
	Total	A1-3	8.35E+00	8.41E+00	-6.26E-02	4.67E-03	5.34E-06	2.64E-02	4.68E-04
Construction process stage	Transport	A4	4.22E-02	4.22E-02	0.00E+00	1.66E-05	9.76E-09	1.71E-04	2.96E-07
	Construction	A5	8.20E-01	8.20E-01	-3.53E-04	2.48E-04	2.72E-07	1.68E-03	2.38E-05
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	4.70E-02	4.69E-02	0.00E+00	1.84E-05	1.09E-08	1.91E-04	3.30E-07
	Waste processing	C3	7.78E+00	7.78E+00	6.29E-02	1.94E-04	7.08E-08	6.61E-03	6.03E-06
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.76E+00	-3.76E+00	0.00E+00	-1.32E-03	-4.96E-07	-5.61E-03	-2.18E-05

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
GWP-biogenic = Global warming potential, biogenic;
GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;
AP = Acidification potential, accumulated exceedance; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results: PU foam with the thickness of ~100 mm with the weight of 2.824 kg/m²

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral& metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	3.80E-03	4.05E-02	1.44E-02	1.22E-05	2.29E+02	-1.19E+01	1.38E-07
	Transport	A2	2.29E-03	2.54E-02	6.73E-03	8.21E-07	6.23E+00	2.30E-02	3.08E-08
	Manufacturing	A3	3.60E-04	3.85E-03	1.30E-02	8.21E-07	7.58E+00	1.22E-01	8.18E-09
	Total	A1-3	6.45E-03	6.98E-02	3.42E-02	1.37E-05	2.43E+02	-1.17E+01	1.77E-07
Construction process stage	Transport	A4	5.11E-05	5.64E-04	1.73E-04	1.49E-07	6.26E-01	2.89E-03	3.64E-09
	Construction	A5	5.07E-04	5.31E-03	2.13E-03	8.67E-07	1.23E+01	-5.76E-01	1.08E-08
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	5.69E-05	6.27E-04	1.92E-04	1.66E-07	6.97E-01	3.22E-03	4.05E-09
	Waste processing	C3	3.51E-03	3.45E-02	7.87E-03	2.72E-06	2.46E+00	1.99E-01	2.51E-08
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.39E-03	-1.59E-02	-4.84E-03	-3.70E-06	-7.23E+01	-3.05E-01	-2.39E-08

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results: PU foam with the thickness of ~100 mm with the weight of 2.824 kg/m²

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	1.91E-01	5.94E+01	2.05E-09	1.76E-07	2.37E+00
	Transport	A2	3.04E-02	4.53E+00	2.08E-10	3.95E-09	3.87E+00
	Manufacturing	A3	1.54E-01	3.79E+00	1.45E-10	2.52E-09	3.90E+00
	Total	A1-3	3.75E-01	6.77E+01	2.40E-09	1.82E-07	1.01E+01
Construction process stage	Transport	A4	3.28E-03	5.19E-01	1.61E-11	5.27E-10	4.38E-01
	Construction	A5	2.01E-02	4.84E+00	2.04E-10	1.01E-08	6.15E-01
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.65E-03	5.78E-01	1.79E-11	5.87E-10	4.88E-01
	Waste processing	C3	1.57E-02	2.70E+01	1.51E-09	1.64E-08	5.51E-01
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-8.17E-01	-1.46E+01	-4.74E-10	-9.95E-09	-9.36E+00

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results: PU foam with the thickness of ~100 mm with the weight of 2.824 kg/m²

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	8.10E+00	0.00E+00	8.10E+00	1.51E+02	7.81E+01	2.29E+02
	Transport	A2	6.09E-02	0.00E+00	6.09E-02	6.23E+00	0.00E+00	6.23E+00
	Manufacturing	A3	1.04E+00	0.00E+00	1.04E+00	6.52E+00	1.06E+00	7.58E+00
	Total	A1-3	9.20E+00	0.00E+00	9.20E+00	1.63E+02	7.92E+01	2.43E+02
Construction process stage	Transport	A4	8.98E-03	0.00E+00	8.98E-03	6.26E-01	0.00E+00	6.26E-01
	Construction	A5	4.72E-01	0.00E+00	4.72E-01	8.38E+00	-1.06E+00	7.32E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	9.99E-03	0.00E+00	9.99E-03	6.97E-01	0.00E+00	6.97E-01
	Waste processing	C3	1.77E-01	0.00E+00	1.77E-01	2.46E+00	-7.81E+01	-7.57E+01
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-4.27E+00	0.00E+00	-4.27E+00	-7.12E+01	0.00E+00	-7.12E+01

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results: PU foam with the thickness of ~100 mm with the weight of 2.824 kg/m²

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	1.59E-03	1.83E-05	0.00E+00	2.24E+00
	Transport	A2	2.19E-03	1.18E-05	0.00E+00	5.97E-04
	Manufacturing	A3	5.21E-04	2.09E-04	0.00E+00	2.88E-03
	Total	A1-3	4.30E-03	2.39E-04	0.00E+00	2.25E+00
Construction process stage	Transport	A4	2.10E-04	2.31E-06	0.00E+00	7.88E-05
	Construction	A5	4.11E-04	1.43E-05	0.00E+00	1.13E-01
End of life	Deconstruction. demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.34E-04	2.57E-06	0.00E+00	8.77E-05
	Waste processing	C3	1.58E-03	2.58E-05	0.00E+00	4.80E-03
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse. recovery. recycling potential	D	2.48E-02	-9.85E-04	0.00E+00	-7.34E-03

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results: PU foam with the thickness of ~100 mm with the weight of 2.824 kg/m²

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	6.06E-02	1.50E+00	5.37E-05
	Transport	A2	7.30E-03	9.08E-02	4.36E-05
	Manufacturing	A3	1.19E-02	3.23E-01	3.92E-05
	Total	A1-3	7.98E-02	1.91E+00	1.36E-04
Construction process stage	Transport	A4	7.03E-04	1.25E-02	4.31E-06
	Construction	A5	4.37E-03	2.60E-01	7.42E-06
End of life	Deconstruction. demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	7.82E-04	1.39E-02	4.80E-06
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse. recovery. recycling potential	D	-5.98E-02	-8.67E-01	-2.26E-04

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results: PU foam with the thickness of ~100 mm with the weight of 2.824 kg/m²

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.47E-03	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	0.00E+00	1.55E-01	0.00E+00	0.00E+00	0.00E+00
	Total	A1-3	0.00E+00	0.00E+00	1.55E-01	0.00E+00	0.00E+00	0.00E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	2.75E-02	1.66E-01	0.00E+00	0.00E+00	0.00E+00
End of life	Deconstruction. demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	0.00E+00	3.16E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse. recovery. recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

LCA Results: Multilayer facing with the weight of 0.340 kg/m²

Life cycle impacts per m² of a 100mm Eurothane GP, Eurowall Cavity, Eurowall+, Instafit or Eurothane Eurodeck multilayer faced insulation board (PU foam + multilayer facing)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	6.79E-01	9.57E-01	-2.81E-01	2.20E-03	4.62E-08	5.52E-03	4.55E-05
	Transport	A2	3.85E-02	3.85E-02	0.00E+00	1.76E-05	8.72E-09	4.89E-04	2.24E-07
	Manufacturing	A3	9.88E-03	9.82E-03	0.00E+00	5.49E-05	7.59E-10	4.65E-05	5.47E-07
	Total	A1-3	7.27E-01	1.01E+00	-2.81E-01	2.27E-03	5.57E-08	6.05E-03	4.63E-05
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

GWP-total = Global warming potential. total;
GWP-fossil = Global warming potential. fossil;
GWP-biogenic = Global warming potential. biogenic;
GWP-luluc = Global warming potential. land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;
AP = Acidification potential. accumulated exceedance; and
EP-freshwater = Eutrophication potential. fraction of nutrients reaching freshwater end compartment

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral& metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ. net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	1.09E-03	1.16E-02	3.76E-03	8.99E-06	1.55E+01	4.34E-01	1.03E-07
	Transport	A2	1.27E-04	1.41E-03	3.89E-04	7.82E-08	5.57E-01	2.31E-03	3.52E-09
	Manufacturing	A3	1.83E-05	1.25E-04	3.78E-05	7.82E-08	1.94E-01	6.03E-03	7.54E-10
	Total	A1-3	1.24E-03	1.31E-02	4.19E-03	9.12E-06	1.63E+01	4.43E-01	1.07E-07
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

EP-marine = Eutrophication potential. fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential. accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;

ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential. deprivation-weighted water consumption; and
PM = Particulate matter.

Parameters describing environmental impacts

			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	8.41E-02	2.18E+01	1.27E-09	1.72E-08	3.99E+01
	Transport	A2	2.79E-03	4.33E-01	1.57E-11	4.20E-10	5.00E-01
	Manufacturing	A3	1.03E-03	1.65E-01	5.16E-12	1.10E-10	4.31E-01
	Total	A1-3	8.79E-02	2.24E+01	1.29E-09	1.78E-08	4.09E+01
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

Parameters describing resource use. primary energy

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	4.93E+00	2.64E+00	7.57E+00	1.15E+01	3.98E+00	1.55E+01
	Transport	A2	6.29E-03	0.00E+00	6.29E-03	5.57E-01	0.00E+00	5.57E-01
	Manufacturing	A3	8.44E-02	0.00E+00	8.44E-02	1.35E-01	0.00E+00	1.35E-01
	Total	A1-3	5.03E+00	2.64E+00	7.66E+00	1.22E+01	3.98E+00	1.62E+01
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

Parameters describing resource use. secondary materials and fuels. use of water

			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	2.04E-02	3.56E-03	0.00E+00	1.16E-02

Parameters describing resource use. secondary materials and fuels. use of water

			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
	Transport	A2	1.79E-04	1.19E-06	0.00E+00	6.36E-05
	Manufacturing	A3	6.68E-03	4.75E-04	0.00E+00	1.46E-04
	Total	A1-3	2.72E-02	4.04E-03	0.00E+00	1.18E-02
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	0.00E+00

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

Other environmental information describing waste categories

			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.24E-01	1.62E+00	3.12E-05
	Transport	A2	6.31E-04	9.22E-03	3.87E-06
	Manufacturing	A3	5.24E-04	1.40E-02	3.86E-07
	Total	A1-3	1.26E-01	1.64E+00	3.54E-05

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

Other environmental information describing output flows – at end of life

			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	9.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total	A1-3	0.00E+00	9.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling
MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	On leaving the manufacturing factory, the insulation board is transported to the construction site. A default transport distance is assumed of 89 km according to EN 15804+A2 PN 514 Rev 3.1.		
	Transport, lorry 16-32 metric tons – Impact	Kg CO2e/tkm	0.17
	Distance	km	89
	Capacity utilisation (incl. empty returns)	%	50
	Bulk density of transported products	kg/m^3	30
A5 – Installation in the building	An installation loss of 5% assumed as a default scenario according to EN 15804+A2 PN 514 Rev 3.1. No resources & energy are considered for the installation of the insulation boards. The packaging materials to pack the final product are accounted for as waste in this stage as well.		
	Waste materials during installation	%	5
Reference service life	The reference service life (RSL) of the product is equal to the lifetime of the building. As per default (BRE PN514 EN15804+A2 PCR V3.1), the RSL of the insulation board is 120 years.		
C1 - Deconstruction	To model the impact of deconstruction, we make use of the assumptions put forward in the MMG study (Allacker K. et al., 2018). No impacts are allocated to the deconstruction of insulation boards. PU insulation boards can be deconstructed manually or by machinery and are collected in mixed construction waste. Since this waste stream is easily collected on a construction site, 100% of the insulation board is assumed to be collected.		
C2 – Transportation	The BRE PN514 EN15804+A2 PCR V3.1 does not provide a default transportation scenario for the End-of-life. Therefore, a distance of 100 km is assumed to the incineration facility		
	Transport, lorry 16-32 metric tons – Distance	km	100
	Capacity utilisation (incl. empty returns)	%	50
C3 – Waste processing	Incineration with energy recovery as per BRE PN514 EN15804+A2 PCR V3.1. PU insulation boards are collected in mixed construction waste. Since this waste stream is easily collected on a construction site, 100% of the insulation board is assumed to be collected and incinerated. 11% is recovered as electricity, 62% as heat and the rest is efficiency loss throughout the process (lower heating values – MJ/kg). For more information about this, please consult in annex the research of Eriksson, O., & Finnveden, G. (2017). No module C4 impacts as 100% of the product will be incinerated for energy recovery and heat.		
	Waste for energy recovery	%	100
	Material waste to incineration	Kg/m^2	3.164
	Material	Lower heating value (MJ/kg)	
	PUR*	26.27	
	PE	42.47	
	Glue (epoxy resin)	12.82	

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
	Paper	14.05	
	Lacquer (acrylic varnish)	20.44	
	* Lower heating value is a weighted average of the materials used in the PU foam production		
Module D	Benefits of incinerating waste generated in module C3 are taken into account in module D. 11% of the lower heating value is recovered as electricity (avoided production of electricity), 62% as heat (avoided production of heat) and the rest are efficiency losses, based on Eriksson & Finnveden, 2017. Energy recovery - Market for electricity, medium voltage (GB) = 9.72 MJ Market for heat, district or industrial, natural gas (RER) = 54.77 MJ Recycling of own and incoming packaging Market for containerboard, linerboard = 0.008 kg Packaging film, LDPE – Europe = 0.0289 kg		

Summary, comments and additional information

Analysis and interpretation

This graph represents the impact of 1 m² of 100 mm PU foam and multilayer facing. The relative contribution of the different life cycle stages is given. It is clear that A1, the raw material production, is the most prominent contributor to all impact indicators. C3, the incineration at the end-of-life, and A2, the transport to the manufacturing site, are also good contributors to various impact indicators. Life cycle stage D is a negative contributor because of the energy recovery accompanied with the incineration production/construction waste.

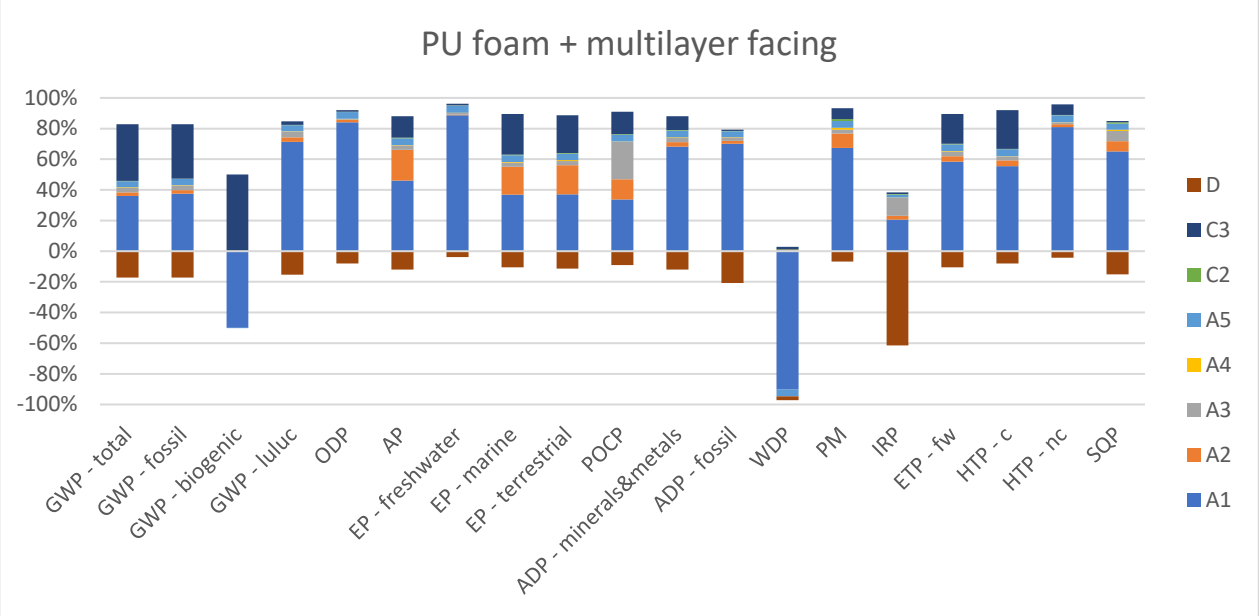


Figure 1. Relative contribution of the life cycle stages to the core and additional environmental impacts of the insulation board (PU foam + multilayer facing).

This graph represents the impact of the multilayer facing of 1 m² of 100 mm Eurothane GP. The relative contribution of the different life cycle stages is given. It is clear that A1, the raw material production, is the most prominent contributor to all impact indicators. A2, the transport to the manufacturing site, is also a good

contributor to various impact indicators. After A3, no impacts are considered because the facing is not physically split from the foam anymore. All impacts are now considered in the “foam” section.

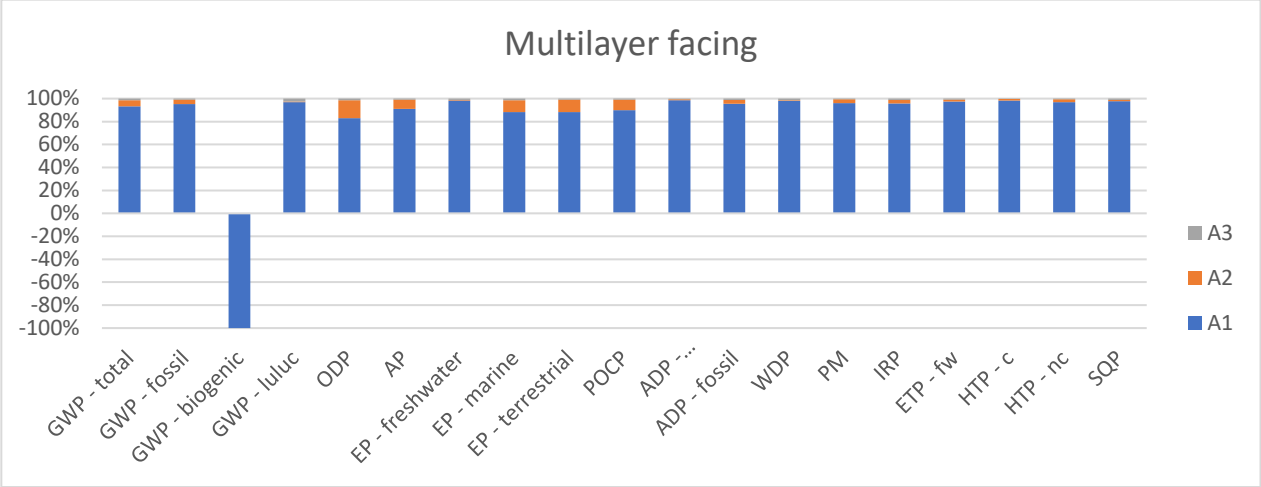


Figure 2. Relative contribution of the life cycle stages to the core and additional environmental impacts of the multilayer facing.

This graph represents the impact of the PU foam of 1 m² of 100 mm Eurothane GP. The relative contribution of the different life cycle stages is given. It is clear that A1, the raw material production, is the most prominent contributor to all impact indicators. C3, the incineration at the end-of-life, A2, the transport to the manufacturing site, and A5, the construction waste, are also good contributors to various impact indicators. Life cycle stage D is a negative contributor because of the energy recovery accompanied with the incineration production/construction waste.

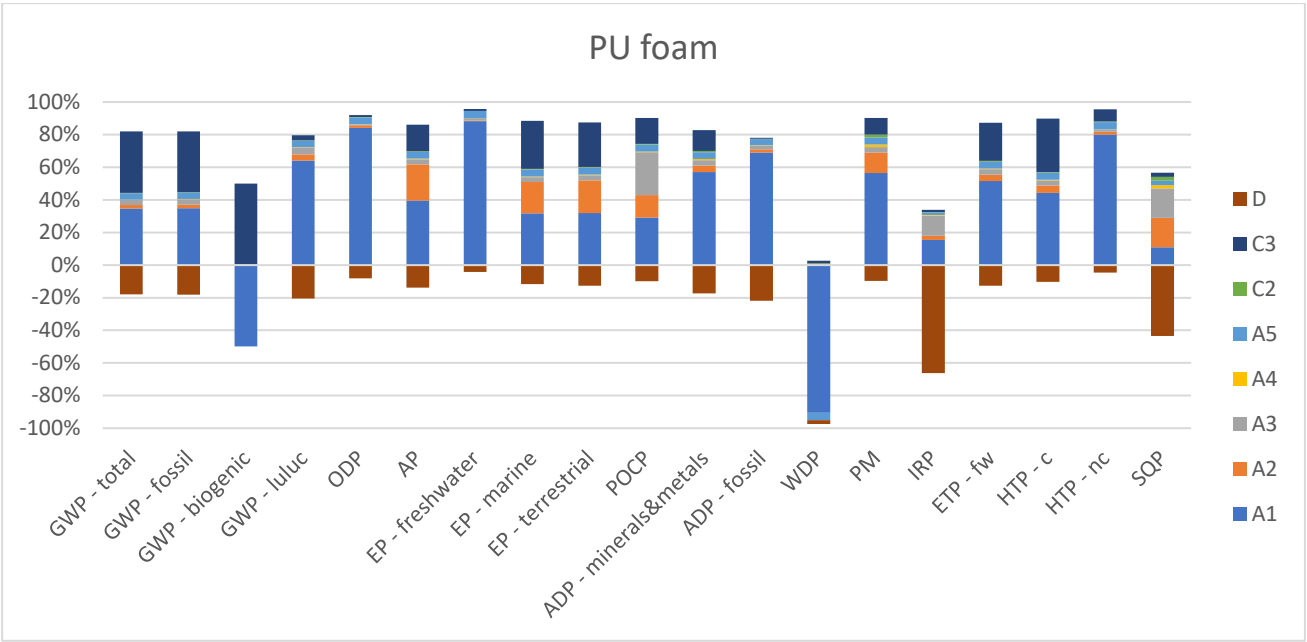


Figure 3. Relative contribution of the life cycle stages to the core and additional environmental impacts of the PU foam.

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