

Environmental Product Declaration

BREG EN EPD No.: 000095

Issue: 01

ECO EPD Ref. No.: 000324

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 33 - 45 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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To check the validity of this EPD please visit www.greenbooklive.com/check or contact us.
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EPD verification and LCA details

| 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 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External |
| Third party verifier ^b : Kim Allbury |
| <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 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
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: Earthwool Building Slab RS33, Earthwool Building Slab RS45, Earthwool Flexible Slab, Earthwool Fabrication Slab, Earthwool RainScreen Slab, Earthwool RainScreen Slab BGV, 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 | N/A |
| 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 | N/A |

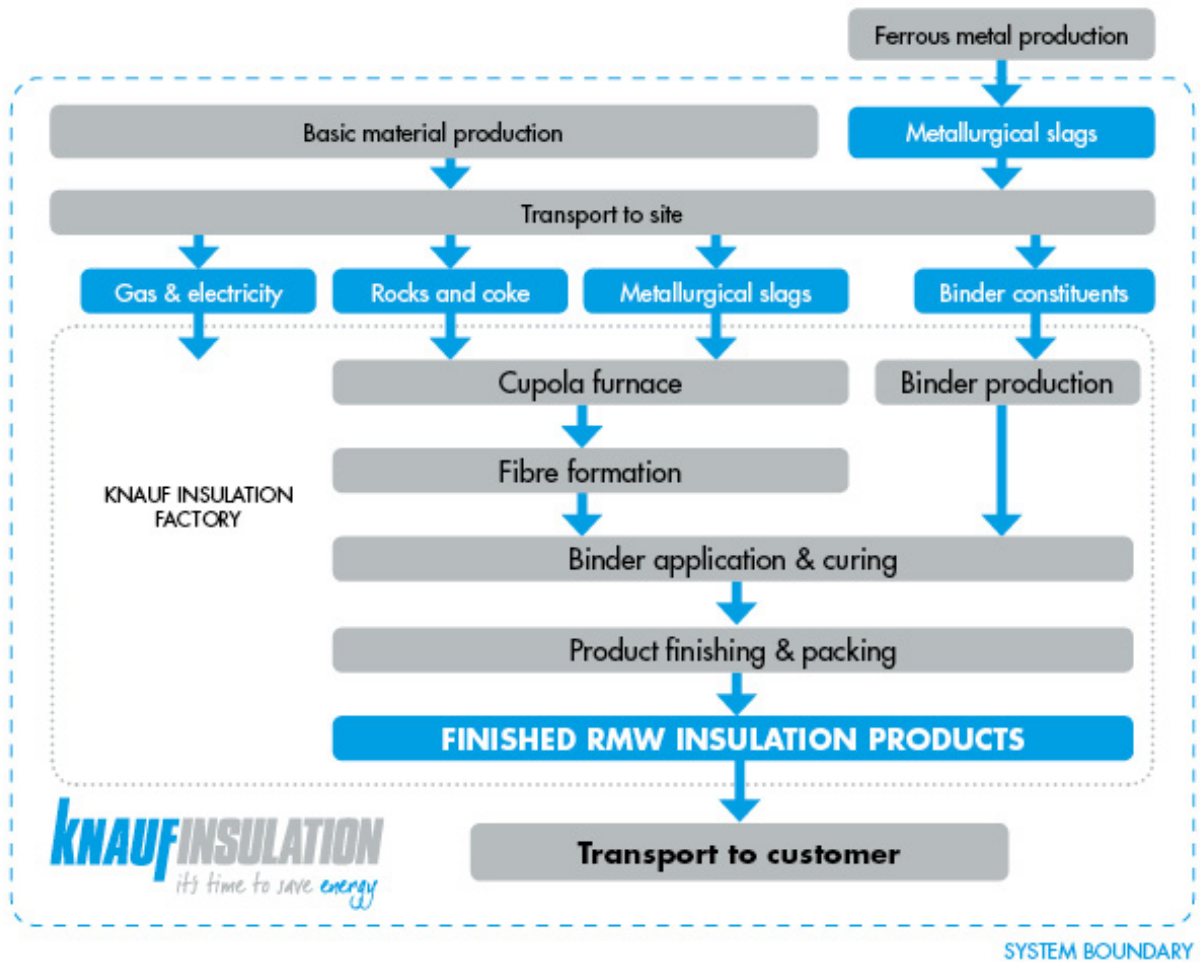
Product Contents

| 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

1cu.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

(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 |
| Environmental impacts per declared/functional unit | | | | | | | | |
| GWP | kg CO ₂ eq. | AGG | AGG | AGG | 53.8 | 0.605 | 0.285 | 0.202 |
| ODP | kg CFC 11 eq. | AGG | AGG | AGG | 2.72E-06 | 1.11E-07 | 5.24E-08 | 6.91E-08 |
| AP | kg SO ₂ eq. | AGG | AGG | AGG | 0.342 | 0.003 | 0.00141 | 0.00154 |
| EP | kg (PO ₄) ³⁻ eq. | AGG | AGG | AGG | 0.0457 | 0.0006 | 0.00028 | 0.00026 |
| POCP | kg C ₂ H ₄ eq. | AGG | AGG | AGG | 0.0199 | 9.73E-05 | 4.59E-05 | 7.39E-05 |
| ADPE | kg Sb eq. | AGG | AGG | AGG | 1.95E-05 | 1.07E-06 | 5.04E-07 | 1.50E-07 |
| ADPF | MJ eq. | AGG | AGG | AGG | 659 | 8.69 | 4.10 | 5.80 |
| 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 | | | | | | | | |
| Resource use | | | | | | | | |
| PERE | MJ | AGG | AGG | AGG | 97.1 | 0.0481 | 0.0227 | 0.128 |
| PERM | MJ | AGG | AGG | AGG | 42.8 | 0.00 | 0.00 | 0.00 |
| PERT | MJ | AGG | AGG | AGG | 140 | 0.0481 | 0.0227 | 0.128 |
| PENRE | MJ | AGG | AGG | AGG | 561 | 9.41 | 4.44 | 6.24 |
| PENRM | MJ | AGG | AGG | AGG | 21.2 | 0.00 | 0.00 | 0.00 |
| PENRT | MJ | AGG | AGG | AGG | 583 | 9.41 | 4.44 | 6.24 |
| SM | kg | AGG | AGG | AGG | 13.00 | 0.00078 | 0.00036 | 0.00117 |
| RSF | MJ | AGG | AGG | AGG | INA | INA | INA | INA |
| NRSF | MJ | AGG | AGG | AGG | INA | INA | INA | INA |
| FW | m ³ | AGG | AGG | AGG | 0.792 | 0.00106 | 0.0005 | 0.00658 |
| 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 | | | | | | | | |
| Waste to disposal | | | | | | | | |
| HWD | kg | AGG | AGG | AGG | 0.0952 | 0.00072 | 0.00034 | 0.00178 |
| NHWD | kg | AGG | AGG | AGG | 1.10 | 0.0055 | 0.0026 | 39.3 |
| TRWD | kg | AGG | AGG | AGG | 0.00139 | 6.36E-05 | 3.00E-05 | 3.96E-05 |
| RWDHL | kg | AGG | AGG | AGG | 0.00014 | 2.69E-07 | 1.27E-07 | 2.49E-07 |
| HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; TRWD = Total Radioactive waste disposed; RWDHL = Radioactive waste disposed (high-level nuclear waste) | | | | | | | | |
| Other output flows | | | | | | | | |
| 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 ³) |
| Lorry | 0.2 | 100 | 33 | 39 |

| End-of-life modules – C1, C3, and C4 | | | |
|--------------------------------------|-------------------------------|------|-------|
| Parameter | Description | Unit | Value |
| Waste for final disposal | Quantity of waste to landfill | kg | 39 |

| Module C2 – Transport to waste processing | | | | |
|---|-------------------------|---------------|--------------------------|---|
| Vehicle Type | Fuel Consumption (L/km) | Distance (km) | Capacity Utilisation (%) | Density Of Product (kg/m ³) |
| Lorry | 0.2 | 50 | 33 | 39 |

Interpretation

This EPD applies to products with densities in the range 33-45kg/cu.m. Indicator values are presented for the mean (weighted average) density: 39 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.

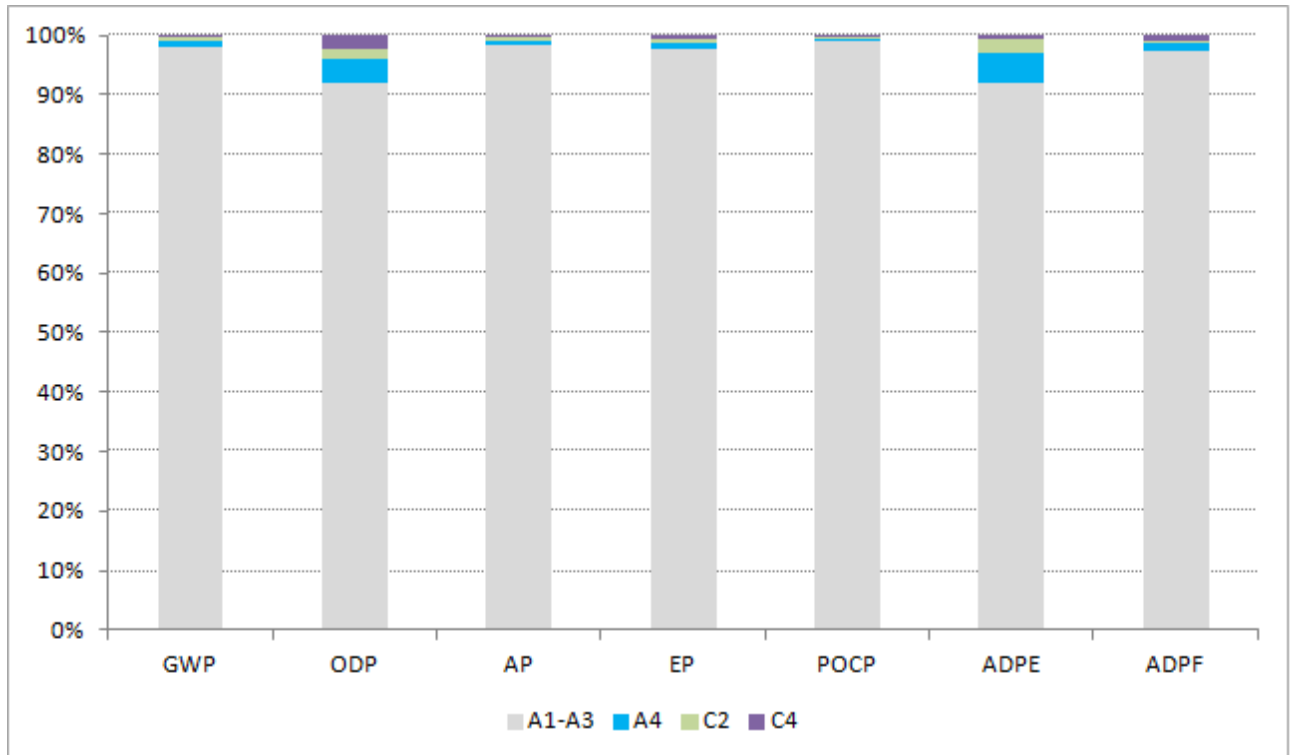


Figure 1

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.