# **ENVIRONMENTAL PRODUCT DECLARATION**

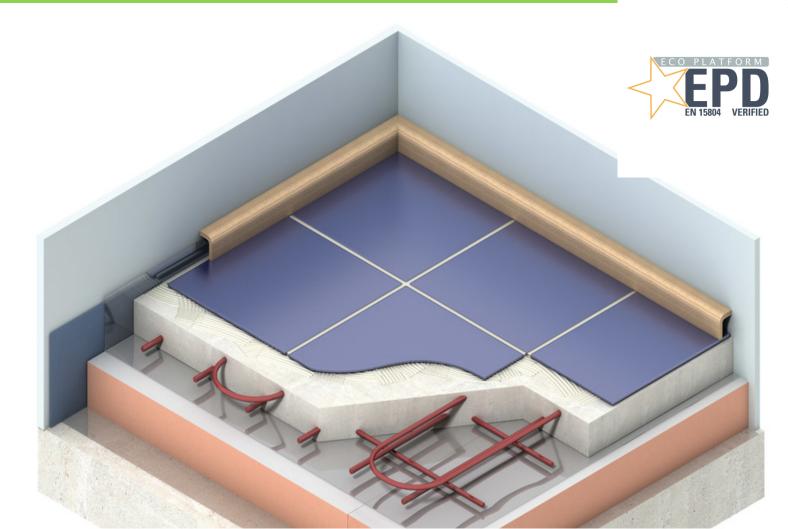
as per *ISO 14025* and *EN 15804+A2* 

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-20210041-CBA1-EN
Issue date	11/03/2021
Valid to	10/03/2026

# Kooltherm® K3 Kingspan Insulation B.V.



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# **General Information**

# Kingspan Insulation B.V.

### Programme holder

IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany

# Declaration number

EPD-KSI-20210041-CBA1-EN

# This declaration is based on the product category rules:

Insulating materials made of foam plastics, 06.2017 (PCR checked and approved by the SVR)

## Issue date

11/03/2021

# Valid to

10/03/2026

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Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)

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Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))

# Product

## **Product description/Product definition**

Kooltherm<sup>®</sup> K3 is a rigid thermoset cellular insulation material faced on both sides with a glass tissue based facing. The product is available in variable thicknesses from 20 mm up to 200 mm. This EPD is based on a thickness of 80 mm and R<sub>D</sub>-value of 4,0 m<sup>2</sup>·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.

## Application

Due to its high insulating value, Kooltherm<sup>®</sup> K3 is suitable for use as floor insulation.

# Kooltherm<sup>®</sup> K3

# Owner of the declaration

Kingspan Insulation B.V. Lingewei 8 4004 LL Tiel The Netherlands

# Declared product / declared unit

Kooltherm<sup>®</sup> K3 Floor Board 1 m<sup>2</sup>, 80 mm thickness,  $R_D = 4,0 \text{ m}^2 \cdot \text{K/W}$ 

## Scope:

The insulation material Kooltherm<sup>®</sup> is produced by Kingspan Insulation B.V. at the manufacturing facility in Tiel, the Netherlands. A glass tissue based facing is autohesively bonded to the insulation core during manufacture.

In order to enable the user of the EPD to calculate the LCA results for different thicknesses, the EPD contains the respective calculation rules.

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
The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to <i>ISO 14025:2010</i>
internally x externally
Stylal
Dipl. Natw. ETH Sascha Iqbal

(Independent verifier)

# **Technical Data**

## **Constructional data**

Name	Value	Unit
	value	Unit
Compressive strength acc. to EN	> 400	1.0.
13166	≥ 100	kPa
Tensile strength perpendicular to	≥ 60	kPa
faces acc. to EN 13166	≥ 00	кра
Thermal conductivity λd acc. to	0.021	W/(mK)
EN 13166 for d = 20 – 44 mm	0.021	VV/(IIIK)
Thermal conductivity λd acc. to	0.020	M//m/
EN 13166 for d = 45 – 120 mm	0.020	W/(mK)
Thermal conductivity λd acc. to	0.001	
EN 13166 for d = 121 – 159 mm	0.021	W/(mK)
Thermal conductivity $\lambda d$ acc. to		
EN 13166 for d = 160 – 200 mm	0.021	W/(mK)
(2 layers)		× ,



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* 

LCA: Calculation rules

## **Declared Unit**

The declared unit  $(1 \text{ m}^2)$  and conversion factors are listed in the table below.

# **Declared unit**

Name	Value	Unit
Declared unit	1	m <sup>2</sup>
Gross density	35	kg/m <sup>3</sup>
conversion factor [Mass/Declared Unit] ( in kg/m² )	2.8	-
Grammage	2.8	kg/m <sup>2</sup>
Layer thickness	0.08	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,

 $\cdot$  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

Regulation (EC) No 1907/2006. These 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.

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

 $\cdot$  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 80 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

								-							
кз	(3 Module A1 - A3						Module D								
	80 mm	20 mm	100 mm	120 mm	200 mm	80 mm	20 mm	100 mm	120 mm	200 mm	80 mm	20 mm	100 mm	120 mm	200 mm
GWP - total	1	0,26	1,25	1,49	2,49	1	0,25	1,25	1,50	2,51	1	0,25	1,25	1,50	2,50
GWP - fossil	1	0,26	1,25	1,50	2,48	1	0,25	1,25	1,50	2,51	1	0,25	1,25	1,50	2,50
GWP - biogenic	1	0,17	1,28	1,56	2,67	1	0,25	1,25	1,50	2,50	1	0,25	1,25	1,50	2,50
GWP - luluc	1	0,21	1,26	1,52	2,57	1	0,25	1,25	1,50	2,49	1	0,25	1,25	1,50	2,50
ODP	1	0,21	1,27	1,53	2,59	1	0,25	1,25	1,50	2,50	1	0,25	1,25	1,50	2,50
AP	1	0,35	1,22	1,44	2,32	1	0,25	1,25	1,50	2,50	1	0,25	1,25	1,50	2,51
EP - freshwater	1	0,23	1,26	1,51	2,53	1	0,25	1,25	1,50	2,50	1	0,25	1,25	1,50	2,50
EP - marine	1	0,28	1,24	1,48	2,44	1	0,25	1,25	1,50	2,50	1	0,25	1,25	1,50	2,51
EP - terrestrial	1	0,29	1,24	1,47	2,42	1	0,25	1,25	1,50	2,50	1	0,25	1,25	1,50	2,50
POCP	1	0,27	1,24	1,49	2,46	1	0,25	1,25	1,50	2,51	1	0,25	1,25	1,50	2,50
ADPF	1	0,24	1,25	1,50	2,52	1	0,25	1,25	1,50	2,50	1	0,25	1,25	1,50	2,50
ADPE	1	0,22	1,26	1,51	2,55	1	0,25	1,24	1,50	2,49	1	0,25	1,25	1,50	2,51
WDP	1	0,24	1,25	1,51	2,52	1	0,25	1,25	1,50	2,50	1	0,25	1,25	1,50	2,50

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.

# **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 <sup>3</sup>

## Installation into the building (A5)

Name	Value	Unit
Output substances following waste	0.06	ka
treatment on site packaging material	0.00	kg

Within A1-A3 the following packaging of the final product is included:

Polyethylene cover and wrap: 0,05 kg/m<sup>2</sup>

Others (mainly Expanded Polystyrene skid): 0,01 kg/m<sup>2</sup>

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	2.8	kg
Energy recovery	2.8	kg
R1-value of waste incineration plant	>60	%

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

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



# **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)

			F THE R = MC						CLUE	ED IN	LCA;	ND = I	MODUI	LE OF		ATOR NOT
PROE	OUCT S	TAGE	CONST ON PRC STA	CESS			U	SE STAC	θE			END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery- Recycling- potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Х	Х	Х	X	Х	ND	ND	MNR	MNR	MNR	ND	ND	Х	Х	X	X	х
													► <b>Λ 2 · 1</b>			hickness
	ndicator		Jnit		-A3	A4		A5		C1		2	C3		C4	D
							_							_		
-	P-total P-fossil		$O_2$ -Eq.]		3E+0 9E+0	2.37E 2.35E		1.60E-1 1.60E-1		1.79E-3 1.79E-3		9E-2 3E-2	6.18E+	-	0.00E+0 0.00E+0	-2.66E+0 -2.66E+0
	2-105511 Diogenic		:O <sub>2</sub> -Eq.] :O <sub>2</sub> -Eq.]		0E-2	2.35E		-2.91E-6		1.26E-7		5E-2	6.18E+ 2.77E-		0.00E+0	-2.00E+0 -5.16E-3
	P-luluc		20 <u>2-Eq.]</u> 20 <sub>2</sub> -Eq.]		5E-2	3.60E		5.76E-6		5.08E-8		)E-4	5.98E-		0.00E+0	-1.81E-3
	DP		C11-Eq.]		1E-8	2.86E-		4.77E-17		.72E-19	1.43		7.41E-		0.00E+0	-2.72E-14
	P	[mol	H⁺-Eq.]	1.25	5E-2	2.78E	-5	2.20E-5	8	3.52E-6	1.39	)E-5	3.69E-	3	0.00E+0	-5.02E-3
	shwater		PO <sub>4</sub> -Eq.]		9E-5	1.14E		8.42E-9		.18E-10		3E-8	1.26E-		0.00E+0	-3.50E-6
	narine		N-Eq.]		4E-3	8.57E		5.82E-6		3.98E-6		BE-6	1.77E-		0.00E+0	-1.15E-3
	rrestrial )CP		IN-Eq.] IVOC-Eq.]		4E-2 2E-2	1.00E 2.23E		9.58E-5 1.67E-5		1.36E-5 1.13E-5	5.02	2E-5 2E-5	2.04E- 4.55E-		0.00E+0 0.00E+0	-1.24E-2 -3.31E-3
	DPE		Sb-Eq.]		5E-6	2.23L 1.64E		6.88E-10		.71E-11	8.19		1.27E-		0.00E+0	-4.15E-7
	DPF		MJ]		)E+2	3.14E		6.33E-2		2.43E-2	1.57		1.67E+		0.00E+0	-4.60E+1
\٨/	DP		vorld-Eq		3E-1	5.08E		1.66E-2		3.13E-6		IE-4	6.07E-		0.00E+0	-2.47E-1
Caption	n Eutro	phicatic	n potentia fossil re	al; POCF	P = Form s; ADPF	ation pot = Abiotic	ential of t depletion	roposphe n potentia	eric ozo al for fos	ne photoc sil resour	chemical ces; WDI	oxidants > = Wate	; ADPE = er (user) d	Abiotic leprivati	depletion on potent	d and water; EP = potential for non- al +A2: 1 m2
80 mr Indicat		kness Jnit	A1-A3		A4		A5		C1		C2		C3		C4	D
PERE	= n	VJ]	2.21E+1	1	1.82E-2	>	1.22E-2		7.14E-5		9.10E-3	2	2.22E-1	0	.00E+0	-9.33E+0
PERM		VJ]	0.00E+0		0.00E+		0.00E+0		0.00E+0		0.00E+0		.00E+0		.00E+0	0.00E+0
PER		VJ]	2.21E+1		1.82E-2		1.22E-2		7.14E-5		9.10E-3		2.22E-1		.00E+0	-9.33E+0
PENR		VJ]	8.18E+2		3.14E-		6.33E-2		2.43E-2		1.57E-1		'.84E+1		.00E+0	-4.60E+1
PENR		VJ]	7.67E+1		0.00E+		0.00E+0		0.00E+0		0.00E+0		7.67E+1		0.00E+0	0.00E+0
PENR		MJ]	1.59E+2		3.14E-		6.33E-2		2.43E-2		1.57E-1		.67E+0		0.00E+0	-4.60E+1
SM RSF		kg] VIJ]	0.00E+0		0.00E+		0.00E+0		0.00E+0		0.00E+0 0.00E+0		0.00E+0 0.00E+0		0.00E+0 0.00E+0	0.00E+0 0.00E+0
NRS		VIJ] VIJ]	0.00E+0		0.00E+		0.00E+0		0.00E+0		0.00E+0		0.00E+0		0.00E+0	0.00E+0
FW		m³]	3.65E-2		3.08E-		3.95E-4		1.66E-7		1.93E-5		1.79E-2		.00E+0	-1.10E-2
Caption	renev n renev	vable pr on-rene wable p	imary en wable pri rimary en	ergy res mary er ergy res	sources nergy ex sources	used as cluding i used as	raw mat non-rene raw ma	erials; P wable p terials; P	ERT = rimary e ENRT	Total use energy re = Total u SF = Use	e of renev esources se of nor	wable pr used as n-renewa	imary en s raw mat able prim	ergy re terials; ary ene	sources; PENRM = ergy reso	ERM = Use of PENRE = Use of Use of non- urces; SM = Use Use of net fresh
			IE LCA kness	– WA	ASTE (	CATEC	GORIE	S ANC	001	PUT F	LOWS	acco	rding t	o EN	15804	+A2:
Indicat	tor L	Jnit	A1-A3		A4		A5		C1		C2		C3		C4	D
HWD	) (	kg]	7.52E-5	5	1.75E-8	3	2.96E-10	) :	2.57E-12	2	8.76E-9	1	1.06E-9	0	.00E+0	-1.89E-8
NHW	_	kg]	7.48E-2		2.55E-5		1.54E-2		1.45E-7		1.28E-5		3.11E-2	_	.00E+0	-1.99E-2
RWD	) [	kg]	1.74E-3		4.26E-7		2.91E-6		2.79E-8		2.13E-7	_	7.51E-5	0	.00E+0	-3.72E-3
CRU		kg]	0.00E+0		0.00E+		0.00E+0		0.00E+0		0.00E+0		.00E+0	_	.00E+0	0.00E+0
MFR		kg]	0.00E+0		0.00E+		0.00E+0		0.00E+0		0.00E+0		0.00E+0		0.00E+0	0.00E+0
MER		kg]	0.00E+0		0.00E+		6.39E-2		0.00E+0		0.00E+0		2.80E+0		0.00E+0	0.00E+0
EEE		MJ]	0.00E+0		0.00E+		3.54E-1 6.38E-1		0.00E+0		0.00E+0 0.00E+0		.07E+1 .91E+1		0.00E+0 0.00E+0	0.00E+0 0.00E+0
EET		MJ]														
																U = Components EE = Exported

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



Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	[Disease Incidence]	1.21E-7	1.60E-10	3.02E-10	9.53E-11	7.99E-11	1.05E-8	0.00E+0	-4.26E-8
IR	[kBq U235- Eq.]	2.72E-1	6.24E-5	3.86E-4	4.08E-6	3.12E-5	1.17E-2	0.00E+0	-6.10E-1
ETP-fw	[CTUe]	5.48E+1	2.11E-1	4.48E-2	1.64E-2	1.06E-1	5.65E-1	0.00E+0	-1.02E+1
HTP-c	[CTUh]	6.33E-9	4.24E-12	3.42E-12	2.79E-13	2.12E-12	9.57E-11	0.00E+0	-1.88E-9
HTP-nc	[CTUh]	6.14E-8	1.70E-10	2.51E-10	9.74E-12	8.52E-11	1.11E-9	0.00E+0	-9.42E-9
SQP	[-]	9.55E+0	1.41E-1	1.59E-2	6.36E-5	7.07E-2	3.28E-1	0.00E+0	-6.93E+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

### 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

#### 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

#### 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)

## PCR Version 1.7, Part A

Institut Bauen und Umwelt e.V., Berlin (pub.): Product Category Rules for Building-Related Products and services, Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report , March 2018

### PCR 2017, Part B

Institut Bauen und Umwelt e.V., Berlin (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part B: Requirements on the EPD for insulating materials made of foam plastics.June 2017

## REACH

Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

https://echa.europa.eu/candidate-list-table; accessed 19th of January 2021, 211 substances listed.

## **Renewable Energy Certificate**

Towarowa Gielda Energii S.A.: Guarantees of origin Document ID: RGP\_ACTBV\_2019-12-31\_0720

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