

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A1:2013 for:

Blowing wool insulation λ 0.032 - 0.033 W/mK



From

KNAUFINSULATION



Program:	The International EPD® System www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-01758
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Programme-related information and verification

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EPD programme operator:	EPD International AB Box 210 60 SE-100 31 Stockholm - Sweden www.environdec.com info@environdec.com
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EPD owner:	Knauf Insulation (Headquarters) Rue de Maestricht 95 4600 Visé Belgium
EPD Developer:	Knauf Insulation (Northern Europe) Stafford Road St Helens Merseyside WA10 3N - UK
Product Category Rules:	CEN standard EN 15804+A1 serves as the Core Product Category Rules (PCR) PCR 2012:01. Construction products and construction services. Version 2.3 Sub-PCR-I Thermal insulation products (EN 16783). Version 2018-11-22
PCR review conducted by:	The Technical Committee of the International EPD® System
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Third-party Verifier:	Ugo Pretato Studio Fieschi & Soci S.r.l. Italy 
Procedure for follow-up of data during EPD validity involves third-party Verifier:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
LCA conducted by:	EuGeos Limited, UK +44 (0)1625 434423 www.eugeos.co.uk 
Product group classification:	UN CPC 37
Reference year for manufacturing data:	2018
Geographical application scope:	Europe

The EPD owner has the sole ownership, liability and responsibility for the EPD.
EPDs within the same product category but from different programmes may not be comparable.
EPDs of construction products may not be comparable if they do not comply with EN 15804.

About the company

Knauf Insulation has more than 40 years of experience in the insulation industry and is one of the most respected names in insulation worldwide.

At Knauf Insulation, we are committed to helping our customers meet the increasing demand for energy efficiency and sustainability in homes, non-residential buildings and industrial applications.

As the only manufacturer of both Glass and Rock Mineral Wool, we are uniquely placed to provide the best insulation solution for each application. We offer a wide range of insulation solutions for all applications in commercial and residential buildings, for both new build and refurbishment projects, in addition to solutions for HVAC, industrial applications and fire protection, green roofs and bespoke applications.

COMPANY CERTIFICATIONS

All Knauf Insulation sites, including the manufacturing facilities for products covered by this EPD, are ISO 9001, ISO 14001, ISO 5001 and OHSAS 18001 certified under the scope "Design, Development and Production of Insulation Materials and Systems".

PRODUCTION SITES

Data used for the product LCA were collected from Knauf Insulation (Northern Europe)'s two-glass insulation manufacturing facilities in the UK:

Knauf Insulation, Stafford Road, St Helens, Merseyside
Knauf Insulation, Cwmbran, Torfaen, Wales

About glass mineral wool production

Glass mineral wool insulation is available in two forms:

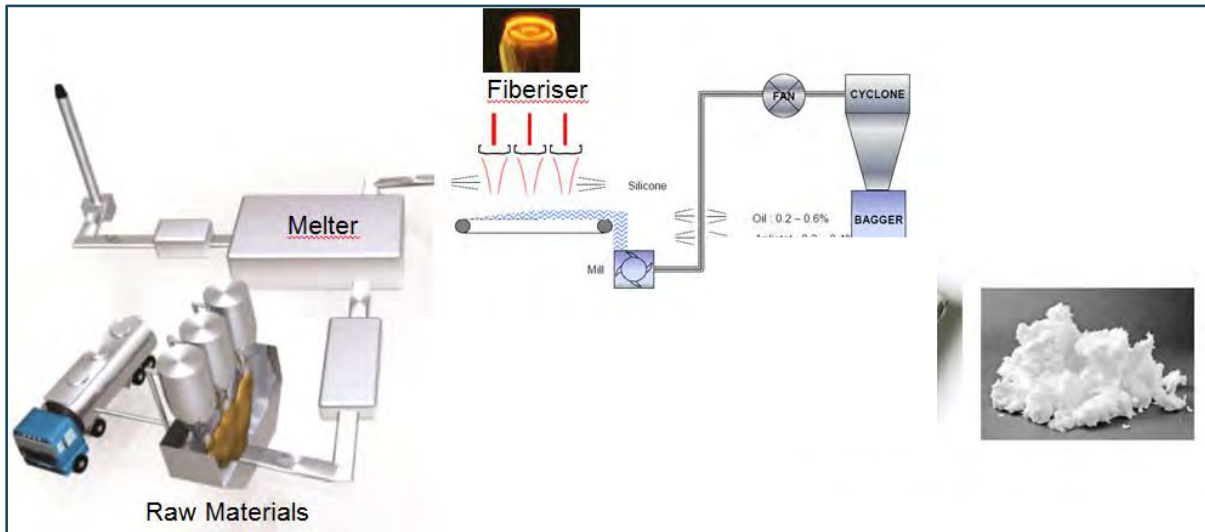
Glass Mineral Wool (GMW) products contain binder and are manufactured in the form of slabs and rolls.

Blowing wool products contain no binder for loose-fill applications.

In the manufacturing process, recovered waste glass is melted together with other raw materials needed to achieve glass of the target composition. As molten glass leaves the furnace, it is cooled and formed into glass fibres. This is transformed directly into the blowing wool product. For mineral wool products, binder is then applied as a solution prior to the forming and oven-curing of the final product

Both GMW and blowing wool are produced at Knauf Insulation (Northern Europe)'s glass insulation manufacturing facilities in the UK.

This EPD concerns blowing wool products compliant with the requirements of EN 14064. These are manufactured in the form of flocks of unbound glass mineral wool; the production process for blowing wool is shown in the figure below.



Product information

PRODUCT DESCRIPTION

Blowing wool comprises over 99% inert material. This inert content comprises recycled glass (external cullet, up to 80% of the composition) with other mineral raw materials - mainly sand and dolomite. The remaining fraction ($\leq 1\%$) comprises anti-static, water repellent and dust-suppressing additives.

Glass blowing wool is used for thermal insulation in buildings. The principal performance characteristic of thermal insulation is its thermal conductivity (λ).

The product is mainly marketed in the Northern Europe, particularly the UK and Scandinavia.

RECYCLED MATERIAL

The external cullet content applied in the LCA for this EPD was taken from 2018 usage data for Cwmbran and St Helens factories.

PACKAGING AND TRANSPORTATION

All glass insulation products are compressed when packed to optimise their transport to customers.

USE AND MAINTENANCE

The product does not require maintenance or replacement.

In normal conditions of use, the product is not visible in either internal or external areas, and will not be in contact with water.

END-OF-LIFE

The product may be disposed of as a non-hazardous material, EWC code 17 06 04.

UN CPC

Under the UN CPC classification system v2.1, Knauf Insulation (NE) mineral wool insulation products are classified CPC 37990.

PRODUCT RANGE

Knauf Insulation Northern Europe's glass blowing wool products have been divided into a number of groups; each group encompasses products with thermal conductivity (λ) within a specified range. This EPD is for products with thermal conductivity in the range 0.032 - 0.033 W/mK. The products to which it applies are listed in the following table.

THERMAL CONDUCTIVITY	Λ 0.032 – 0.033 W/mK
DENSITY RANGE	29 - 31 kg/m ³
PRODUCTS	SUPAFIL® FRAME (0.033 W/mK)

TECHNICAL CHARACTERISTICS

The products are intended for use as thermal insulation in buildings. They comply with BS EN 14064 and the CE mark.

Key technical properties are shown in the table below; consult the relevant product Technical Data Sheet for a comprehensive specification.

PARAMETER	VALUE
THERMAL CONDUCTIVITY (EN 12667) AT 10°C	Λ 0.032 - 0.033 W/mK
GROSS DRY DENSITY RANGE (EN 1602)	29 -31 kg/m ³
WATER VAPOUR DIFFUSION RESISTANCE FACTOR (BS EN 13162)	1
WATER ABSORPTION Wp (BS EN 29767)	<1 kg/m ²
REACTION TO FIRE (BS EN 13501-1:2002)	EUROCLASS A1

REFERENCE SERVICE LIFE

The expected lifetime of the product is as long as the lifetime of the building equipment in which it is installed (at least 50 years).

RESIDUAL RISKS AND EMERGENCIES

There are no residual risks associated with the normal day-to-day use of insulation products. Care must be taken to install the products in accordance with Knauf Insulation (NE)'s guidance.

The product is classified as non-hazardous. The International Agency for Research on Cancer (IARC) classifies mineral wool fibres in group 3: "*not classified as to their carcinogenicity to humans*". These fibres are exempt from carcinogenic classification under European Regulation 1272/2008, having bio-persistence below the values defined in its note "Q". This exemption is certified by the European Certification Board (EUCEB, www.euceb.org).

CONTENT DECLARATION

No substance included in the Candidate List of Substances of Very High Concern for authorisation under the REACH Regulations is present in these insulation products, either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

FURTHER PRODUCT INFORMATION

Detailed product information and datasheets can be found

- on our website: <https://www.knaufinsulation.co.uk/>
- or by contacting Customer Service by telephone: 01744 766 766
- or by email: technical.uk@knaufinsulation.com

LCA information

This section of the EPD records key features of the LCA on which it is based.

DECLARED UNIT

The declared unit is 1m² at 100mm thickness.

The applicable thermal conductivity is 0.032 - 0.033 W/mK.

Indicator values are declared for product with density 30 kg/m³. If indicator values for other densities are required, they may be obtained by linear extrapolation of these values.

SCOPE AND SYSTEM BOUNDARIES

The system boundary of the EPD is defined using the modular approach set out in EN 15804 as shown in the table below.

This a cradle-to-gate with options EPD.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BEYOND BOUNDARIES
RAW MATERIAL SUPPLY	TRANSPORT	MANUFACTURING	TRANSPORT TO THE SITE	ASSEMBLY	USE	MAINTENANCE	REPAIR	REPLACEMENT	REFURBISHMENT	OPERATIONAL ENERGY USE	OPERATIONAL WATER USE	DE-CONSTRUCTION DEMOLITION	TRANSPORT	WASTE DISPOSAL	DISPOSAL	REUSE-RECOVERY-RECYCLING-POTENTIAL
A 1	A 2	A 3	A 4	A 5	B1	B2	B3	B4	B5	B 6	B 7	C 1	C 2	C 3	C 4	D
X	X	X	X	X	MND	MND	MND	MND	MND	M	M	M	X	MND	X	MND
										N	N	N				
										D	D	D				

Modules declared in the EPD: X: included in LCA; MND: module not declared or NR for not relevant

PRODUCT STAGE

This stage includes the extraction and manufacture of raw materials, intermediate products and energy, as well as waste processing up to the end-of-waste state (i.e. no longer considered a waste material) or disposal of final residues arising during the product stage.

All upstream resource extraction and manufacturing processes are included in the system. All energy used in factories and factory support offices is included but energy used in head offices and sales offices etc. is not. Maintenance of equipment is also excluded.

Modules A1, A2 and A3 are declared as one aggregated module: A1 – A3. Details of the product and packaging applied in the LCA are provided in the table below

PRODUCT PARAMETERS	VALUE
DECLARED DENSITY	30 KG/M ³
GLASS MINERAL WOOL WEIGHT (WITHOUT FACING WEIGHT)	3.0 KG
SURFACE	1 M ²
THICKNESS	100 MM
VOLUME	0.1 M ³
FACING	NA
PACKAGING PLASTIC SHEET	0.024KG
PACKAGING WOODEN PALLET	0.012KG

CONSTRUCTION STAGE

Module A4 covers transport of product from the place of manufacture to the construction site. It includes the transport distance and the relevant transport mode.

Module A5 covers installation of the product in the building. Blowing wool is blown into place using compressed air; therefore, for blowing wool products, A5 includes energy use as well as product wastage at 2% and management of product packaging after use.

These modules are included in the LCA using scenarios, except for energy used to install blowing wool in module A5, which is modelled using data collected by Knauf Insulation for installation in different contexts within the building. The parameters applied are shown in the table below:

PARAMETER	VALUE
AVERAGE TRANSPORT DISTANCE	600 KM
TYPE OF FUEL AND VEHICLE CONSUMPTION OR TYPE OF VEHICLE USED FOR TRANSPORT	TRUCK. EURO 6, 16 – 32 T / 16 T PAYLOAD, 21L / 100 KM
TRUCK CAPACITY UTILISATION (INCLUDING 30% OF EMPTY RETURNS)	35 %
LOSS OF MATERIALS ON SITE	2%
PACKAGING WOODEN PALLET	31% RECYCLED, 69% TO LANDFILL
PACKAGING PLASTIC SHEET	45% RECYCLED, 14% INCINERATED, 41% TO LANDFILL

END-OF-LIFE STAGE

Module C2 concerns transport of the end-of-life construction product, after removal from the building, to a waste processing facility

Module C4 covers final disposal of the end-of-life construction product.

These modules are included in the LCA using scenarios; the parameters used for these modules are shown in the table below:

PARAMETER	VALUE
DISPOSAL TYPE (MINERAL WOOL)	100% LANDFILL
AVERAGE TRANSPORT DISTANCE WASTE (C2)	50 KM
TYPE OF FUEL AND VEHICLE CONSUMPTION OR TYPE OF VEHICLE USED FOR TRANSPORT	TRUCK, EURO 4, 7.5-16 T, 18 L/ 100 KM
TRUCK CAPACITY UTILIZATION	35 %

ADDITIONAL LCA INFORMATION

CUT-OFF CRITERIA

According to the PCR, flows can be omitted (cut off) from the LCA up to a maximum of 1% of the total mass of material inputs or 1% of the total energy content of fuels and energy carriers; energy inputs at one site which represented <0.5% of total energy use in a previous LCA were omitted from the LCA underpinning this EPD.

DATA SOURCES AND DATA QUALITY

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.

ALLOCATION

In the background data, the Eco invent default allocation is applied to all processes except those in which secondary materials are used, where the "cut-off" allocation is applied. This ensures that secondary materials are free of upstream burdens that arise prior to their reaching the "end of waste" state; this is in accordance with the PCR and also Section 6.3.4.2 of EN 15804.

Following ISO 14044, the overall process is subdivided as far as possible, so that flows dedicated to a particular product type are fully assigned to that product type and the need for allocation is minimised.

ASSUMPTIONS AND ESTIMATES

Inputs to and outputs from the system are accounted for over a 100-year time period; long-term emissions are therefore omitted from the impact assessment part of the LCA.

The "primary energy used as material" indicators (PERM; PENRM) are calculated using - as characterisation factors - published values for constituent materials, which can yield energy on combustion, where available, and from published calorific values where PEM values are not available. Calculations of PE(N)RM are based on a feedstock energy content of 47MJ/kg for plastic packaging film, and 16MJ/kg for wood.

"Primary energy as fuel" indicators (PENRE, PERE) are calculated as the total primary energy demand minus primary energy used as material.

The secondary material indicator counts recycled glass in the product only.

TIME REPRESENTATIVENESS

Data used for this LCA were collected following guidance in ISO 14044:2006 and cover the 12-month period January 1 - December 31 2018.

DATABASE(S) AND LCA SOFTWARE USED

The LCA model, the data aggregation and environmental impacts were calculated in openLCA. Background data were taken from the Eco invent v 3.4 database.

Environmental performance indicators

This EPD contains environmental information about the specified products, in the form of quantitative indicator values for parameters, which encompass calculated environmental impact potentials, resource and energy use, and waste generation. These are abbreviated as follows:

INDICATORS	ABBREVIATION	UNIT
ENVIRONMENTAL IMPACT POTENTIALS		
GLOBAL WARMING POTENTIAL	GWP	KG CO ₂ EQ.
STRATOSPHERIC OZONE LAYER DEPLETION POTENTIAL	ODP	KG CFC 11 EQ.
ACIDIFICATION POTENTIAL	AP	KG SO ₂ EQ.
EUTROPHICATION POTENTIAL	EP	KG PO ₄ ³⁻ EQ.
FORMATION POTENTIAL OF TROPOSPHERIC OZONE	POCP	KG C ₂ H ₄ EQ.
ABIOTIC RESOURCES DEPLETION POTENTIAL – ELEMENTS	ADPE	KG SB EQ.
ABIOTIC RESOURCES DEPLETION POTENTIAL – FOSSIL RESOURCES	ADPF	MJ
RESOURCE USE		
PRIMARY ENERGY RESOURCES – RENEWABLE USE AS ENERGY CARRIER	PERE	MJ NET CALORIFIC VALUE
PRIMARY ENERGY RESOURCES – RENEWABLE USE AS RAW MATERIALS	PERM	MJ NET CALORIFIC VALUE
PRIMARY ENERGY RESOURCES – RENEWABLE - TOTAL	PERT	MJ NET CALORIFIC VALUE
PRIMARY ENERGY RESOURCES – NON-RENEWABLE USE AS ENERGY CARRIER	PENRE	MJ NET CALORIFIC VALUE
PRIMARY ENERGY RESOURCES – NON-RENEWABLE USE AS RAW MATERIALS	PENRM	MJ NET CALORIFIC VALUE
PRIMARY ENERGY RESOURCES – NON-RENEWABLE - TOTAL	PENRT	MJ NET CALORIFIC VALUE
SECONDARY MATERIAL	SM	KG
RENEWABLE SECONDARY FUELS	RSF	MJ NET CALORIFIC VALUE
NON-RENEWABLE SECONDARY FUELS	NRSF	MJ NET CALORIFIC VALUE
NET USE OF FRESH WATER	FW	M ³
WASTE PRODUCTION		
HAZARDOUS WASTE DISPOSED	HW	KG
NON-HAZARDOUS WASTE DISPOSED	NHW	KG
RADIOACTIVE WASTE DISPOSED	RW	KG
OTHER OUTPUT FLOWS		
COMPONENTS FOR REUSE	CR	KG
MATERIAL FOR RECYCLING	MR	KG
MATERIALS FOR ENERGY RECOVERY	MER	KG
EXPORTED ENERGY	EE	MJ

BLOWING WOOL INSULATION, Λ 0.032 - 0.033 W/MK, DENSITY 30 KG/M³

Environmental indicator results for the A1 - A3 modules on an aggregated basis and the A4, A5, C2 & C4 modules are shown in the following tables for the declared unit of 1m² at 100mm thickness (0.1m³).

For module A5 (installation in the building), indicator values are shown for applications into 3 different contexts:

- 'loft' for installation in lofts or in pre-fabricated modules ("MAX Frame")
- 'timber frame' for installation in timber-framed buildings
- 'cavity' for installation in cavity walls

ENVIRONMENTAL IMPACT POTENTIALS

INDICATOR	UNIT	TOTAL A1-A3	A4	A5 LOFT	A5 TIMBER FRAME	A5 CAVITY	C2	C4
GWP	KG CO ₂ EQ.	2.92E+00	5.06E-02	1.03E-01	1.10E-01	1.43E-01	3.15E-02	1.61E-02
ODP	KG CFC 11 EQ.	3.00E-07	9.11E-09	7.59E-09	8.79E-09	1.48E-08	5.69E-09	5.30E-09
AP	KG SO ₂ EQ.	6.93E-03	1.25E-04	2.13E-04	2.64E-04	5.10E-04	1.19E-04	1.18E-04
EP	KG PO ₄ ³⁻ EQ.	9.00E-04	1.59E-05	3.48E-05	4.56E-05	9.98E-05	2.09E-05	2.04E-05
POCP	KG C ₂ H ₄ EQ.	4.20E-04	7.88E-06	1.04E-05	1.18E-05	1.84E-05	5.26E-06	5.83E-06
ADPE	KG SB EQ.	1.66E-04	4.88E-07	3.29E-06	3.30E-06	3.32E-06	4.09E-07	5.38E-08
ADPF	MJ	4.96E+01	7.65E-01	1.12E+00	1.22E+00	1.69E+00	4.74E-01	4.54E-01

RESOURCE USE

INDICATOR	UNIT	TOTAL A1-A3	A4	A5 LOFT	A5 TIMBER FRAME	A5 CAVITY	C2	C4
PERE	MJ, NET CAL VALUE	7.83E-01	9.24E-03	2.28E-02	2.34E-02	2.62E-02	7.23E-03	1.17E-02
PERM	MJ, NET CAL VALUE	3.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ, NET CAL VALUE	1.11E+00	9.24E-03	2.28E-02	2.34E-02	2.62E-02	7.23E-03	1.17E-02
PENRE	MJ, NET CAL VALUE	6.06E+01	7.76E-01	1.36E+00	1.45E+00	1.93E+00	4.85E-01	4.61E-01
PENRM	MJ, NET CAL VALUE	7.19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ, NET CAL VALUE	6.13E+01	7.76E-01	1.36E+00	1.45E+00	1.93E+00	4.85E-01	4.61E-01
SM	KG	2.14E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, NET CAL VALUE	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, NET CAL VALUE	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	M ³	1.82E-02	1.41E-04	3.90E-04	4.20E-04	4.80E-04	9.45E-05	5.10E-04

WASTE PRODUCTION

INDICATOR	UNIT	TOTAL A1-A3	A4	A5 LOFT	A5 TIMBER FRAME	A5 CAVITY	C2	C4
HW	KG	5.40E-04	2.02E-05	3.35E-05	4.87E-05	1.25E-04	1.32E-05	2.71E-05
NHW	KG	4.29E-01	3.62E-02	8.41E-02	8.41E-02	8.44E-02	1.85E-02	3.00E+00
RW	KG	3.00E-04	5.16E-06	7.12E-06	7.80E-06	1.12E-05	3.26E-06	3.02E-06

OTHER OUTPUT FLOWS

INDICATOR	UNIT	TOTAL A1-A3	A4	A5 LOFT	A5 TIMBER FRAME	A5 CAVITY	C2	C4
CR	KG	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	KG	1.30E-04	4.31E-07	2.65E-06	2.68E-06	2.82E-06	2.57E-07	3.16E-07
MER	KG	9.52E-13	1.83E-14	1.96E-14	2.03E-14	2.37E-14	1.41E-14	1.35E-14
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

LCA interpretation

Modules A1 - A3 are the most significant across the whole life cycle. Knauf Insulation's own processes make the largest contribution to the indicator totals for almost all environmental impact categories, through energy use and emissions from the glass-making process.

Waste indicators and the indicator values obtained for ODP and water use should be used with caution; all are subject to uncertainties in data or method, which limit the scope for their use for comparison with other products or with other EPD, produced using background data from different sources.

References

General Programme Instructions Version 2.5 - The International EPD® System - EPD International AB

ISO 14025

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

EN 15804

EN 15804:2012-04+A1 2013: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

EN 14064 - Part1

EN 14064:2010 Thermal insulation products for buildings - In-situ formed loosefill mineral wool products - Part 1: Specification for the loosefill products before installation

EN 14064 - Part2

EN 14064:2010 Thermal insulation products for buildings - In-situ formed loosefill mineral wool products - Part 2: Specification for the installed products

EN 1602

EN 1602: 2013 Thermal insulating products for building applications - Determination of the apparent density

EN 12667

EN 12667: 2001 Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance

BS EN 13501-1

EN 13501-1: 2009 Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests.

BS EN 29767




BS EN ISO 29767:2019: Thermal insulating products for building applications. Determination of short-term water absorption by partial immersion

LCA of Glass Mineral Wool Insulation with Ecose® (2019) - Report For Knauf Insulation Northern Europe - EuGeos Limited

Product Category Rules PCR 2012:01. Construction products and construction services. Version 2.3 - The International EPD® System - EPD International AB

Sub-PCR-I Thermal insulation products (EN 16783). Version 2018-11-22

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