Statement of Verification

BREG EN EPD No.: 000095 Issue 2
ECO EPD Ref. No. 000324

This is to verify that the

Environmental Product Declaration

provided by:

Knauf Insulation (Northern Europe)

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

Rock Mineral Wool Insulation 33-45 kg/cu.m

Company Address

Stafford Road
St. Helens
Merseyside
WA10 3NS

KNAUF INSULATION it's time to save energy

Signed for BRE Global Ltd	Laura Critien Operator	15 February 2019 Date of this Issue
08 March 2016 Date of First Issue		07 March 2021 Expiry Date

BRE Global Verified EPD

BRE Global Ltd., Garston, Watford WD25 9XX.
T: +44 (0)333 321 8811 F: +44 (0)1923 664603 E: Enquiries@breglobal.com

ECO PLATFORM EPD EN 15804 VERIFIED

Environmental Product Declaration

EPD Number: 000095

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013.
Commissioner of LCA study	**LCA consultant/Tool**
Knauf Insulation (Northern Europe) Stafford Road St. Helens Merseyside WA10 3NS	Chris Foster EuGeos Limited Macclesfield Cheshire SK11 8JR www.eugeos.co.uk
Declared/Functional Unit	**Applicability/Coverage**
1 cu.m of rock mineral wool with the product names listed in the Product Description. Indicator values are presented for a product density of 39kg/cu.m.	Product Average.
EPD Type	**Background database**
Cradle to Gate with options	ecoinvent

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
(Where appropriate [b])Third party verifier: Kim Allbury
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be 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+A1:2013 for further guidance

Information modules covered

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)

This environmental product declaration is for 1 cubic metre of Rock Mineral Wool Insulation 33 – 45 kg/cu.m produced by Knauf Insulation (Northern Europe) at the following manufacturing facilities:

Knauf Insulation (Northern Europe) Chemistry Lane Queensferry Flintshire CH5 2DA	

Construction Product

Product Description

The product takes the form of slabs (often called “batts”) with the names: Earthwool Building Slab RS33, Earthwool Building Slab RS45, Earthwool Flexible Slab, Earthwool Fabrication Slab, Earthwool DriTherm Cavity Slab, Earthwool Universal Slab RS33, Earthwool Universal Slab RS40, Earthwool Universal Slab RS45, Earthwool Multi-Purpose Slab, HTC Multigrow 45, Wickes Flexible Slab, High Temperature Board HTB350, HUSH-Slab 100, BNT 45 LAM, Universal Slab RS33, Universal Slab RS40, Universal Slab RS45.

Technical Information

Property	Value, Unit
Gross dry density (EN 1602)	33 – 45, kg/m^3
Water vapour diffusion resistance factor (EN 13162)	1
Water absorption Wp (EN 1609)	<1, kg/m^2
Thermal conductivity (EN 12667)	0.035 – 0.037, W/mK
Fire classification (BS EN 13501-1:2002)	Euroclass A1

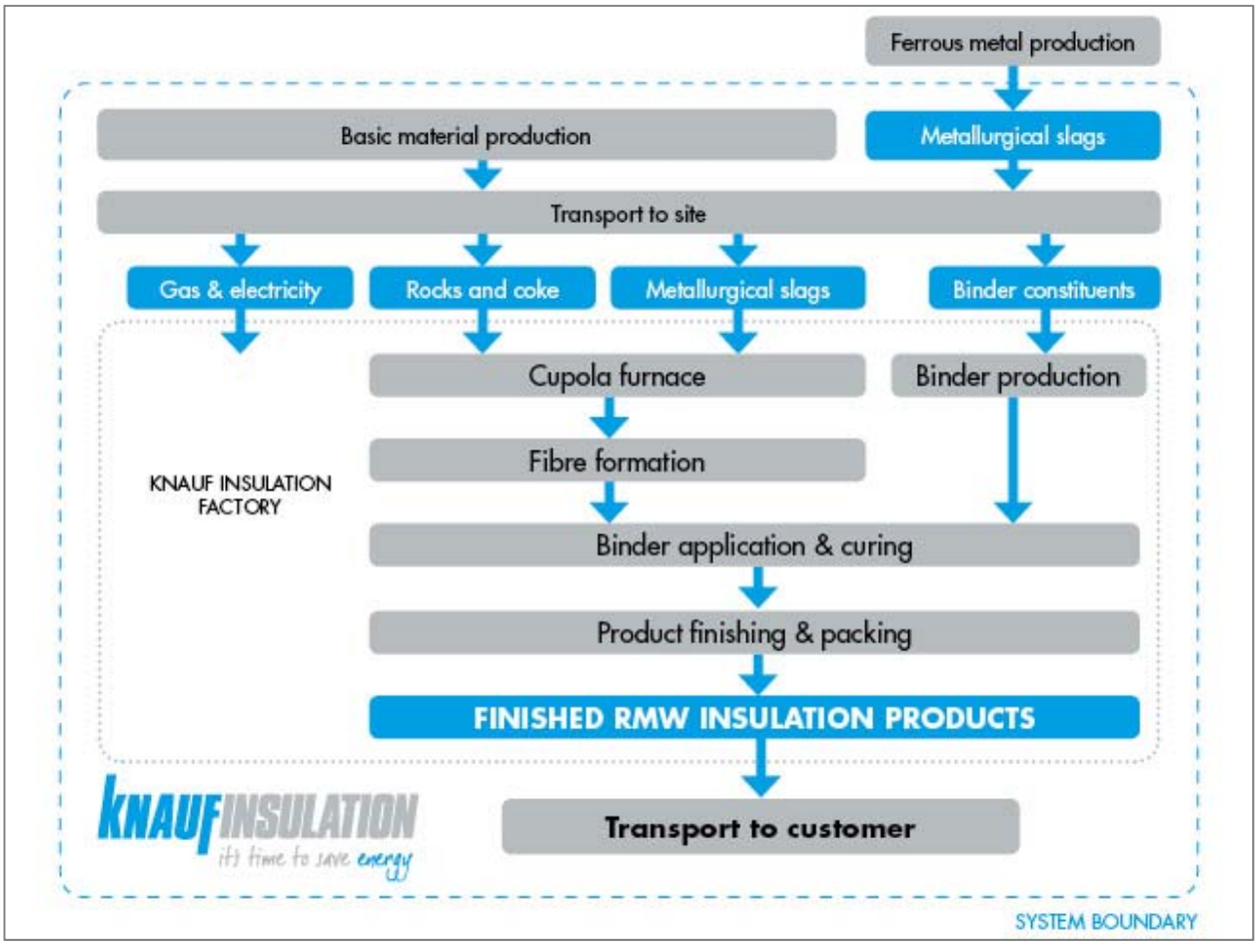
Main Product Contents

Material/Chemical Input	%
Basalt	55 - 60
Dolomitic limestone	15 - 20
Recovered metallurgical slags	17 - 23
Organic resin	4 - 7
Additives	<1

Manufacturing Process

Inorganic rocks and metallurgical slags are the main constituents (typically 96%) of rock mineral wool, with the remaining fraction being a thermosetting organic resin. The inorganic raw materials are melted in a cupola with coke. Fibres are formed at the outlet of the cupola. The binder (thermoset resin) is then applied to the fibres; its polymerisation sets the product's dimensions and mechanical properties. Two different binders are used – one based on a plant-derived polymer, one based on a phenol-formaldehyde resin; each is used on products covered by this EPD. As a final step in production, product is cut to size, and packed.

Process flow diagram



Construction Installation

Rock mineral wool is installed to provide thermal insulation, acoustic insulation and/or fire protection in buildings. Methods of installation vary according to the type of application.

Use Information

The product may be installed in new or existing buildings. The product does not require maintenance or replacement. In normal conditions of use, the product is not exposed in either internal or external areas, and will not be in contact with water.

End of Life

The product is classified as non-hazardous and may be disposed of as non-hazardous material EWC code 17 06 04.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 cu.m of rock mineral wool with the product names listed in the Product Description. Indicator values are presented for a product density of 39kg/cu.m.

System boundary

The system boundary of the EPD is defined using the modular approach set out in EN 15804. This cradle-to-gate with options EPD includes the production stage (modules A1-A3); transport to the construction site (A4); transport to waste processing (C2) and disposal at end-of-life (C4).

Data sources, quality and allocation

Specific foreground data derived from Knauf Insulation's production information are used in the product-stage LCA for modules A1-A3. Generic data are used for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e. raw material production, vehicle operation, end-of-life).
Background data were taken from the ecoinvent v 3.1 database. Where the creation of specific background datasets was necessary, these were created using process data within the ecoinvent 3.1 database.
Following EN 15804, the most current available data were used to calculate the EPD. The manufacturer-specific data from Knauf Insulation cover a period of 1 year (Jan 01 to Dec 31, 2014).
Allocation of foreground data is avoided wherever possible. Where allocation is unavoidable materials, energy and associated emissions are allocated to the product by physical property. All allocation procedures in the background datasets are in accordance with EN 15804.

Cut-off criteria

The collected data covered all raw materials, consumables and packaging materials; associated transport to the manufacturing site; process energy and water use; direct production wastes; emissions to air and water. According to EN 15804 and the PCR, flows can be omitted (cut-off) in the LCA up to a maximum of 1% of the total mass of input of that process; raw materials accounting for <0.5% of material inputs were omitted from the LCA due to lack of data.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO_2 equiv.	kg CFC 11 equiv.	kg SO_2 equiv.	kg $(PO_4)^{3-}$ equiv.	kg C_2H_4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	53.8	2.72E-06	0.342	0.0457	0.0199	1.95E-05	659
Construction process stage	Transport	A4	0.605	1.11E-07	0.003	0.0006	1.95E-05	1.07E-06	8.69
	Construction	A5	MND	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND	MND	MND	MND
	Transport	C2	0.285	5.24E-08	0.00141	0.00028	4.59E-05	5.04E-07	4.10
	Waste processing	C3	MND	MND	MND	MND	MND	MND	MND
	Disposal	C4	0.202	6.91E-08	0.00154	0.00026	7.39E-05	1.50E-07	5.80
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND	MND	MND	MND

GWP = Global Warming Potential;
ODP = Ozone Depletion Potential;
AP = Acidification Potential for Soil and Water;
EP = Eutrophication Potential;
POCP = Formation potential of tropospheric Ozone;
ADPE = Abiotic Depletion Potential – Elements;
ADPF = Abiotic Depletion Potential – Fossil Fuels;

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	97.1	42.8	140	561	21.2	583
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND	MND	MND
	Transport	C2	0.0227	0.00	0.0227	4.44	0.00	4.44
	Waste processing	C3	MND	MND	MND	MND	MND	MND
	Disposal	C4	0.128	0.00	0.128	6.24	0.00	6.24
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND	MND	MND

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 (continued)

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	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	97.1	42.8	140	561
Construction process stage	Transport	A4	0.0481	INA	INA	0.792
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND
	Transport	C2	0.00036	INA	INA	0.0005
	Waste processing	C3	MND	MND	MND	MND
	Disposal	C4	0.00117	INA	INA	0.00658
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND

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 (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.0952	1.10	0.00139
Construction process stage	Transport	A4	0.00072	0.0055	6.36E-05
	Construction	A5	MND	MND	MND
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND
	Transport	C2	0.00034	0.0026	3.00E-05
	Waste processing	C3	MND	MND	MND
	Disposal	C4	0.00178	39.3	3.96E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND

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

LCA Results (continued)

Other environmental information describing output flows – at end of life						
			CRU	MFR	MER	EE
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	INA	INA	INA	INA
Construction process stage	Transport	A4	INA	INA	INA	INA
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND
	Transport	C2	INA	INA	INA	INA
	Waste processing	C3	MND	MND	MND	MND
	Disposal	C4	INA	INA	INA	INA
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND

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	Vehicle Type	n/a	Lorry
	Fuel Consumption	L/km	0.2
	Distance	km	100
	Capacity utilisation (incl. empty returns)	%	33
	Bulk density of transported products	kg/m^3	39
C1, C3, and C4 – End-of-life modules	Waste for final disposal		
	Quantity of waste to landfill	kg	39
C2 – Transport to waste processing	Vehicle Type	n/a	Lorry
	Fuel Consumption	L/km	0.2
	Distance	km	50
	Capacity utilisation (incl. empty returns)	%	33
	Bulk density of transported products	kg/m^3	39

Summary, comments and additional information

Interpretation

As Figure 1 shows, the product stage is the dominant one for all impact categories. Direct emissions from the manufacturing site make a strong contribution to GWP, AP and eutrophication (EP). A4 (transport to site) contributes more strongly to the ODP and ADPE impact categories than to others; however, these contributions derive from background data that have a high level of uncertainty. The total values of the ODP and ADPE indicators are driven strongly by background data, and as a result have high levels of uncertainty. There are no direct emissions of ozone-depleting substances from Knauf Insulation's RMW production process and the mineral constituents of RMW account for less than 1.5% of the total ADPE indicator value. Production of wooden pallets accounts for the majority of renewable biomass inputs to the system modelled in the LCA. The end-of-life of pallets, and of packaging in general, is outside the scope of the modules included in the EPD for which this LCA was conducted. PERM and PENRM values are based on the organic content of the insulation product itself. Similarly, carbon taken up by wood grown for pallets is not counted in this LCA as biogenic carbon stored in the product.

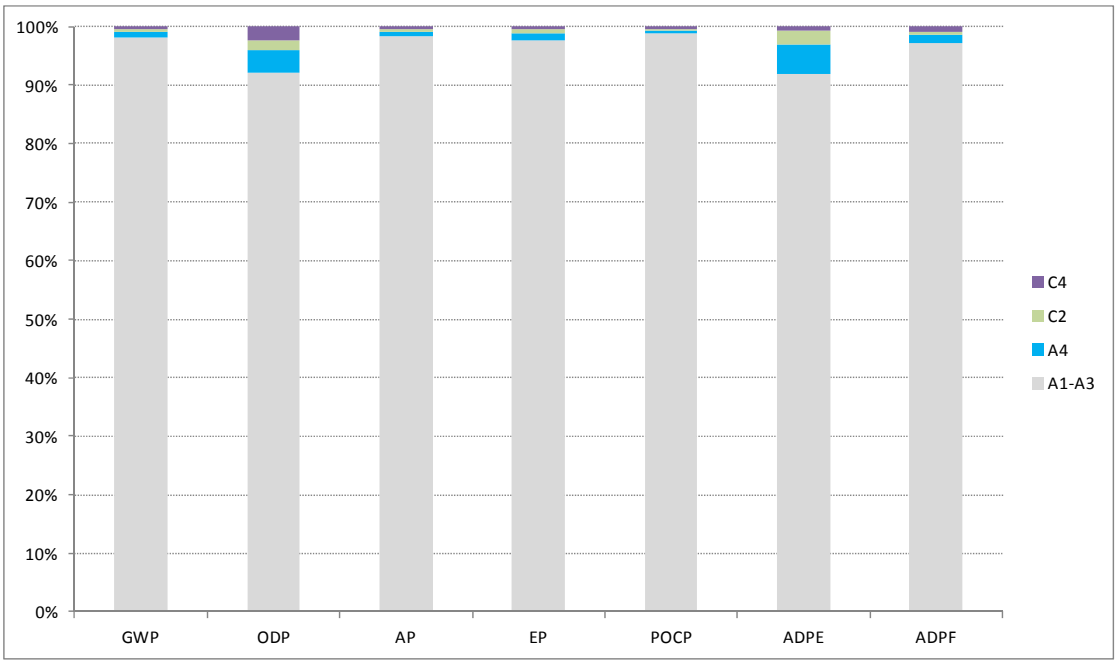


Figure 1

References

BRE Global. BRE Environmental Profiles 2013: Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013. PN 514. Watford, BRE 2014.

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A1:2013. London, BSI, 2013.

BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

BSI. Environmental management – Life cycle assessment – Principles and framework. BS EN ISO 14040:2006. London, BSI, 2006.

BSI. Environmental management – Life cycle assessment – requirements and guidelines. BS EN ISO 14044:2006. London, BSI, 2006.