October 2021

LEED version 4.1

PRODUCT DATA FOR CERTIFICATION

GLASS MINERAL WOOL WITH ECOSE TECHNOLOGY

LEEDv4.1 (Leadership in Energy and Environmental Design) is a voluntary standard that defines high performance green buildings which are healthier, more environmentally responsible, and more profitable structures. Credits for certification can be earned in various categories, each with a unique focus on sustainable design: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, innovation and design process.

KNAUF INSULATION products can put you on the right track for the highest result into the certification!

LEED - Credit Category code	Definition	Knauf Insulation Products contribution	Contributes towards
Energy and Atmosphere (EA) Optimize Energy Performance	To achieve increasing levels of performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use**.**	ECOSE Technology products help reducing energy demand through very high insulation efficiency (building envelop, partition walls, HVAC equipment, floors and ceilings).	**18 points**
Materials and Resources (MR) Building Product Disclosure and Optimization – Environmental Product Declarations	To encourage the use of products where Life Cycle Assessment (LCA) is available and have environmentally, economically and socially preferable LCA. To reward project including products with verified LCA.	Third party verified Environmental Product Declarations (EN 15804-EPDs) are available online for ECOSE Technology products[1].	**2 points**
Materials and Resources (MR) Building Product Disclosure and Optimization – Sourcing of Raw Materials	To encourage the use of products where LCA is available and have environmentally, economically and socially preferable LCA. To reward project including products verified to be extracted or sourced in a responsible manner.	ECOSE Technology Products are manufactured with up to 80% of recycled content (pre-consumer and post-consumer waste)[2].	**1 point**

[1] https://www.knaufinsulation.com/downloads/environmental-product-declaration-epd/glass-mineral-wool-ecose%C2%AE-gmw ; https://ibu-epd.com/; http://www.base-inies.fr; https://www.environdec.com/EPD-Search/?query=knauf

[2] See annex1

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LEED - Credit Category code	Definition	Knauf Insulation Products contribution	Contributes towards
Materials and Resources (MR) Building Product Disclosure and Optimization – Material Ingredients	To encourage the use of products where LCA is available and have environmentally, economically and socially preferable LCA. To reward project for which the products chemical ingredients are inventoried.	ECOSE Technology products contain no ingredients listed on the REACH Authorization list, Restriction list or Substances of Very High Concern Candidate list[3]. They are inventoried to at least 0.01% by weight (100ppm) and certified DECLARE LBC Red List Free which means no harmful chemical substances[4].	**1 point**
Indoor Environmental Quality (EQ) Low-Emitting Materials	To reduce concentrations of chemical contaminants, as Volatile Organic Compound (VOC) that can damage air quality, human health, productivity and the environment. Emissions from ceilings, walls, thermal, and acoustic insulation are a complete category to be assessed.	ECOSE Technology products are compliant with the German AgBB Testing and Evaluation Scheme and the higher category (A+) of the French labelling. The binder is without added phenol formaldehyde. Products with or without facing, (with the exception of the black facing) are certified for Indoor Air Comfort[5] Eurofins Gold and Blue Angel[6].	**3 points**
Indoor Environmental Quality (EQ) Acoustic Performance	To provide spaces that promote occupants' well-being, productivity and communication through effective acoustic design.	ECOSE Technology products have high performance acoustic properties[7]. Products reduce HVAC background noise levels, increase sound insulation of building envelope, partitions, ceilings and aid in controlling reverberation time.	**1 point**

[3] Compliance letter statement to REACH can be requested for dedicated product's manufacturing plants
[4] See annex 2
[5] www.product-testing.eurofins.com and certificate in annex 3
[6] https://www.blauer-engel.de/en/s/knauf
[7] Acoustic test examples,see annex 4

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LEED - Credit Category code	Definition	Knauf Insulation Products contribution	Contributes towards
Indoor Environmental Quality (EQ) Thermal Comfort	To promote occupants productivity, comfort, and well-being by providing quality thermal comfort.	Insulation is a design alternative strategy. Heat radiation and air-conditioning will be minimized which will have positive comfortability feel and increase productivity for workers.	**1 point**

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GLASS MINERAL WOOL WITH ECOSE TECHNOLOGY

Annex 1: Materials and Resources: Sourcing of Raw Materials

Here enclosed additional detailed information[8] about pre-consumer waste (reintroduction of third party manufacturing scrap into another manufacturing process) and post-consumer waste (produced by the end consumer) utilized in the raw materials batch for the manufacturing of the ECOSE® technology glass mineral wool.

In LEED, total recycled content is the sum of 100% post-consumer recycled content plus 50% of the pre-consumer recycled content.

	Visé (B)	**Lannemezan (Fr)**	**Krupka (Cz)**	**Bernburg (D)**	**Eskisehir (Tr)**	**Abu Dhabi (UAE)**	**Cwmbran (UK)**	**St Helens (UK)**
% pre-consumer waste content	9.4%	4.9%	20.7%	26.8%	44.8%	0%	10%	0%
% post-consumer waste content	58.7%	64.5%	48.5%	32.8%	24.1%	27.5%	51.2%	69.5%
Total recycled content (100% pre-consumer+50% post-consumer)	**63.4%**	**67%**	**58.8%**	**46.2%**	**46.5%**	**27.5%**	**56.2%**	**69.5%**
LEED MR 4	contributes towards 2 points							

Recycled content claims must conform to the definition ISO 14021-1999.

Pre-consumer waste: waste comes from process waste that is used to make a different product. This definition does not include in-house industrial scrap or trimmings, which are normally fed back into the same manufacturing process.

Post-consumer waste: waste which comes from curbside recycling programs (glass, plastic, paper, ect). Other postconsumer feedstock is generated when construction and demolition debris is recycled. To be a feedstock, the raw materials must have served a useful purpose in the consumer market before being used again.

[8] Data 2020

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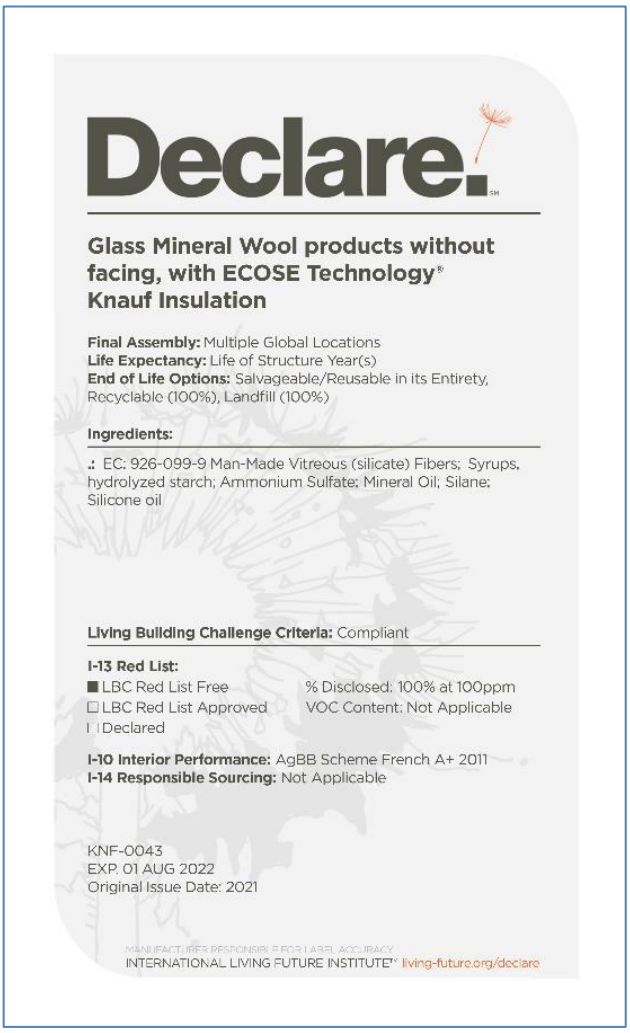
GLASS MINERAL WOOL WITH ECOSE TECHNOLOGY

Annex 2: DECLARE labels



https://declare.living-future.org/

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Annex 3: Indoor Environmental Quality - Low-Emitting Materials

Here below, an example of Eurofins Indoor Air Comfort Gold Certificate for ECOSE products:

INDOOR AIR COMFORT
eurofins
GOLD
CERTIFIED PRODUCT

Certificate

Indoor Air Comfort Gold

Knauf Insulation unfaced GMW products with ECOSE® Technology

Certified Product

Knauf Insulation

Applicant

The product complies with Indoor Air Comfort Gold requirements for product type, version 7.0 (2020). These include both inspections of factory production according to DIN 18200 and VOC testing according to EN 16516 by an ISO 17025 accredited laboratory, at regular interval.

Indoor Air Comfort Gold certification ensures that low product emission requirements are fulfilled and is a sign of the applicant's focus on quality and contribution to a healthy indoor environment.

Compliance with Indoor Air Comfort Gold means compliance with VOC requirements on low emitting products of:

France VOC class A+, Germany (AgBB/ABG), BREEAM International, BREEAM NOR, BREEAM NL, LEED, WELL Building, SKA Rating, French HQE certification, Italian CAM Edilizia, BVB (Sweden), Eco Product Norway, DGNB, EMICODE EC1Plus, GUT, EU ecolabel, Nordic Swan, Blue Angel DE-UZ 132, M1, Danish Indoor Climate Label, very low emitting products according to EN 16798-1, Singapore Green Label, GreenTag Australia

Product type:	Insulation
Certificate number:	IACG-323-01-25-2020
Issue date:	15 October 2020
Validity date:	15 October 2025

This certificate is valid as specified if regular surveillance and testing is done.

Thomas Neuhaus
Head of Certification Body

eurofins | Product Testing

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INDOOR AIR COMFORT eurofins GOLD CERTIFIED PRODUCT

Appendix to Certificate IACG-323-01-25-2020

Knauf Insulation

receives the Indoor Air Comfort Gold certificate with validity 15 October 2025

for below product group produced at sites as listed:

Product group: Knauf Insulation unfaced GMW products with ECOSE® Technology

Product type: Insulation

Production sites:

Bernburg, Germany
Cwmbran, United Kingdom
Eskisehir, Turkey
Krupka, Czech Republic
Lannemezan, France
St Helens, United Kingdom
Stupino, Russia
Visé, Belgium

The products in this group are based on identical or similar recipe and are produced under equivalent conditions. Grouping of the products and inspection of the production process is part of the Indoor Air Comfort Gold certification. A worst-case product, which is representative for the whole group, is being tested frequently.

eurofins | Product Testing

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GLASS MINERAL WOOL WITH ECOSE TECHNOLOGY

Annex 4: ECOSE product and sound transmission and absorption examples

STC_c in North America is the composite *Sound Transmissions Class* and is equivalent to R_w *Sound Reduction Index* in Europe. *α* coefficient is the coefficient for *sound absorption*.

9/12

RAPPORT D'ESSAIS N° AC13-26044790-Rév01

INDICE D'AFFAIBLISSEMENT ACOUSTIQUE R D'UNE CLOISON AD12

Essai	2
Date	21/06/13
Poste	EPSILON

DEMANDEUR, FABRICANT KNAUF

DESIGNATION KMA 23 Oversize 395/150-2

CONFIGURATION Avec laine de verre d'épaisseur (100 + 45) mm dans chaque ossature

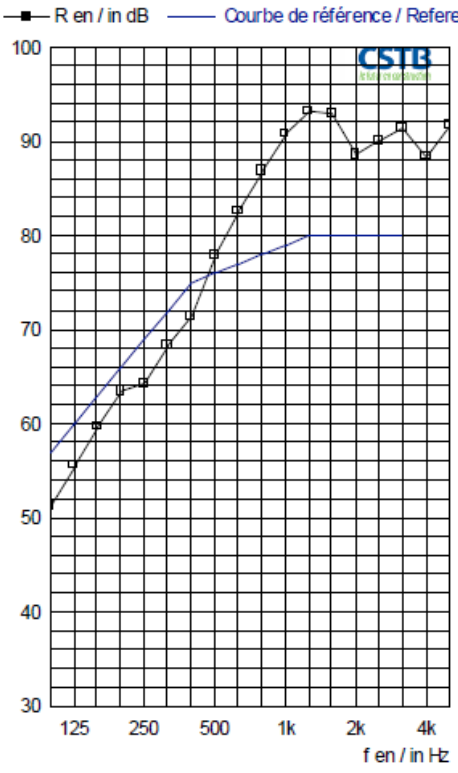
CARACTÉRISTIQUES PRINCIPALES

Dimensions en mm : 4180 x 2470
Épaisseur en mm : 393,5
Masse surfacique en kg/m² : 65,5 (hors ossature)

CONDITIONS DE MESURES

Salle émission : Température : 24 °C Humidité relative : 65 %
Salle réception : Température : 23,5 °C Humidité relative : 68 %

RÉSULTATS



f	R
100	51,3+ (52,6)
125	55,6+ (57,9)
160	59,7+ (62,6)
200	63,5+ (65,4)
250	64,3+ (67,6)
315	68,4+ (70,6)
400	71,4+ (75,6)
500	77,9+ (77,6)
630	82,6+ (81,1)
800	86,9+ (84,3)
1000	90,8+ (89,5)
1250	93,2+ (91,6)
1600	93,0+ (93,0)
2000	88,6+ (95,8)
2500	90,1+ (95,7)
3150	91,4+ (95,6)
4000	88,4+ (97,0)
5000	91,7+ (90,0)
Hz	dB

(+) : valeur corrigée/corrected value. (+) : limite de postétalonnage limit.

R_w (C;C_{tr}) ≥ 76(-2;-8) dB

Pour information / For information:
$R_A = R_w + C \geq 74$ dB
$R_{tr} = R_w + C_i \geq 68$ dB

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PRODUCT DATA FOR CERTIFICATION

GLASS MINERAL WOOL WITH ECOSE TECHNOLOGY

MEASUREMENT OF SOUND ABSORPTION IN A REVERBERATION ROOM ACCORDING TO CSN EN ISO 354

Registration no.: **A-604**

Product: **Mineral insulation with ECOSE Technology (IPB 037) – thickness 50 mm**

Specimen description: The sample consist of 12 boards 1350 mm × 625 mm in the test room K4. The boards were produced on the basis of glass fibres with ECOSE technology. They are planned for thermal, sound and anti fire insulation. The specimen was laid freely on a floor and confined to specimen height.

Specimen size: 2,50 m × 4,05 m

Manufacturer: KNAUF INSULATION spol. s r.o. Bucharova 2641, 158 00 Praha 5

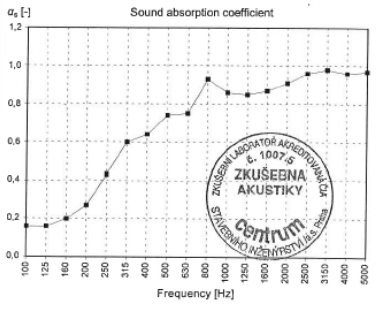
Test room: K4
Room volume: 80,25 m³
Air temperature: 23,0 °C
Relative humidity:: 46 %

Date of test: August 14, 2012
Fabrication date: August 14, 2012

Reverberation method measurement results according to CSN EN ISO 354 and CSN EN ISO 11654

Sound absorption coefficient α_s in 1/3 octave bands and weighed sound absorption coefficient α_w:

Frequency [Hz]	α_s [-]
100	0,16
125	0,16
160	0,20
200	0,27
250	0,43
315	0,60
400	0,64
500	0,74
630	0,75
800	0,93
1000	0,86
1250	0,85
1600	0,87
2000	0,91
2500	0,96
3150	0,98
4000	0,96
5000	0,97



Evaluation according to CSN EN ISO 11654:
α_w = 0,70 (H)

Specimen area: 10,12 m²
Basic weight: - kg/m²
Specimen thickness: 50 mm
Air gap thickness: -

Centrum stavebního inzenyrství a.s. (Centre of Building Engineering)– Acoustic Test Laboratory
Test Laboratory accredited by CAI, No. 1007.5
Prazska 16, 102 21 Prague 10 – Hostivar
phone: 281017111, 281017491 fax: 271751128
e-mail: meller@csias.cz

Date: August 20, 2012
Test Laboratory Chief:
Ing. M. Meller, CSc

Protokol o zkoušce č. 2210
Strana 6 / 8

Lugar de medida: Cámara reverberante normalizada de AUDIOTEC. Parc. 28 y 30. Parque Tecnológico de Boecillo. Valladolid. España.
Ensayo realizado: Medición de la absorción acústica en cámara reverberante.
Cliente: KNAUF INSULATION
C/ La Selva, 2. 08820. El Prat de Llobregat (Barcelona)
Fecha: 30 de Enero de 2010.
Composición de la muestra: Lana Mineral Natural ULTRACOUSTIC de 60 mm de espesor y Rd = 1,60 m2.K/W.
Superficie muestra: 11,7 m². **Volumen cámara:** 202,12 m³.
Norma: UNE-EN ISO 354:2004.

Frec(Hz)	125	250	500	1000	2000	4000
α_p	0,20	0,60	0,90	0,90	0,85	0,80

α_w = 0,85