ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Kingspan Insulation B.V.
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-KSI-20200286-CBA2-EN
Issue date	05/03/2021
Valid to	04/03/2026

Kooltherm[®] K8 Kingspan Insulation B.V.



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General Information

Kooltherm[®] K8 Kingspan Insulation B.V. Programme holder Owner of the declaration IBU - Institut Bauen und Umwelt e.V. Kingspan Insulation B.V. Panoramastr. 1 Lingewei 8 4004 LL Tiel 10178 Berlin The Netherlands Germanv **Declaration number** Declared product / declared unit EPD-KSI-20200286-CBA2-EN Kooltherm® K8 Cavity Wall Board 1 m², 100 mm thickness, $R_D = 4,75 \text{ m}^2 \cdot \text{K/W}$ This declaration is based on the product Scope: category rules: The insulation material Kooltherm[®], is produced by Kingspan Insulation B.V. at the manufacturing facility in Insulating materials made of foam plastics, 06.2017 Tiel, the Netherlands. A composite foil based facing is (PCR checked and approved by the SVR) autohesively bonded to the insulation core during manufacture. Issue date 05/03/2021 In order to enable the user of the EPD to calculate the LCA results for different thicknesses, the EPD contains Valid to the respective calculation rules. 04/03/2026 The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences. The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as EN 15804. Verification Man liten The standard EN 15804 serves as the core PCR Independent verification of the declaration and data according to ISO 14025:2010 Dipl. Ing. Hans Peters internally externally (chairman of Institut Bauen und Umwelt e.V.) Some Harly Dipl. Natw. ETH Sascha Igbal Dr Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.)) (Independent verifier) Product **Product description/Product definition** Application Due to its high insulating value, Kooltherm® K8 is

Kooltherm® K8 is a rigid thermoset cellular insulation material faced on both sides with a composite foil based facing. The product is available in variable thicknesses from 20 mm up to 200 mm. This EPD is based on a thickness of 100 mm and R_D -value of 4,75 m²·K/W.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (*CPR*) applies. The product needs a declaration of performance taking into consideration *EN 13166*:2012+A2:2016 - Thermal insulation products for buildings - Factory made phenolic foam (PF) products - specification and the CE-marking. For the application and use the respective national provisions apply.

suitable for use as cavity wall insulation.

Technical Data

Constructional data

Name	Value	Unit
Compressive strength acc. to EN 13166	≥ 100	kPa
Thermal conductivity λd acc. to EN 13166 for d = 20 – 44 mm	0.021	W/(mK)
Thermal conductivity λd acc. to EN 13166 for d = 45 – 120 mm	0.021	W/(mK)
Thermal conductivity λd acc. to EN 13166 for d = 121 – 159 mm	0.021	W/(mK)



Technical parameters not included are modulus of elasticity as well as sound absorption (not relevant for this application), and creep (not placed under permanent load).

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 13166*:2012+A2:2016 - Thermal insulation products for buildings - Factory made phenolic foam (PF) products -Specification

Base materials/Ancillary materials

The main materials are phenolic (PF) resin (between 70-80%) with added catalyst and additives (between 15-20%). Phenolic rigid foam onto a facing material (between 5-10%) is formed by the chemical reaction of these materials and adding a blowing agent with no ozone depletion potential (ca. 5%). Due to the closed cell structure (conform *EN 13166*), the blowing agent remains in the foam.

In the current *REACH* regulations, phenolic foam insulation products are considered "articles" and are exempt from the requirements of Article 57 and 59(1) of *REACH* Regulation (EC) No 1907/2006. These

LCA: Calculation rules

Declared Unit

The declared unit (1 m^2) and conversion factors are listed in the table below.

Declared unit

Name	Value	Unit
Declared unit	1	m ²
Gross density	35	kg/m ³
conversion factor [Mass/Declared Unit] (in kg/m²)	3.5	-
Grammage	3.5	kg/m ²
Layer thickness	0.1	m

System boundary

Type of EPD: according to *EN 15804*: cradle to gate with options, modules C1–C4, and module D (A1–A3, C, D and additional modules: A4,A5).

According to PCR Part A:

1a) declaration of one specific product from one plant of one manufacturer.

The product stage is a mandatory information module and it covers:

 A1, raw material extraction and processing, processing of secondary material input (e.g. recycling processes),

· A2, transport to the manufacturer,

• A3, manufacturing, including provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of-waste state or disposal of final residues during the product stage.

The construction process stage includes:

· A4 transport to the building site;

· A5 installation in the building

including provision of all materials, products and energy, as well as waste processing up to the end-of-

products are not classified as "hazardous products" according to any current legislation, and can hence be declared as follows:

- This article contains substances listed in the candidate list (date: 19.01.2021) exceeding 0.1 percentage by mass: **no.**

- This article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: **no.**

- Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Biocidal Products Regulation No. 528/2012 (*BPR*): **no.**

The chemical functional group of the additives used in the resin is that of non-ionic surfactants.

Reference service life

The reference service life is not to be declared in this EPD as it does not cover the use stage.

waste state or disposal of final residues during the construction process stage.

The end-of-life stage is a mandatory information module and it covers:

- · C1 de-construction, demolition;
- · C2 transport to waste processing;

C3 waste processing for reuse, recovery and/or recycling;

 \cdot C4 disposal (not applicable for this EPD) including provision and all transport, provision of all materials, products and related energy and water use.

Environmental burden of the incineration (R1 > 60%) of the product

at the end-of-life stage are assigned to the product system (C3); resulting potential credits for thermal and electrical energy from energy substitution are declared in module D.

Renewable electricity sources for manufacturing

All electricity used during production comes from renewable sources.

By generating energy on-site with solar panels and with procured energy from fully certified renewable sources. Following the global Net Zero Energy strategy from Kingspan Group plc.

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.

Factors for different thicknesses

The LCA results for the insulation material declared in this EPD refer to a product with a thickness of 100 mm. To enable the user of the EPD to calculate the results for different thicknesses the factors in the following table can be used for the calculation. For modules A1-



A3, C3 and D the LCA results in chapter 5 have to be

multiplied with these factors.

ка		Mo	dule A1 -	A3			Module C					Module D				
NO	100 mm	20 mm	80 mm	120 mm	200 mm	100 mm	20 mm	80 mm	120 mm	200 mm	100 mm	20 mm	80 mm	120 mm	200 mm	
GWP - total	1	0,26	0,81	1,18	2,06	1	0,20	0,80	1,20	2,01	1	0,20	0,80	1,20	2,17	
GWP - fossil	1	0,28	0,82	1,18	2,04	1	0,20	0,80	1,20	2,01	1	0,20	0,80	1,20	2,17	
GWP - biogenic	1	0,87	0,97	1,03	1,14	1	0,20	0,80	1,20	2,00	1	0,20	0,80	1,20	2,17	
GWP - Iuluc	1	0,16	0,79	1,21	2,05	1	0,20	0,80	1,20	1,99	1	0,20	0,80	1,20	2,18	
ODP	1	0,14	0,79	1,21	2,07	1	0,20	0,80	1,20	2,00	1	0,20	0,80	1,20	2,17	
AP	1	0,41	0,85	1,14	1,87	1	0,20	0,80	1,20	2,00	1	0,20	0,80	1,20	2,17	
EP - freshwater	1	0,28	0,82	1,18	1,94	1	0,20	0,80	1,20	1,99	1	0,20	0,80	1,20	2,17	
EP - marine	1	0,32	0,83	1,17	1,97	1	0,20	0,80	1,20	2,00	1	0,20	0,80	1,20	2,17	
EP - terrestrial	1	0,33	0,83	1,17	1,96	1	0,20	0,80	1,20	2,00	1	0,20	0,80	1,20	2,17	
POCP	1	0,29	0,82	1,18	2,18	1	0,20	0,80	1,20	2,00	1	0,20	0,80	1,20	2,17	
ADPF	1	0,21	0,80	1,20	2,15	1	0,20	0,80	1,20	2,00	1	0,20	0,80	1,20	2,17	
ADPE	1	0,17	0,79	1,21	2,06	1	0,20	0,80	1,20	2,00	1	0,20	0,80	1,20	2,18	
WDP	1	0,25	0,82	1,19	2,10	1	0,20	0,80	1,20	2,01	1	0,20	0,80	1,20	2,17	

Background data from GaBi software-system version 9 with Service Packs 39 *GaBi ts* is used.

LCA: Scenarios and additional technical information

Characteristic product properties Information on biogenic Carbon

The total mass of biogenic carbon containing materials is less than 5 % of the total mass of the product and accompanying packaging.

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

Waste incineration with energy recuperation is assumed as end-of-life scenario

Technical information

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment.

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	0.0103	l/100km
Transport distance	100	km
Gross density of products transported	35	kg/m ³

Installation into the building (A5)

Name	Value	Unit				
Output substances following waste treatment on site packaging material	0.08	kg				
Within A1-A3 the following packaging of the final						

product is included:

Polyethylene cover and wrap: 0,06 kg/m²

Others (mainly Expanded Polystyrene skid): 0,02 kg/m²

The recycling of the packaging is considered in A5.

End of life (C1-C4)

The assumptions for C1 are: diesel driven excavator (100 kW; 0.2 litre fuel per ton excavated material). The assumptions for C2 are: Truck Euro 6, diesel driven, 26-28 t gross weight, assumed distance 50 km

Name	Value	Unit
Collected as mixed construction waste	3.5	kg
Energy recovery	3.5	kg
R1-value of waste incineration plant	>60	%



LCA: Results

Disclaimer:

EP-freshwater: This indicator has been calculated as "kg P eq" as required in the characterization model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml)

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Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling- potential						
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D						
X	Х	Х	X	Х	ND	ND	MNR	MNR	MNR	ND	ND	Х	X	X	X	X						
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	ndicator		Unit		-A3	A4		A5		C1	с		C3		C4	D						
	P-total		:O ₂ -Eq.]		'E+0	2.98E		2.00E-1		25E-3	1.49		7.73E+		0.00E+0	-3.33E+0						
	p-fossil biogenic		CO ₂ -Eq.] CO ₂ -Eq.]		2E+0 2E-1	2.96E -1.80E		2.00E-1 -3.63E-6		25E-3 .59E-7	1.48		7.73E+ 3.47E-		0.00E+0 0.00E+0	-3.32E+0 -6.44E-3						
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	DP		C11-Eq.]		IE-8	3.59E-		5.97E-17		16E-19	1.80		9.26E-1		0.00E+0	-3.40E-14						
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	narine		<u>0₄-∟q.j</u> N-Eq.]		1E-3	1.08E		7.28E-6									5.38		2.21E-		0.00E+0	-1.44E-3
	rrestrial		IN-Eq.]		3E-2	1.26E		1.20E-4		47E-5	6.30		2.55E-		0.00E+0	-1.55E-2						
			IVOC-Eq.] Sb-Eq.]	1.95E-2 6.36E-6		2.81E 2.06E		2.09E-5 8.60E-10		42E-5 92E-11	1.40				0.00E+0 0.00E+0	-4.14E-3 -5.19E-7						
	ADPE [ADPF		<u>30-∟q.j</u> [MJ]		E+2		3.94E-1					3.05E-2		E-3	2.09E+		0.00E+0	-5.75E+1				
w	'DP		vorld-Eq prived]	1.28	E+0	6.38E	-4	7.91E-2 2.08E-2		93E-6	3.19				0.00E+0	-3.09E-1						
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PENR		NJ]	1.06E+2		3.94E-	1	1.53E-2		0.00E+0 8.97E-5	(1.14E-2).00E+0 1.14E-2	0.	.78E-1 00E+0 .78E-1	0								
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NRSI FW Caption RESU 1 m2 Indicat HWE NHW RWE	F M F M renew of sec ILTS (100 m tor U D [] D] D]	MJ] MJ] ERE = 1 vable pr pon-rene vable p condary OF TH m thi Init kg] kg]	0.00E+(0.00E+(0.00E+(5.71E-2 Use of rec imary en vable pri rimary en vaterial IE LCA ckness A1-A3 8.87E-5 3.18E-1 2.76E-5))) hnewable ergy res ergy res ; RSF = , - WA 5 5 6 6	3.94E- 0.00E+ 0.00E+ 3.87E- 2 primar sources bergy ex sources Use of A4 2.20E- 3.21E- 5.35E-	0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.53E-2 7.92E-2 0.00E+0 7.92E-2 0.00E+0 0.00E+0 0.00E+0 4.94E-4 excludii raw mat bon-rene conrection and esecor CORIE 3.71E-10 1.93E-2 3.64E-6	ng renew erials; Pi wable pi terials; P ndary fue S AND	0.00E+0 8.97E-5 3.05E-2 0.00E+0 3.05E-2 0.00E+0 0.00E+0 0.00E+0 1.66E-7 rable print ERT = Trimary et ERT = Trimary et ERT = T rimary et ERT = T 1.82E-7 3.51E-8	e contractor of the second sec	0.00E+0 1.14E-2 1.97E-1 1.00E+0 1.97E-1 1.00E+0 1.00E+0 0.00E+0 1.00E+0 1.93E-5 ergy ress of renew sources se of nor-r of non-r LOWS C2 1.10E-8 1.60E-5 2.68E-7	0. 2 9. -9 2. 0. 0. 1 Durces u vable pri used as h-renewable accol	00E+0 .78E-1 79E+1 .58E+1 00E+0 00E+0 00E+0 .00E+0 .79E-2 sed as r mary en raw mal bele prim e second total for the second total for th	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.5804- C4 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0	-1.17E+1 0.00E+0 -1.17E+1 -5.75E+1 0.00E+0 -5.75E+1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 -1.37E+2 ERM = Use of PENRE = Use of PENRE = Use of e Use of non- urces; SM = Use Use of net fresh +A2: D -2.37E-8 -2.49E-2 -4.65E-3						
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NRSI FW Caption RESU 1 m2 Indicat HWE NHW RWE CRU CRU MEF	F P F P renew of sec DLTS (100 m tor U D [D] J [R] R] R] I [M	MJ MJ MJ ERE = 0 vable pr pon-rener vable pr condary DF TH Imit Imit kg] kg] kg] MJ	0.00E+(0.00E+(0.00E+(5.71E-2 Use of rel imary en wable pri rimary en v material IE LCA ckness A1-A3 8.87E-5 3.18E-1 2.76E-5 0.00E+(0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3.94E- 0.00E+ 0.00E+ 0.00E+ 3.87E- 9 primar sources bergy ex sources 4 Use of A4 2.20E- 3.21E- 5.35E- 0.00E+ 0.00E+ 0.00E+ 0.00E+	0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.53E-2 7.92E-2 0.00E+0 7.92E-2 0.00E+0 0.00E+0 4.94E-4 excludii raw mat oon-rene raw mat oon-rene oon-reno oon-rene oon-rene oon-rene	ng renew erials; Pl wable pl terials; P ndary fue S AND	0.00E+0 8.97E-5 3.05E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 1.66E-7 rable prine ERT = T rimary entities ERT = T rimary entities water OUTI 3.24E-12 1.82E-7 3.51E-8 0.00E+0 0.00E	PUT F	0.00E+0 1.14E-2 1.97E-1 0.00E+0 1.97E-1 1.07E-1 1.07E-1 1.07E-1 0.00E+0 1.97E-1 1.07E-1 0.00E+0 1.03E-5 2.68E-7 0.00E+0 0.0	0. 2 9. -9. 2. 0. 0. 0. 1. 0. 0. 0. 1. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0	00E+0 78E-1 79E+1 58E+1 00E+0 00E+0 00E+0 00E+0 79E-2 sed as ramary end raw mat ble prime e second rding t 33E-9 38E-2 39E-5 00E+0 00E+0 34E+1 39E+1	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	0.00E+0 0.0	-1.17E+1 0.00E+0 -1.17E+1 -5.75E+1 0.00E+0 -5.75E+1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 -1.37E+2 ERM = Use of PENRE = Use of PENRE = Use of PENRE = Use of use of non- urces; SM = Use Use of net fresh +A2: D -2.37E-8 -2.49E-2 -4.65E-3 0.00E+0 0.00E+0 0.00E+0						

for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy



2.01E-10 7.84E-5	3.77E-10 4.82E-4	1.20E-10 5.13E-6	1.00E-10 3.92E-5	1.32E-8	0.00E+0	-5.32E-8 -7.63E-1			
	4.82E-4	5.13E-6	3.92E-5	1.46E-2	0.00E+0	7.635 1			
						-7.03L-1			
2.65E-1	5.60E-2	2.06E-2	1.33E-1	7.07E-1	0.00E+0	-1.28E+1			
5.32E-12	4.28E-12	3.50E-13	2.66E-12	1.20E-10	0.00E+0	-2.34E-9			
2.14E-10	3.14E-10	1.22E-11	1.07E-10	1.39E-9	0.00E+0	-1.18E-8			
1.78E-1	1.99E-2	7.99E-5	8.89E-2	4.09E-1	0.00E+0	-8.66E+0			
	2.14E-10 1.78E-1 disease due to or ecosystems;	2.14E-10 3.14E-10 1.78E-1 1.99E-2 disease due to PM emissions; I I or ecosystems; HTP-c = Potent I	2.14E-10 3.14E-10 1.22E-11 1.78E-1 1.99E-2 7.99E-5 disease due to PM emissions; IR = Potential H or ecosystems; HTP-c = Potential comparative	2.14E-10 3.14E-10 1.22E-11 1.07E-10 1.78E-1 1.99E-2 7.99E-5 8.89E-2 disease due to PM emissions; IR = Potential Human exposure or ecosystems; HTP-c = Potential comparative Toxic Unit for h	2.14E-10 3.14E-10 1.22E-11 1.07E-10 1.39E-9 1.78E-1 1.99E-2 7.99E-5 8.89E-2 4.09E-1 disease due to PM emissions; IR = Potential Human exposure efficiency relation ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancer	2.14E-10 3.14E-10 1.22E-11 1.07E-10 1.39E-9 0.00E+0 1.78E-1 1.99E-2 7.99E-5 8.89E-2 4.09E-1 0.00E+0			

Disclaimer 1 – for the indicator IR

This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

References

BPR

Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products

CPR

Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised condition for the marketing of construction products and repealing Council Directive 89/106/EC

EN 13166

EN 13166:2012+A2:2016: Thermal insulation products for buildings. Factory made phenolic foam (PF) products. Specification

EN 15804+A2

EN15804/A2: Sustainability of construction works -Environmental product declarations - Core rules for the product category of construction products, 2019

GaBi ts

thinkstep AG: Leinfelden-Echterdingen GaBi Software-System and Database for Life Cycle Engineering 1992-2019

IBU 2016

IBU (2016): General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V., Version 1.1 Institut Bauen und Umwelt e.V., Berlin, www.ibu-epd.de

ISO 14025

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

LCA-tool

Kingspan LCA tool, version 1.0. IBU-KSI-202001-LT1-EN.

Developed by Sphera Solutions GmbH (formely Thinkstep GmbH)

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Renewable Energy Certificate

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