ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025, ISO 21930 and EN 15804+A2 for:

Loft Roll 44, Eko Roll, Space Loft Roll

From

KNAUF INSULATION



Program:	The International EPD® System www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-08812
Publication date:	2023-10-23
Validity date:	2028-10-23
Version:	2
Date of update:	2025-03-26

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Programme-related information and verification

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs following EN 15804+A2 should be compared with those of the same standard. EPDs of construction products may not be comparable if they do not comply with EN 15804+A2. For further information about comparability, see EN 15804+A2 and ISO 14025.

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
EPD registration number:	S-P-08812
Published:	2023-10-23
Valid until:	2028-10-23
EPD owner	Knauf Insulation Sprl Rue de Maestricht 95 4600 Visé (Belgium)
Product Category Rules:	PCR 2019 :14. Construction products (EN 15804+A2) Version 1.2.5 Sub-PCR-005 Thermal insulation products (EN 16783: 2017) Version: 2019-12-20
Product group classification:	UN CPC 37
Reference year for plant data:	2022
Geographical application scope:	Europe

CEN standard EN 15804+A2 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14. Construction products (EN 15804+A2) Version 1.2.5 Sub-PCR-005 Thermal insulation products (EN 16783: 2017) Version: 2019-12-20
PCR review was conducted by: The Technical Committee of the International EPD@ System
Independent third-party verification of the declaration and data, according to ISO 14025:2006. ☒ EPD verification by EPD Process Certification* Third-party verification: *Viktor Hakkarainen, Bureau Veritas* (*Certificate number: SE008541-1)* an approved certification body accountable for third-party verification. Third-party verifier is accredited by: *SWEDAC - Sverige AB 1236* *For EPD Process Certification, an accredited certification body certifies and reviews the management process and verifies EPDs published on a regular basis. For details about third-party verification procedure of the EPDs, see the GPI
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

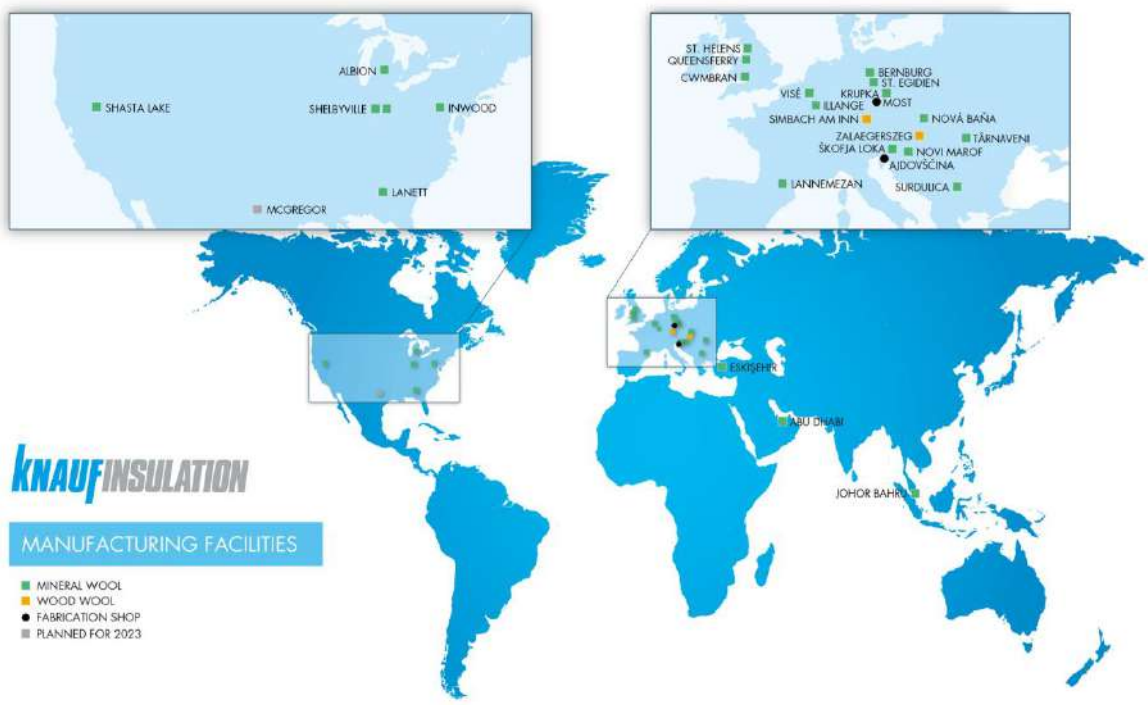
General information

Information about the company

Description of the organisation:
Knauf Insulation is a leading provider of glass and rock mineral wool, as well as wood wool insulation solutions. With more than 40 years of experience in the insulation industry, it is one of the most respected names in insulation worldwide.

As part of the Knauf Group, a €15.4bn turnover family-owned global manufacturer of building materials and construction systems, Knauf Insulation employs more than 6,000 employees and has 28 manufacturing sites in 15 countries, with a turnover of €2.5bn.

Knauf Insulation's mission is to challenge conventional thinking and create innovative insulation solutions that shape the way we live and build in the future, with care for the people who make them, the people who use them and the world we all depend on. Its vision is to lead the change in smarter insulation solutions for a better world.



The Headquarters are located in Visé, in Belgium.

Product-related or management system-related certifications:
All Knauf Insulation sites which are covered by EPD process certification system, including the sites considered for this EPD, are ISO 9001, ISO 14001, ISO 50001 and ISO 45001 certified under the scope "Design, Development and Production of Insulation Materials and Systems".

Knauf Insulation supports the Ten Principles of the United Nations Global Compact on human rights, labor, environment and anti-corruption.

Name and location of production site:
The intended application of these products in the construction industry is within the United Kingdom & Ireland. The data utilised for the production stage life cycle assessment is related to the production plants located utilisedutilisedin St. Helens (United Kingdom) and Cwmbran (United Kingdom).

Knauf Insulation, PO Box 10, Stafford Road, St. Helens, WA10 3NS, Merseyside, UK
Knauf Insulation, Pont-Y-Felin, Cwmbran, NP44 2YQ, Torfaen, South Wales

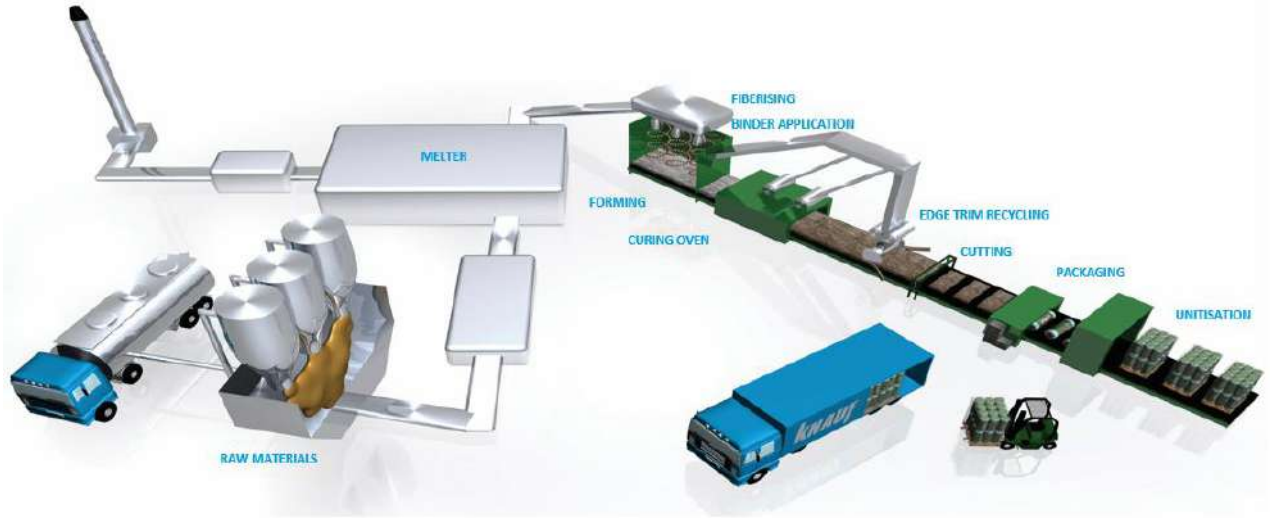
Information about glass mineral wool production

Knauf Insulation glass mineral wool products (GMW) are available in the form of rolls, slabs and blowing wool.

Typically, the density of glass mineral wool falls within the range of 10 to 85 kg/m³, and it comprises a minimum of 92% inert materials. The inert part primarily comprises recycled glass (external cullet), which constitutes up to 80% of the composition. Sand and dolomite are introduced to the mix, and the entire blend is melted together in a furnace.

For slabs and rolls, the residual fraction, which accounts for up to 8%, is composed of bio-based binder components. At Knauf Insulation, the binder used for the glass mineral wool products is the ECOSE® Technology binder. ECOSE® Technology contains no added formaldehyde or phenol. Additionally, the binder is derived from rapidly renewable natural raw materials, specifically plant starch.

Blowing wool insulation is a non-bonded, virgin fibrous insulation material, manufactured as a loose-fill product without the use of binders. In contrast, rolls and slabs of insulation are bonded and cured in an oven.



Product information

Product name: Loft Roll 44, Eko Roll, Space Loft Roll.

Product identification: The declared insulation consists of Loft Roll 44, Eko Roll and Space Loft Roll which are unfaced and uncoated glass mineral wool rolls of 1m^2.
For the placement of the products on the construction market in the European Union/ EFTA (with exception of Switzerland and UK), the Regulation/ (EU) No 305/2011/ applies. The products concerned need Declarations of Performance / DoP G4207CPCPR and G4209CPCPR, taking into consideration the harmonised product standard EN 13162 and the CE-mark.

Product description: The main application for Loft Roll 44, Eko Roll, Space Loft Roll is insulating cold pitched roofs at ceiling level.

Geographical scope: The manufacturing is in St. Helens (United Kingdom) and Cwmbran (United Kingdom). Energy-related information is described in the next section. The products are mainly marketed in the United Kingdom & Ireland.

Technical Characteristics:

Parameter	Value
Thermal conductivity/ EN 12667	0.044W/(mK) at 10°C
Water vapor diffusion resistance (EN 12086)	1
Thermal Resistance (ISO 8301)	2.25 m^{2}K/W
Reaction to fire (EN 13501-1)	A1
Declared density range/ EN 1602	8.9 kg/m^3 (+/-10%)

UN CPC code:
37990: Non-metallic mineral products (including mineral wool, expanded mineral materials, worked mica, articles of mica, non-electrical articles of graphite or other carbon and articles of peat).

LCA information

Functional unit / declared unit
The declared unit is 1m^2 of unfaced glass mineral wool Loft Roll 44, Eko Roll, Space Loft Roll with R-value of 2.25 m^{2}K/W (for a thickness of 100 mm) and a declared lambda of 0.044 W/mK).

Reference service life: The RSL or durability of Loft Roll 44, Eko Roll, Space Loft Roll is as long as the lifetime of the building in which it is used (at least 50 years).

Time representativeness & Information on Specific Data:
The complete reference year used for the plant production data is 2022. The product group considered in this EPD is produced in multiple Knauf Insulation manufacturing sites with equal weight.

The data which are used to carry out the LCA calculations contains more than 90% specific data and less than 10% generic data.

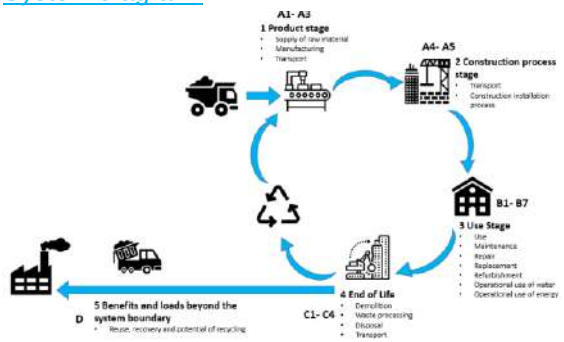
Database(s) and LCA software used:
The LCA model, the data aggregation and environmental impacts are calculated with the software LCA for Experts (GaBi) 10.7 and its content version 2023.1. The impact models used are those indicated in EN 15804:2012+A2:2019.

Gas information
The gas input (reference year: 2019) from United Kingdom is selected for St. Helens and Cwmbran.

Electricity information

Plants (countries)	Electricity mixes	Location (electricity)	Dataset Reference Year	Impact (Kg CO_2/kwh)
St. Helens & Cwmbran (United Kingdom)	Renewable Energy Certificates	United Kingdom	2019	0.037

System diagram:



Description of system boundaries:

The system boundary of the EPD follows the modularity approach defined by the EN 15804:2012+A2:2019.

The type of EPD is cradle-to-grave.
A comprehensive list and detailed explanations of each stage within the EPD are available as follows.

The product stage (A1-A3) includes:
- A1 – raw material extraction and processing, processing of secondary material input (e.g., recycling processes),
- A2 – transport to the manufacturer and
- A3 – manufacturing.

This includes 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 LCA results are presented in an aggregated format for the product stage, where modules A1, A2, and A3 are consolidated into a single module, denoted as A1-A3.

Product Parameters	Value
Glass mineral wool weight	0.89 kg
Area	1m²
Thickness	100 mm
Volume	0.10 m^3
Packaging - PE film	0.02 kg
Packaging - Wooden pallet	0.04 kg

The construction process stage includes:
- A4 – transport to the construction site and
- A5 – installation into the building.

The transport to the building site (A4) and installation (A5) included in this LCA use the following parameters:

Parameter	Value
Average transport distance (truck)	250 km
Type of fuel and vehicle used for transport (truck)	Truck Euro 6 (28 – 32 t / 22 t payload).
Truck capacity utilisation (including 30% of empty returns)	26.91 % of the weight capacity
Loss of materials on site	2%
Packaging - PE film	40% recycled, 60% incinerated
Packaging - Wooden pallet	40% recycled, 60% incinerated

The treatment and the transport of the packaging waste after the installation of the product (A5) has been considered.

The Use stage (B1-B7) includes:
- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational Energy Use
- B7: Operational Water Use

Once installation is complete, no actions or technical operations are required during the use stages until the end of life. Therefore, the mineral wool has no impact (excluding potential energy savings) on this stage.

The end-of-life stage includes:
- C1 – de-construction, demolition,
- C2 – transport to waste processing,
- C3 – waste processing for reuse, recovery and/or recycling and
- C4 – disposal.

This includes provision of all transport, materials, products and related energy and water use. The common manual dismantling impact of insulation is considered as very small and can be neglected in C1.

Although glass mineral wool products from Knauf Insulation are partly recycled at their end-of-life, an established collection system does not yet exist. Therefore, the assumption chosen in this study, 100% landfill (C4) after the use phase, is the most conservative approach.

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-trailer, Euro 6, 34 - 40t gross weight / 27t payload capacity/ 40 L for 100 km. (if 100 % utilisation).
Truck capacity utilisation	50 % of the weight capacity

Module D includes reuse, recovery and/or recycling potentials. According to EN 15804:2012+A2:2019 any declared benefits and loads from net flows leaving the product system not allocated as co-products and having passed the end-of waste state shall be included in module D. The benefits considered in module D originate from packaging recycling or incineration.

Recycled material

The mineral wool waste generated during the manufacturing process is recycled internally and fed back into the mineral wool production process at multiple stages.

The external cullet input for the production site in is accounted for in the assessment. The average recycled content for the manufacturing plants and products in consideration has been calculated at 70% in St. Helens (2022) and Cwmbran (2022) according to the cullet market availability. The calculation is completed following EN 15804+A2 Use of Resources indicator Secondary Material (SM), taking into account the % of secondary materials from external supply input into the batch against virgin raw materials supply. The external waste considerations are also following the ISO 14021 norm.

Additional information:

All raw materials used in the manufacture of the declared product, the required energy, water consumption and the resulting emissions are considered in the LCA. As a result, recipe components with a share of less than 1% are included. All neglected processes contribute less than 5% to the total mass or less than 5% to the total energy consumption. For information, the impact of the glass mineral wool plant construction or manufacturing equipment is not taken into account in the life cycle assessment. Allocation criteria with by-products (mineral wool for ceiling tiles) are based on cost.

Materials required for fixing and installation are not included in the scope of this LCA. The impact of any additional construction products or materials not included in this EPD should be accounted for at building level. Regarding installation, this EPD only includes the environmental impacts relating to the product itself, such as material losses and packaging disposal.

Knauf Insulation adopts a conservative approach in its EPDs.

The conversion factor used in this EPD involves multiplying the results by 1.12 to obtain Environmental Impact Indicator results for 1 kg. An insulation product should always be characterised by its thickness and R-value. Solely considering the product's weight could potentially lead to misinterpretations.

Differences versus previous versions:

In the second version of this document, the results for the GWP-biogenic indicator were corrected to ensure the biogenic carbon is balanced across all life stages.

More information:

www.knaufinsulation.com

Name and contact information of LCA practitioner:

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Knauf Insulation Sprl
Rue de Maestricht 95
4600 Visé
Belgium
Contact: sustainability@knaufinsulation.com

Content Declaration

The product does not contain substances on the "Candidate List of Substances of Very High Concern for Authorisation" under the REACH regulation (if above 0.1% of the mass).

Product components	Weight %	Pre-consumer material, weight - % *(out of total)*	Post- costumer % *(out of total)*	Renewable material, weight- % *(out of total)*
Mineral Materials	20 – 60	0	0	0
Recycled Glass	40 - 80	0-25	75-100	0
Bio - based binder	2 - 15	0	0	0
Additives	< 1	0	0	0
Packaging Materials	Weight, kg/ DU or FU	Weight -% (versus the product)		
Packaging - PE film (0-50% recycled content)	0.02	1.88%		
Packaging - Wooden pallet	0.04	4.05%		
TOTAL	0.05	5.96%		

Declared Modules, geography, share of specific data (in GWP-GHG indicator) & data variation

Life cycle stages as defined in the European standard EN 15978 :2011 and the description of the system boundaries for the reference product LCA (X = included in the LCA, MND = module is not declared)

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe	Europe
Specific data used	> 90 %																
Variation* – products	NA																
Variation** – St. Helens	2.3%																
Variation** – Cwmbran	-2.3%																

*Variation regarding the average EPD result in terms of GWP-GHG indicator amongst products covered with this EPD

**Variation regarding the average EPD result in terms of GWP-GHG indicator

Environmental performance

Potential environmental impacts: 1m² of glass mineral wool Loft Roll 44, Eko Roll, Space Loft Roll with a thickness of 100 mm and the R-value of 2.25 m^2K/W.

These results are representative of all the products mentioned in this EPD.

ENVIRONMENTAL IMPACTS										
Parameter	**Unit**	**A1-3*****	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D****
GWP-fossil	kg CO_2 eq.	8.11E-01	3.88E-02	4.47E-02	0.00E+00	0.00E+00	2.81E-03	0.00E+00	1.46E-02	-3.07E-02
GWP-biogenic	kg CO_2 eq.	-1.28E-01	5.04E-04	5.99E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.27E-02	0.00E+00
GWP-luluc	kg CO_2 eq.	4.91E-04	3.46E-04	2.64E-05	0.00E+00	0.00E+00	2.50E-05	0.00E+00	6.24E-05	-2.42E-06
GWP-total	kg CO_2 eq.	6.84E-01	3.97E-02	1.05E-01	0.00E+00	0.00E+00	2.84E-03	0.00E+00	9.73E-02	-3.07E-02
ODP	kg CFC 11 eq.	1.03E-12	4.86E-15	2.99E-14	0.00E+00	0.00E+00	3.52E-16	0.00E+00	8.22E-15	-1.51E-13
AP	mol H^+ eq.	8.33E-03	4.17E-05	1.83E-04	0.00E+00	0.00E+00	2.80E-06	0.00E+00	1.06E-04	-5.16E-05
EP-freshwater	kg P eq.	1.37E-05	1.36E-07	2.94E-07	0.00E+00	0.00E+00	9.88E-09	0.00E+00	3.06E-07	8.05E-09
EP-marine	kg N eq.	1.35E-03	1.34E-05	3.12E-05	0.00E+00	0.00E+00	8.59E-07	0.00E+00	2.93E-05	-1.67E-05
EP-terrestrial	mol N eq.	3.24E-02	1.61E-04	7.15E-04	0.00E+00	0.00E+00	1.04E-05	0.00E+00	3.13E-04	-1.85E-04
POCP	kg NMVOC eq.	2.90E-03	4.12E-05	6.97E-05	0.00E+00	0.00E+00	2.68E-06	0.00E+00	8.56E-05	-5.82E-05
ADP-minerals&metals *	kg Sb eq.	1.92E-07	2.46E-09	4.12E-09	0.00E+00	0.00E+00	1.78E-10	0.00E+00	1.51E-09	-1.51E-09
ADP-fossil*	MJ	1.17E+01	5.08E-01	2.85E-01	0.00E+00	0.00E+00	3.68E-02	0.00E+00	1.92E-01	-7.85E-01
WDP	m^3	1.20E-01	4.51E-04	8.87E-03	0.00E+00	0.00E+00	3.27E-05	0.00E+00	1.10E-03	-3.43E-03
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption									

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

***: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].*

**** The indicator's results are calculated using a reference product, with equal weighting between plants. A product sourced from a single plant may have a variation of more than 10% from the reference product (concerning A1- A3).*

Potential environmental impact – additional mandatory and voluntary indicators

Indicator	Unit	Tot.A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG [2]	kg CO_2 eq.	8.10E-01	3.89E-02	4.47E-02	0.00E+00	0.00E+00	2.81E-03	0.00E+00	1.45E-02	-3.07E-02

[2] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of resources: 1m² of glass mineral wool Loft Roll 44, Eko Roll, Space Loft Roll with a thickness of 100 mm and the R-value of 2.25 m²K/W.

These results are representative of all the products mentioned in this EPD.

RESOURCES USE										
Parameter	**Unit**	**A1-3*****	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D***
PERE [MJ]	MJ	8.76E+00	3.70E-02	1.87E-01	0.00E+00	0.00E+00	2.68E-03	0.00E+00	2.24E-02	-4.33E-01
PERM [MJ]	MJ	1.52E+00	0.00E+00	3.05E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [MJ]	MJ	1.03E+01	3.70E-02	2.17E-01	0.00E+00	0.00E+00	2.68E-03	0.00E+00	2.24E-02	-4.33E-01
PENRE [MJ]	MJ	1.10E+01	5.10E-01	2.72E-01	0.00E+00	0.00E+00	3.70E-02	0.00E+00	1.92E-01	-7.86E-01
PENRM [MJ]	MJ.	7.21E-01	0.00E+00	1.44E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT [MJ]	MJ	1.18E+01	5.10E-01	2.86E-01	0.00E+00	0.00E+00	3.70E-02	0.00E+00	1.92E-01	-7.86E-01
SM	kg	6.09E-01	0.00E+00	1.24E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	3.99E-03	4.05E-05	2.35E-04	0.00E+00	0.00E+00	2.94E-06	0.00E+00	3.66E-05	-1.20E-04
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water									

**: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].*

**** The indicator's results are calculated using a reference product, with equal weighting between plants. A product sourced from a single plant may have a variation of more than 10% from the reference product (concerning A1- A3).*

Waste production and output flows: 1m² of Glass Mineral Wool Loft Roll 44, Eko Roll, Space Loft Roll with a thickness of 100 mm and the R-value of 2.25 m²K/W.

These results are representative of all the products mentioned in this EPD.

OUTPUT FLOWS AND WASTE CATEGORIES										
Parameter	**Unit**	**A1-3*****	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D***
Hazardous waste disposed	kg	-4.14E-10	1.58E-12	5.40E-11	0.00E+00	0.00E+00	1.14E-13	0.00E+00	3.04E-09	-4.27E-11
Non-hazardous waste disposed	kg	3.50E-02	7.78E-05	2.19E-02	0.00E+00	0.00E+00	5.63E-06	0.00E+00	8.92E-01	4.67E-04
Radioactive waste disposed	kg	8.09E-05	9.55E-07	2.66E-06	0.00E+00	0.00E+00	6.92E-08	0.00E+00	2.62E-06	-2.74E-05
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	2.16E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	3.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	9.65E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	1.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].*
**** The indicator's results are calculated using a reference product, with equal weighting between plants. A product sourced from a single plant may have a variation of more than 10% from the reference product (concerning A1- A3).*

Additional impact categories and indicators: 1m² of Glass Mineral Wool Loft Roll 44, Eko Roll, Space Loft Roll with a thickness of 100 mm and the R-value of 2.25 m²K/W.

The results communicated is representable for all the products mentioned in this EPD

ADDITIONAL IMPACT CATEGORIES AND INDICATORS										
Parameter	**Unit**	**A1-3*** **	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D***
PM	Disease Incidence	1.06E-07	3.00E-10	2.28E-09	0.00E+00	0.00E+00	2.09E-11	0.00E+00	1.30E-09	-7.48E-10
IRP	kBq U235 eq.	1.03E-02	1.42E-04	3.59E-04	0.00E+00	0.00E+00	1.03E-05	0.00E+00	2.54E-04	-4.55E-03
ETP-fw	CTUe	2.76E+01	3.61E-01	5.91E-01	0.00E+00	0.00E+00	2.62E-02	0.00E+00	1.18E-01	-2.91E-01
HTP-c	CTUh	5.27E-10	7.39E-12	1.22E-11	0.00E+00	0.00E+00	5.35E-13	0.00E+00	1.47E-11	-8.75E-12
HTP-nc	CTUh	3.16E-08	3.94E-10	7.59E-10	0.00E+00	0.00E+00	2.83E-11	0.00E+00	1.64E-09	-2.91E-10
SQP	dimensionless	5.16E+01	2.12E-01	1.07E+00	0.00E+00	0.00E+00	1.54E-02	0.00E+00	4.51E-02	-2.53E-01
Acronyms	PM = Particulate matter emissions; IRP= Ionising radiation, human health; ETP-fw: Ecotoxicity (freshwater); ETP-c: Human toxicity, cancer effects; HTP-nc: Human toxicity, non-cancer effects; SQP: Land use related impacts / soil quality									

Information on biogenic carbon content

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	**kg C**	1.48E-02
Biogenic carbon content in packaging	**kg C**	1.80E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

**: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery, and recycling potential) therefore, when summing up results, this stage should be considered separately].*

**** The indicator's results are calculated using a reference product, with equal weighting between plants. A product sourced from a single plant may have a variation of more than 10% from the reference product (concerning A1- A3).*

LCA interpretation

ENVIRONMENTAL IMPACTS

All impact categories except the Abiotic Depletion Potential for Non-Fossil Resources (ADP- minerals &metals) and the Depletion Potential of the Stratospheric Ozone layer (ODP) are dominated by the production. This is mainly due to the consumption of energy (electricity and natural gas) during the production of glass mineral wool.

The Global Warming Potential (GWP-total) is clearly dominated by the production, mostly due to energy consumption but significantly reduced by the use of electricity from renewable sources.

The Depletion Potential of the Stratospheric Ozone layer (ODP) is mostly influenced by the manufacturing phase (module A1-A3) and significantly influenced using electricity.

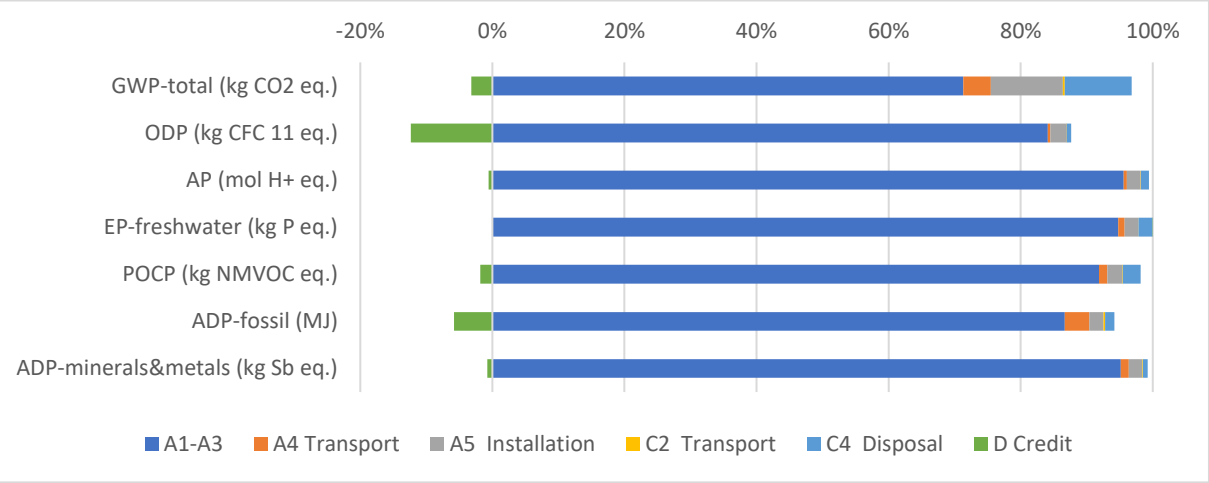
The Acidification Potential (AP) is also dominated by the production due to the process emissions and the electricity consumption. Most of the impact is by emissions of sulphur dioxide, ammonia and nitrogen oxides.

The Eutrophication Potential (all EP indicators in total) is significantly influenced by production due to emissions from the curing oven, furnace and other unit processes. The glucose for the binder production also has an impact because of crops fertilizers use.

The Formation Potential of Tropospheric Ozone (POCP) is dominated by emissions from the manufacturing processes (including energy use) and raw materials.

The Abiotic Depletion Potential for Non-Fossil Resources (ADP-minerals&metals) is dominated by the raw materials production.

The Abiotic Depletion Potential for Fossil Resources Potential (ADP-fossil) is dominated by energy consumption for the production. The packaging (plastic) and the binder have also a non-negligible impact.



The variation in Global Warming Potential (GWP) results (A1-A3) between the manufacturing sites covered by this EPD and the average results is 2.3%. Cwmbran plant has a lower environmental impact compared to St. Helens plant due to variations in energy and raw material consumption.

RESOURCES USE

Total Use of Non-Renewable Primary Energy Resources (PENRT) is dominated by the production of glass mineral wool products (especially due to the energy consumption) and with little influence of raw materials, binder and packaging.

Total Use of Renewable Primary Energy Resources (PERT) is dominated by the binder (bio-based), the production process (electricity from REGOs) and the packaging (wooden pallets).

For the Use of Secondary Material (SM), there is a lot of external cullet used into the batch process (recycled glass from windows, bottles and jars) up to 80% depending on plants.

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2023_06_26_LoftRoll44_SH,CB **(I-report)**
I-report is an interactive report created with LCA for Experts based on the scenario. More details on the product characteristics, plant allocation and scenario can be found in the i-report.

BR_GMW_2023 **(Background Report)**
Calculation rules for the Life Cycle Assessment and Requirements and more details about the production on the Background Report.

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