



## ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804 + A1  
Owner of the Declaration – Ballytherm Trading Ltd.

---

Declaration number: EPDIE-21-43  
Issue date 19th April 2021  
Valid to 19th April 2026

---

EPD Programme - EPD Ireland  
Programme Operator - Irish Green Building Council  
[www.epdireland.org](http://www.epdireland.org)

### Foil faced PIR insulation boards

25mm, 50mm, 100mm, 150mm thicknesses

## 1. General information

PROGRAMME OPERATOR	OWNER OF DECLARATION
Irish Green Building Council, 19 Mountjoy Square, Dublin D01 E8P5	Ballytherm Trading Ltd, Annagh Industrial Park Ballyconnell, Co. Cavan, H14 X528, Ireland
DECLARATION NUMBER	PRODUCTION SITE
EPDIE-21-43	Ballytherm Trading Ltd, Annagh Industrial Park Ballyconnell, Co. Cavan, H14 X528, Ireland
ECO PLATFORM EPD	DECLARED UNIT
Yes	1m <sup>2</sup> Foil faced 25mm, R-value 1.136 m <sup>2</sup> K/W 1m <sup>2</sup> Foil faced 50mm, R-value 2.272 m <sup>2</sup> K/W 1m <sup>2</sup> Foil faced 100mm, R-value 4.545 m <sup>2</sup> K/W 1m <sup>2</sup> Foil faced 150mm, R-value 6.818 m <sup>2</sup> K/W
APPLICABLE PRODUCT CATEGORY RULES	DECLARED PRODUCT
EN 15804:2012+A1:2013, EPD Ireland PCR Part A. I.S. EN 16783:2017 Thermal insulation products – Product category rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations	Ballytherm foil faced PIR insulation boards: 25mm, 50mm, 100mm, 150mm thicknesses
DATE OF ISSUE	SCOPE OF EPD
19.04.2021	Cradle to gate (A1-A3)
DATE OF EXPIRY	LCA CONSULTANT OR PERSON RESPONSIBLE FOR LCA
19.04.2026	EcoReview, Kilkenny, Co. Kilkenny, Ireland, +353 87 258 9783 / +31 646 264 9327 info@ecoreview.ie / www.ecoreview.eu
TYPE OF EPD: SINGLE OR MULTI PRODUCT	LCA SOFTWARE AND DEVELOPER IF APPLICABLE
Multi product EPD	Ecochain
PRODUCT CLASSIFICATION OR NACE CODE	NAME AND VERSION OF INVENTORY USED
Thermal insulation products	Ecoinvent v 3.5
COMPARABILITY	
Environmental Product Declarations from different programmes may not be directly comparable if not compliant with EN 15804:2012+A1:2013. 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+2012+A1:2013	
The CEN Norm /EN 15804 serves as the core PCR	
Independent verification of the declaration according to ISO 14025	

Internally  Externally

SIGNATURE OF PROGRAMME OPERATOR	SIGNATURE VERIFIER
Pat Barry - CEO - Irish Green Building Council  	Kim Allbury - Intertek Deutschland GmbH  

## 2. Scope and Type of EPD

This is a Cradle to Gate EPD. The Modules that are declared are shown in the table below.

PRODUCT STAGE			CONSTRUCTION ON 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
<b>A1</b>	<b>A2</b>	<b>A3</b>	<b>A4</b>	<b>A5</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>D</b>
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X - Module declared.

MND - Module not declared.

### 3. Detailed product description

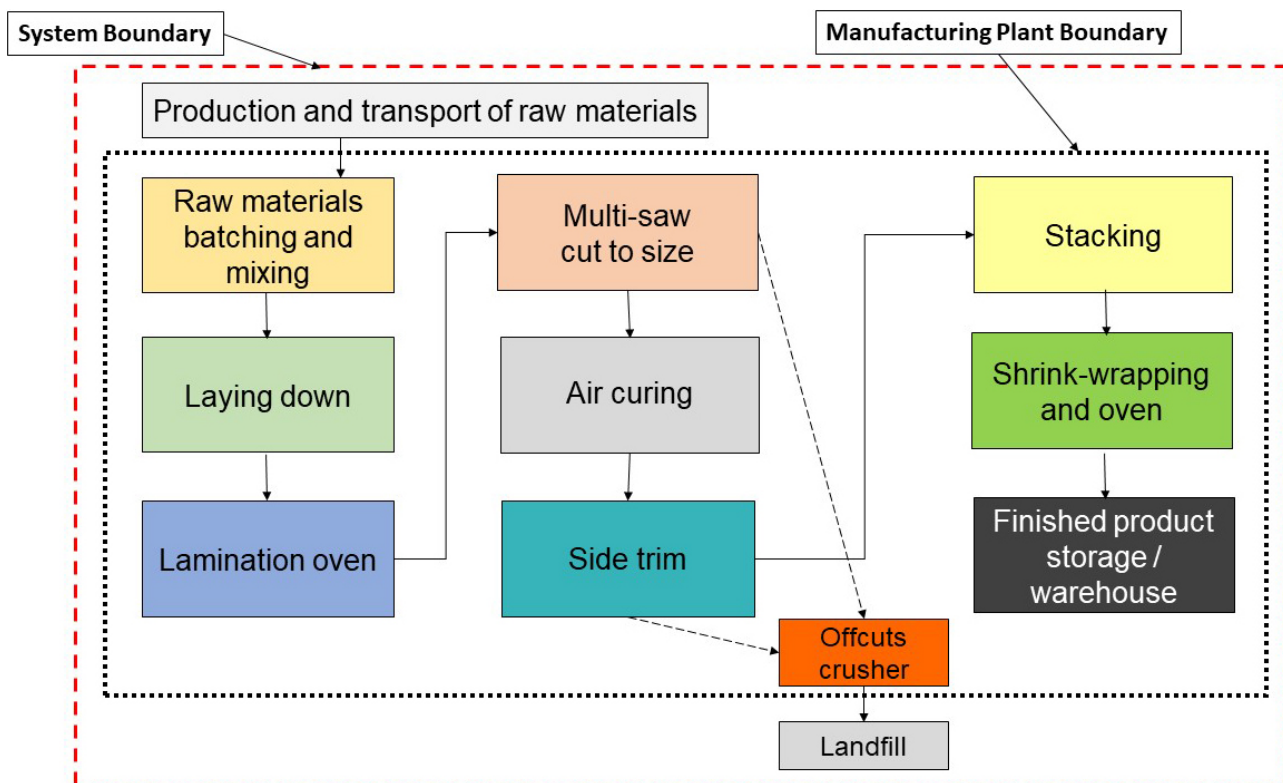
This EPD is carried out for the Ballytherm PIR insulation panels comprising foil-faced panels 25mm, 50mm, 100mm and 150mm thick. The main raw materials of the insulation boards are MDI, polyol, flame retardant, pentane blowing agent, foil sheet facings, and minor amounts of catalysts. The insulation products are manufactured in accordance with BS EN 13165:2012+A2:2016 Thermal insulation products for buildings. Factory made rigid polyurethane foam (PU) products. Specification. These Ballytherm insulation products are used in floors, cavity walls, drylining board, steel and timber-frame walls.

Further product details available at: <https://www.ballytherm.ie/downloads/>

#### 3.1 Manufacturing Process

The bulk raw chemicals (polyol & MDI) are mixed with various catalysts and additives before being metered onto a moving conveyor. The chemical mix then starts to rise, due to the effects of the blowing agent, to produce the foam. The foam continues to rise until it contacts the top layer of facer material as it enters the double-belt laminator, where it is then cured under heat to produce the rigid, thermoset foam board. The board exits the lamination oven and then reaches a cross-cut saw which cuts the board into shorter mother boards. Each mother board then enters a cooling zone before entering a multiblade cutting area which removes side trims and cuts the boards to the required length. There is a minor amount of additional cutting to produce specialty boards. Finished boards are stored in the warehouse before despatch to customers. Off-cuts from the cutting and trimming are sent to landfill.

The manufacturing process flowchart is shown below:



## 4.1 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 25mm, R-value 1.136 m<sup>2</sup>K/W

### Environmental impact per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO <sub>2</sub> -Eq.]	3.41E+00	9.80E-02	7.25E-02	3.58E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ODP	[kg CFC11-Eq.]	5.63E-07	1.80E-08	6.89E-09	5.88E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO <sub>2</sub> -Eq.]	1.76E-02	3.29E-04	3.12E-04	1.82E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO <sub>4</sub> ) -Eq.]	4.28E-03	4.52E-05	1.00E-04	4.43E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	3.97E-03	5.12E-05	1.69E-03	5.71E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	2.24E-05	2.85E-07	1.74E-07	2.29E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	6.84E+01	1.49E+00	5.84E-01	7.05E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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.

Note - MND - Module not declared INA - Indicator not assessed.

## 4.1 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 25mm, R-value 1.136 m<sup>2</sup>K/W

### Resource use per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	5.70E+00	1.69E-02	7.35E-01	6.45E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	5.70E+00	1.69E-02	7.35E-01	6.45E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	5.39E+01	1.60E+00	6.21E-01	5.61E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	1.77E+01	0.00E+00	0.00E+00	1.77E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	7.16E+01	1.60E+00	6.21E-01	7.38E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	6.86E-02	2.47E-04	1.22E-04	6.90E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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. INA = Indicator not assessed. MND = Module not declared.

SM, RSF and NRSF are not calculated by the EcoChain software.

## 4.1 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 25mm, R-value 1.136 m<sup>2</sup>K/W

### Output flows and waste categories per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
HWD	[kg]	1.35E-04	9.55E-07	7.12E-07	1.37E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	2.90E-01	6.86E-02	5.74E-02	4.16E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	1.47E-04	1.01E-05	3.86E-06	1.61E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

## 4.2 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 50mm, R-value 2.272 m<sup>2</sup>K/W

### Environmental impact per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO <sub>2</sub> -Eq.]	9.49E+00	2.63E-01	7.25E-02	9.83E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ODP	[kg CFC11-Eq.]	1.62E-06	4.84E-08	6.89E-09	1.68E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO <sub>2</sub> -Eq.]	4.86E-02	7.88E-04	3.12E-04	4.97E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO <sub>4</sub> ) -Eq.]	1.22E-02	1.14E-04	1.00E-04	1.24E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	1.14E-02	1.34E-04	1.69E-03	1.32E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	4.73E-05	7.79E-07	1.74E-07	4.83E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	1.93E+02	4.01E+00	5.84E-01	1.97E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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.

Note - MND - Module not declared INA - Indicator not assessed.



## 4.2 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 50mm, R-value 2.272 m<sup>2</sup>K/W

### Resource use per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	1.23E+01	4.46E-02	7.35E-01	1.31E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	1.23E+01	4.46E-02	7.35E-01	1.31E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	1.54E+02	4.30E+00	6.21E-01	1.59E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	4.86E+01	0.00E+00	0.00E+00	4.86E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	2.03E+02	4.30E+00	6.21E-01	2.08E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	1.93E-01	6.64E-04	1.22E-04	1.93E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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. INA = Indicator not assessed. MND = Module not declared.

SM, RSF and NRSF are not calculated by the EcoChain software.

## 4.2 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 50mm, R-value 2.272 m<sup>2</sup>K/W

### Output flows and waste categories per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
HWD	[kg]	2.23E-04	2.57E-06	7.12E-07	2.26E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	7.65E-01	1.88E-01	5.74E-02	1.01E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	4.17E-04	2.73E-05	3.86E-06	4.48E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

### 4.3 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 100mm, R-value 4.545 m<sup>2</sup>K/W

#### Environmental impact per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
GWP	[kg CO <sub>2</sub> -Eq.]	1.77E+01	4.81E-01	7.25E-02	1.82E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ODP	[kg CFC11-Eq.]	3.05E-06	8.86E-08	6.89E-09	3.14E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO <sub>2</sub> -Eq.]	9.04E-02	1.39E-03	3.12E-04	9.21E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO <sub>4</sub> ) -Eq.]	2.29E-02	2.04E-04	1.00E-04	2.32E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	2.13E-02	2.45E-04	1.69E-03	2.33E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	8.09E-05	1.43E-06	1.74E-07	8.25E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	3.59E+02	7.35E+00	5.84E-01	3.67E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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.

Note - MND - Module not declared INA - Indicator not assessed.

### 4.3 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 100mm, R-value 4.545 m<sup>2</sup>K/W

#### Resource use per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	2.13E+01	8.12E-02	7.35E-01	2.21E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	2.13E+01	8.12E-02	7.35E-01	2.21E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	2.89E+02	7.87E+00	6.21E-01	2.97E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	8.97E+01	0.00E+00	0.00E+00	8.97E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	3.78E+02	7.87E+00	6.21E-01	3.87E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	3.60E-01	1.21E-03	1.22E-04	3.61E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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. INA = Indicator not assessed. MND = Module not declared.

SM, RSF and NRSF are not calculated by the EcoChain software.

### 4.3 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 100mm, R-value 4.545 m<sup>2</sup>K/W

#### Output flows and waste categories per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
HWD	[kg]	3.42E-04	4.71E-06	7.12E-07	3.47E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	1.40E+00	3.46E-01	5.74E-02	1.81E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	7.80E-04	5.00E-05	3.86E-06	8.34E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

## 4.4 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 150mm, R-value 6.818 m<sup>2</sup>K/W

### Environmental impact per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
GWP	[kg CO <sub>2</sub> -Eq.]	2.67E+01	7.22E-01	7.25E-02	2.75E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
ODP	[kg CFC11-Eq.]	4.63E-06	1.33E-07	6.89E-09	4.77E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO <sub>2</sub> -Eq.]	1.37E-01	2.06E-03	3.12E-04	1.39E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO <sub>4</sub> ) -Eq.]	3.48E-02	3.04E-04	1.00E-04	3.52E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	3.24E-02	3.66E-04	1.69E-03	3.44E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	1.18E-04	2.15E-06	1.74E-07	1.20E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	5.44E+02	1.10E+01	5.84E-01	5.55E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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.

Note - MND - Module not declared INA - Indicator not assessed.

## 4.4 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 150mm, R-value 6.818 m<sup>2</sup>K/W

### Resource use per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	3.12E+01	1.21E-01	7.35E-01	3.20E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	3.12E+01	1.21E-01	7.35E-01	3.20E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	4.38E+02	1.18E+01	6.21E-01	4.50E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	1.35E+02	0.00E+00	0.00E+00	1.35E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	5.73E+02	1.18E+01	6.21E-01	5.85E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	5.45E-01	1.82E-03	1.22E-04	5.47E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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. INA = Indicator not assessed. MND = Module not declared.

SM, RSF and NRSF are not calculated by the EcoChain software.

## 4.4 LCA results - Ballytherm 1m<sup>2</sup> Foil faced 150mm, R-value 6.818 m<sup>2</sup>K/W

### Output flows and waste categories per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
HWD	[kg]	4.73E-04	7.06E-06	7.12E-07	4.81E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
NHWD	[kg]	2.11E+00	5.19E-01	5.74E-02	2.69E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	1.18E-03	7.50E-05	3.86E-06	1.26E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.



## 5.1 LCA results - Additional Impact Indicators - Ballytherm 1m<sup>2</sup> Foil faced 25mm, R-value 1.136 m<sup>2</sup>K/W

Environmental impact per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Human toxicity potential	kg 1,4-DB-eq	1.69E+00	3.79E-02	2.42E-02	1.75E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	8.23E-02	1.01E-03	4.44E-04	8.38E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	9.02E+01	3.92E+00	1.29E+00	9.55E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	1.88E-02	1.32E-04	5.59E-04	1.95E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.

## 5.2 LCA results - Additional Impact Indicators - Ballytherm 1m<sup>2</sup> Foil faced 50mm, R-value 2.272 m<sup>2</sup>K/W

Environmental impact per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
Human toxicity potential	kg 1,4-DB-eq	4.56E+00	1.01E-01	2.42E-02	4.68E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	2.30E-01	2.74E-03	4.44E-04	2.34E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	2.41E+02	1.05E+01	1.29E+00	2.53E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	5.36E-02	3.53E-04	5.59E-04	5.45E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.

### 5.3 LCA results - Additional Impact Indicators - Ballytherm 1m<sup>2</sup> Foil faced 100mm, R-value 4.545 m<sup>2</sup>K/W

#### Environmental impact per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	8.42E+00	1.85E-01	2.42E-02	8.63E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	4.28E-01	5.02E-03	4.44E-04	4.34E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	4.44E+02	1.93E+01	1.29E+00	4.64E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	9.98E-02	6.47E-04	5.59E-04	1.01E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.

## 5.4 LCA results - Additional Impact Indicators - Ballytherm 1m<sup>2</sup> Foil faced 150mm, R-value 6.818 m<sup>2</sup>K/W

### Environmental impact per m<sup>2</sup>

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Human toxicity potential	kg 1,4-DB-eq	1.27E+01	2.78E-01	2.42E-02	1.30E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	6.50E-01	7.52E-03	4.44E-04	6.58E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	6.68E+02	2.89E+01	1.29E+00	6.98E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	1.52E-01	9.69E-04	5.59E-04	1.53E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed.

## 6. Additional LCI Indicators

N/A

## 7. Calculation rules

### Methodology and reproducibility

The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented in the LCA report. In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated which can be accessed via the EcoChain tool. This data portfolio contains a summary of all the data used in this LCA, and correspondingly, in the Ballytherm insulation Ecochain account.

### Data quality

Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

### Data collection period

The dataset is representative for the production processes used in 2019.

## 8. Scenarios and additional technical information

### A1. Raw materials supply

This module considers the extraction and processing of all raw materials and energy which occur upstream to the Ballytherm Insulation manufacturing process, as well as waste processing up to the end-of waste state.

### A2. Transport of raw materials to manufacturer

This includes the transport distance of the raw materials to the manufacturing facility via road, boat and/or train.

### A3. Manufacturing

This module covers the manufacturing of Ballytherm Insulation and includes all processes linked to production such as, mixing, packing and internal transportation. Use of electricity, fuels and auxiliary materials used during production is taken into account as well.

## 9. Mandatory additional information on release of dangerous substances to indoor air, soil and water

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, or they do not exceed the limit for registration with the European Chemicals Agency.

## 10. Other optional additional environmental information

The CO<sub>2</sub> impact of these insulation products is mostly influenced by the materials (predominantly MDI and polyol) contributing in the order of 97% of the CO<sub>2</sub> impact, followed by processes/energy and transport at 3%.

## 11. References

1. ISO 14040 Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO 14040:2006.
2. ISO 14044 Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO 14044:2006
3. ISO 14025 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures', International Organization for Standardization, ISO 14025:2006.
4. I.S. EN 15804:2012+A1:2013 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', EN 15804:2012+A1:2013.
5. Product Category Rules: Part A. Implementation and use of I.S. EN 15804:2012 and CEN TR 16970:2016 in Ireland, EPD Ireland, IGBC
6. I.S. EN 16783:2017 Thermal insulation products – Product category rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations.
7. Ecochain, 2017, web: <http://app.ecochain.com>.
8. I.S. EN 13165:2008, Thermal insulation products for buildings. Factory made rigid polyurethane foam (PUR) products. Specification.
9. CML - Department of Industrial Ecology, CML-IA Characterisation Factors, August 2016, Leiden University, Leiden, Netherlands: <https://www.universiteitleiden.nl/en/research/research-output/science/cml-ia-characterisation-factors>.