

## Environmental Product Declaration

BREG EN EPD No.: 000098

Issue: 01

ECO EPD Ref. No.: 000327

This is to certify that this verified Environmental Product Declaration provided by:

**Knauf Insulation (Northern Europe)**

Is in accordance with the requirements of:

**EN 15804:2012+A1:2013**

This declaration is for:


**Rock Mineral Wool Insulation 160 - 205 kg/cu.m**



### Company Address

Stafford Road  
St. Helens  
Merseyside  
WA10 3NS



	Laura Critien Operator	08 March 2016 Date of this Issue
08 March 2016 Date of First Issue		07 March 2021 Expiry Date



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## EPD verification and LCA details

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR <sup>a</sup>
Independent verification of the declaration and data according to EN ISO 14025:2010
<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
Third party verifier <sup>b</sup> : <b>Kim Allbury</b>
<small>a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)</small>

LCA Consultant	Verifier
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## General Information

### Summary

This environmental product declaration is for 1 cubic metre of Rock Mineral Wool Insulation 160 - 205 kg/cu.m produced by Knauf Insulation (Northern Europe) at the following manufacturing facilities:

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

This is a Cradle to gate with options EPD. The life cycle stages included are as shown below (X = included, MND = module not declared):

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	Transport	Waste processing	Disposal	Reuse, Recovery and/or Recycling potential
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	MND	X	MND

### Programme Operator

BRE Global, Watford, Herts, WD25 9XX, United Kingdom.

This declaration is based on the BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013.

### Comparability

Environmental declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the product category rules used and the source of the data, e.g. the database. See EN 15804:2012+A1:2013 for further guidance.

## Construction Product

### Product Description

The product takes the form of slabs (often called "batts") with the names: Building Slab RS200, Krimpact™ Flat Roof Slab Extra, PyroDuct Slab, FireTech Dry Fix Noggin Slab, Universal Slab RS170, Universal Slab RS180, Universal Slab RS200, Universal Slab CR180, Firetherm CR180, Unidare HD Slab, Wickes HD Slab.

## Technical Information

Property	Value	Unit
Thermal conductivity (EN 12667)	0.036 - 0.040	W/mK
Gross dry density (EN 1602)	160 - 205	kg/m <sup>3</sup>
Water vapour diffusion resistance factor (EN 13162)	1	N/A
Water absorption Wp (EN 1609)	<1	kg/m <sup>2</sup>
Fire classification (BS EN 13501-1:2002)	Euroclass A1	N/A

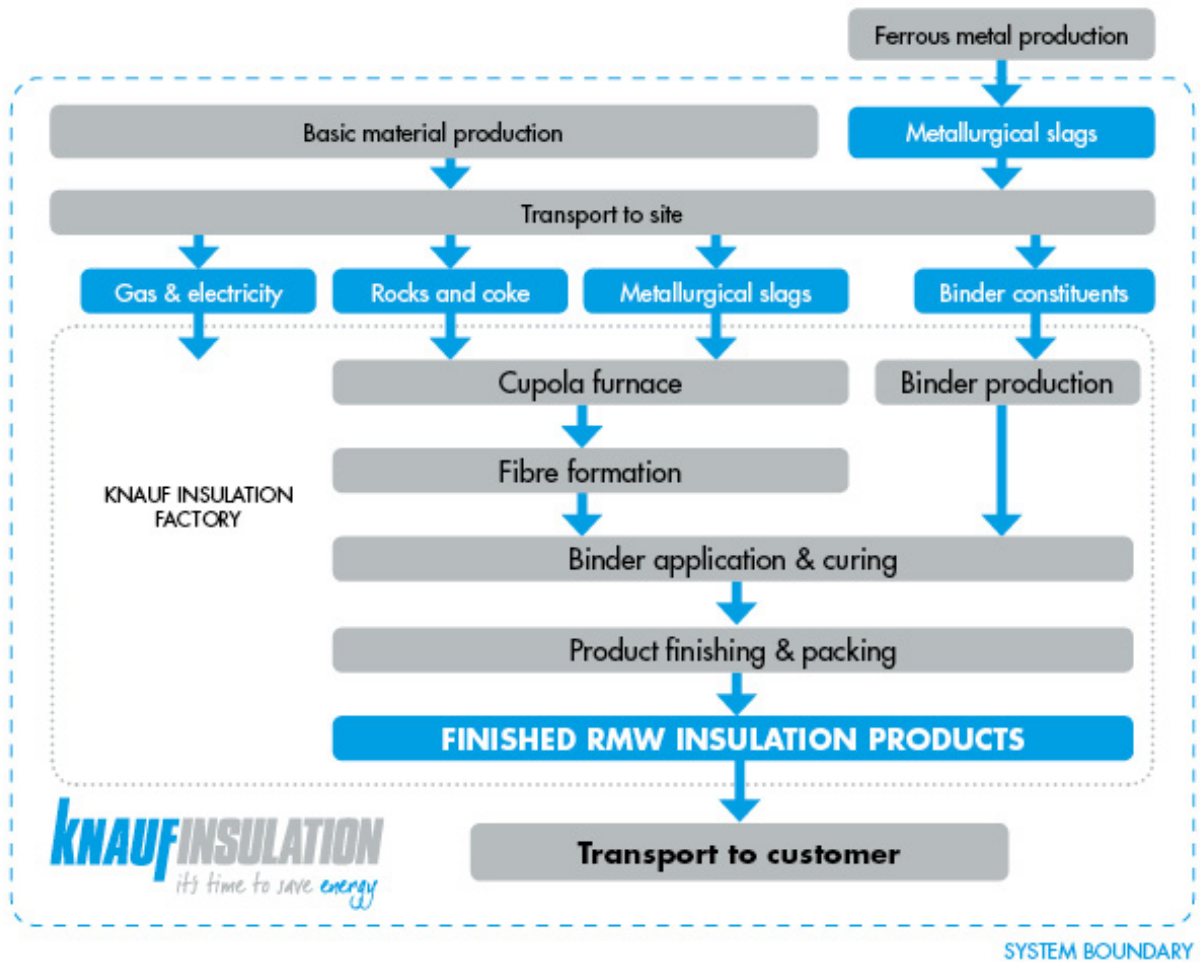
## Product Contents

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.

The process flow diagram is shown below:



### 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. For further information about the products and their application, see <http://www.knaufinsulation.co.uk/products/rock-mineral-wool>.

### 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

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 181kg/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

(INA = Indicator not assessed, AGG = Aggregated, NA = Not Applicable)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C2	C4
		Raw Material supply	Transport to factory	Manufacturing	Merged A1/A2/A3	Transport to site	Transport	Disposal
<b>Environmental impacts per declared/functional unit</b>								
GWP	kg CO <sub>2</sub> eq.	AGG	AGG	AGG	264	2.78	1.31	0.932
ODP	kg CFC 11 eq.	AGG	AGG	AGG	1.24E-05	5.12E-07	2.42E-07	3.18E-07
AP	kg SO <sub>2</sub> eq.	AGG	AGG	AGG	1.58	0.0138	0.00649	0.00709
EP	kg (PO <sub>4</sub> ) <sup>3-</sup> eq.	AGG	AGG	AGG	0.191	0.00276	0.00129	0.0012
POCP	kg C <sub>2</sub> H <sub>4</sub> eq.	AGG	AGG	AGG	0.107	0.000448	0.000211	0.00034
ADPE	kg Sb eq.	AGG	AGG	AGG	5.28E-05	4.92E-06	2.32E-06	6.93E-07
ADPF	MJ eq.	AGG	AGG	AGG	3470	40.00	18.9	26.7
GWP = Global Warming Potential (Climate Change); ODP = Ozone Depletion Potential; AP = Acidification Potential for Soil and Water; EP = Eutrophication Potential; POCP = Photochemical Ozone Creation; ADPE = Abiotic Depletion Potential – Elements; ADPF = Abiotic Depletion Potential – Fossil Fuels								
<b>Resource use</b>								
PERE	MJ	AGG	AGG	AGG	510	0.222	0.104	0.591
PERM	MJ	AGG	AGG	AGG	46.2	0.00	0.00	0.00
PERT	MJ	AGG	AGG	AGG	556	0.222	0.104	0.591
PENRE	MJ	AGG	AGG	AGG	2880	43.3	20.4	28.7
PENRM	MJ	AGG	AGG	AGG	231	0.00	0.00	0.00
PENRT	MJ	AGG	AGG	AGG	3120	43.3	20.4	28.7
SM	kg	AGG	AGG	AGG	59.6	0.00355	0.00166	0.00539
RSF	MJ	AGG	AGG	AGG	INA	INA	INA	INA
NRSF	MJ	AGG	AGG	AGG	INA	INA	INA	INA
FW	m <sup>3</sup>	AGG	AGG	AGG	3.73	0.00484	0.0023	0.0303
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 = Net use of fresh water								
<b>Waste to disposal</b>								
HWD	kg	AGG	AGG	AGG	0.524	0.00332	0.00157	0.0082
NHWD	kg	AGG	AGG	AGG	5.28	0.0253	0.012	181
TRWD	kg	AGG	AGG	AGG	0.00663	0.000293	0.000138	0.000182
RWDHL	kg	AGG	AGG	AGG	0.0007	1.24E-06	5.84E-07	1.15E-06
HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; TRWD = Total Radioactive waste disposed; RWDHL = Radioactive waste disposed (high-level nuclear waste)								
<b>Other output flows</b>								
CRU	kg	AGG	AGG	AGG	INA	INA	INA	INA
MFR	kg	AGG	AGG	AGG	INA	INA	INA	INA
MER	kg	AGG	AGG	AGG	INA	INA	INA	INA
EE	MJ	AGG	AGG	AGG	INA	INA	INA	INA
CRU = Components for reuse; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Export energy								

## Scenarios and Additional Technical Information

Module A4 – Transport to the building site				
Vehicle Type	Fuel Consumption (L/km)	Distance (km)	Capacity Utilisation (%)	Density Of Product (kg/m <sup>3</sup> )
Lorry	0.2	100	33	181

End-of-life modules – C1, C3, and C4			
Parameter	Description	Unit	Value
Waste for final disposal	Quantity of waste to landfill	kg	181

Module C2 – Transport to waste processing				
Vehicle Type	Fuel Consumption (L/km)	Distance (km)	Capacity Utilisation (%)	Density Of Product (kg/m <sup>3</sup> )
Lorry	0.2	50	33	181

## Interpretation

This EPD applies to products with densities in the range 160-205 kg/cu.m. Indicator values are presented for the mean (weighted average) density: 181 kg/cu.m. 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.



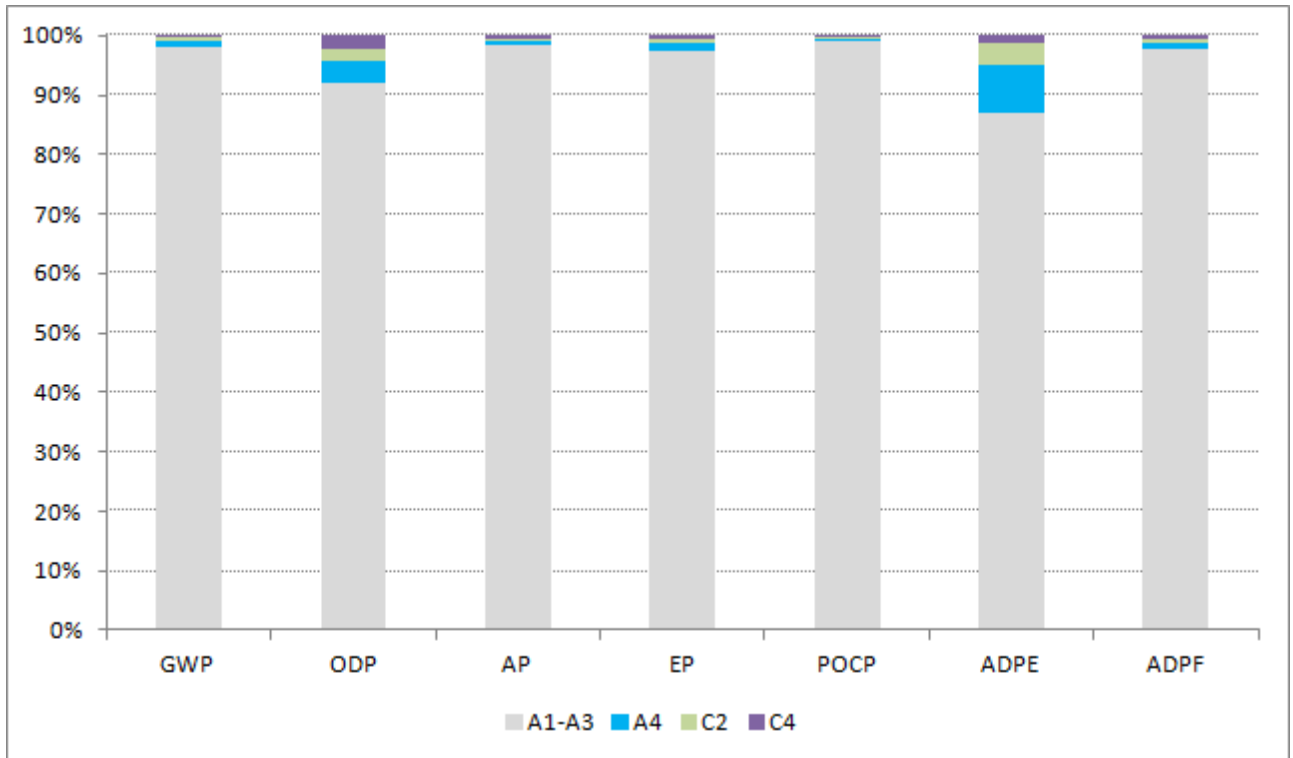


Figure 1

## Sources of additional information

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.