ENVIRONMENTAL FACT SHEET

September 2023

Knauf Insulation
Thermo-teK LM CLD ALS, 50 mm
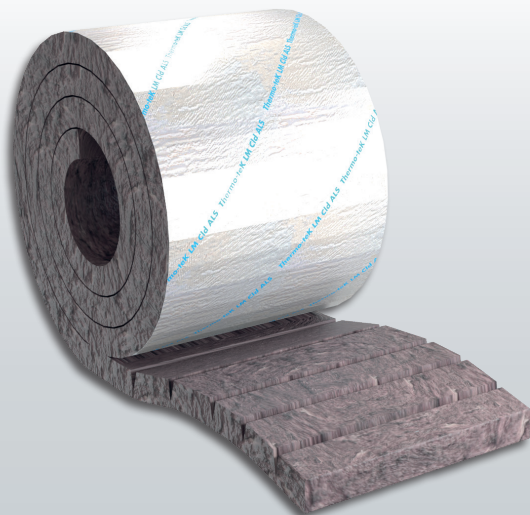
Description: Rock Mineral Wool mat, consisting of individual mineral wool strips (lamellas) that are bonded on one side to an extra strong fibre glass reinforced, tear-resistant aluminium foil, which acts as a water vapour barrier and provides extra mechanical protection. Knauf Insulation Thermo-teK LM CLD ALS is produced with ECOSE® Technology, a patented binder system, based entirely on renewable raw materials.

Product characteristic: CE marking following EN 14303

Other certifications:
- Plants: ISO 9001, ISO 14001, ISO 45001, ISO 50001
- Products: RAL, EUCEB

Declared unit: 1 m² / 50 mm
As the product range has the same density, linear scaling can be applied to different thicknesses.

Manufacturing plants:
Knauf Insulation Novi Marof (Croatia)

Transport distance: 600 km

End-of-Life scenario:
Landfill, as the most conservative approach

EFS ref. N°: EFS-Thermo-teK LM CLD ALS, 50 mm

Publication date: September 2023
Expiration date: September 2028

Scope of validity: The environmental Fact sheet is only valid for a specific product. The calculation model is based on an externally verified model by Bureau Veritas for the generation of EPDs for RMW products according to standard EN 15804+A2.

LIFECYCLE IMPACT CATEGORIES

Parameter	Unit	Manufacturing A1-3	Transport to site A4	Transport to EoL C2	Disposal C4
GWP	[kg CO₂ eq.]	2.74E+00	4.17E-01	8.25E-03	1.24E-01
ODP	[kg CFC11-Eq.]	6.65E-12	5.15E-14	1.04E-15	1.96E-14
AP	[Mole of H+ eq.]	1.31E-02	4.53E-04	8.53E-06	2.54E-04
EP – freshwater	[kg P eq.]	1.6SE-0S	1.4SE-06	2.92E-08	7.28E-07
EP – freshwater	[kg PO43-Eq.]	5.0SE-0S	4.44E-06	8.95E-08	2.23E-06
POCP	[kg NMVOC eq.]	6.00E-03	4.52E-04	8.27E-06	2.04E-04
ADPE	[kg Sb Eq.]	2.20E-07	2.63E-08	5.29E-10	3.53E-09
ADPF	[MJ]	4.11E+01	5.40E+00	1.09E-01	4.58E-01
WDP	[m³ world equiv.]	2.43E-01	4.79E-03	9.64E-05	2.62E-03
PERT	[MJ]	1.5SE+01	3.93E-01	7.91E-03	5.34E-02
PENRT	[MJ]	4.13E+01	5.42E+00	1.09E-01	4.58E-01
FW	[m³]	1.49E-02	4.30E-04	8.66E-06	8.72E-05
HWD	[kg]	3.37E-09	1.68E-11	3.38E-13	7.24E-09
NHWD	[kg]	3.42E-01	8.26E-04	1.66E-05	2.12E+00
RWD	[kg]	1.17E-03	1.01E-05	2.04E-07	6.25E-06
Caption		GWP - total = global warming potential; ODP = ozone depletion; AP = acidification terrestrial and freshwater; EP = eutrophication potential; POCP = photochemical ozone formation; ADPF = abiotic depletion potential (fossil); ADPE = abiotic depletion potential (element); WDP = water depletion potential; PERT = Total use of renewable primary energy resources; PENRT = Total use of non renewable primary energy resources; FW = Use of net fresh water; HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed.		

UNDERSTANDING THE METHODOLOGICAL APPROACH

Objectives

Knauf Insulation is committed to making information about the environmental impact relating to products it places on the market available upon request. The format for presenting this information can either be a standard verified EPD or a simpler Environmental Fact Sheet based on a verified EPD. The results are based on the LCA of rock mineral wool insulation products produced by Knauf Insulation RMW Novi Marof (Croatia) plant.

The areas of application of the Thermo-teK LM CLD ALS: Cold parts of Air Ducts (rectangular or round), such as air intake on HVAC systems and other parts of cold operated duct work.

Also thermal insulation of valves, flanges and armatures with complex shapes in cold and dual temperatures pipe work or duct structures or on chilled water supply lines.

System boundaries

The assessment is based on a "Cradle to Grave" LCA. 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 end of life is based on landfill scenario.

Scope

Standards: the environmental data reported in this Environmental Fact Sheet are based on calculation rules according to EN 15804+A2 (see annex).

Data and tools

The model used for the calculation of the LCA results is based on a certified EPD model according to EN 15804+A2. LCA for Expert (GaBi) software is used for modelling and calculation of results and the background LCA datasets were updated in 2023. https://sphera.com/product-sustainability-software/

Verification

The results and the consistency with the above mentioned standards have been checked through an extensive internal review. Knauf Insulation EPD process is certified by Bureau Veritas following the International EPD General Program Instruction version 4.0. www.environdec.com

ENVIRONMENTAL INDICATORS

Global Warming Potential (GWP): impact of greenhouse gases such as carbon dioxide (CO_2) or methane.

Ozone Depletion Potential (ODP): relative impact that the product can cause to the stratospheric ozone layer.

Acidification Potential (AP): the acidification of soils and waters predominantly occurs through the transformation of air pollutants into acids.

Eutrophication Potential (EP): impact of nitrification by nitrogen and phosphorus to aquatic and terrestrial ecosystems, for example through algal blooms, disturbing the balance between species.

Photochemical Ozone Creation Potential (POCP): also known as summer smog, the impact from oxidizing of volatile compounds in the presence of nitrogen oxides (NOx) which frees ozone in the lower atmosphere.

Abiotic Depletion Potential (fossil) (ADP-f): Impact from depletion of fossil fuel resources (such as oil or natural gas) expressed in MJ.

Abiotic Depletion Potential element (ADP-e): impact from depletion of resources excluding fossil fuel resources (such as oil or natural gas) expressed in equivalent antimony so to take into account scarcity of resources.

Non-renewable Primary Energy: non-renewable energy resources required to manufacture the product. Sources of non-renewable energy are fossil fuels and uranium.

Renewable Primary Energy: renewable energy resources required to manufacture the product. Sources of renewable energy are biomass, wind, solar or hydraulic sources for example.

Annex to Environmental Fact Sheet N° EFS-Thermo-teK LM CLD ALS, 50 mm
Complete results according to EN 15804+A2 presentation

RESULTS OF THE LCA – ENVIRONMENTAL IMPACT: 50 mm / 1 m² Thermo-teK LM CLD ALS (40 kg/m³)

Parameter	Unit	A1-3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	[kg CO_2 eq.]	2.74E+00	4.17E–01	4.69E–01	0	0	0	0	0	0	0	0	8.25E–03	0	1.24E–01	8.92E–02
GWP – fossil	[kg CO_2 eq.]	3.46E+00	4.08E–01	1.45E–01	0	0	0	0	0	0	0	0	8.20E–03	0	3.41E–02	–1.56E–01
GWP – biogenic	[kg CO_2 eq.]	–7.28E–01	5.08E–03	3.24E–01	0	0	0	0	0	0	0	0	–2.87E–05	0	9.02E–02	2.45E–01
GWP – luluc	[kg CO_2 eq.]	1.82E–03	3.67E–03	1.57E–04	0	0	0	0	0	0	0	0	7.39E–05	0	1.49E–04	–1.47E–05
ODP	[kg CFC–11 eq.]	6.65E–12	5.15E–14	2.60E–13	0	0	0	0	0	0	0	0	1.04E–15	0	1.96E–14	–1.01E–12
AP	[Mole of H+ eq.]	1.31E–02	4.53E–04	3.54E–04	0	0	0	0	0	0	0	0	8.53E–06	0	2.54E–04	–2.82E–04
EP – freshwater	[kg P eq.]	1.65E–05	1.45E–06	4.05E–07	0	0	0	0	0	0	0	0	2.92E–08	0	7.28E–07	1.41E–07
EP – freshwater	[kg PO_4^{3}–Eq.]	5.05E–05	4.44E–06	1.24E–06	0	0	0	0	0	0	0	0	8.95E–08	0	2.23E–06	4.32E–07
EP – marine	[kg N eq.]	2.17E–03	1.48E–04	6.96E–05	0	0	0	0	0	0	0	0	2.67E–06	0	6.99E–05	–9.86E–05
EP – terrestrial	[Mole of N eq.]	2.18E–02	1.76E–03	7.92E–04	0	0	0	0	0	0	0	0	3.22E–05	0	7.45E–04	–1.11E–03
POCP	[kg NMVOC eq.]	6.00E–03	4.52E–04	1.94E–04	0	0	0	0	0	0	0	0	8.27E–06	0	2.04E–04	–3.03E–04
ADPE	[kg Sb eq.]	2.20E–07	2.63E–08	6.38E–09	0	0	0	0	0	0	0	0	5.29E–10	0	3.53E–09	–8.22E–09
ADPF	[MJ]	4.11E+01	5.40E+00	1.21E+00	0	0	0	0	0	0	0	0	1.09E–01	0	4.58E–01	–3.31E+00
WDP	[m³ world equiv.]	2.43E–01	4.79E–03	4.89E–02	0	0	0	0	0	0	0	0	9.64E–05	0	2.62E–03	–1.46E–02

Caption: GWP - total = global warming potential; GWP - fossil = global warming potential (fossil fuel only); GWP - biogenic = global warming potential (biogenic); GWP - luluc = global warmng potential (land use only); ODP = ozone depletion; AP = acidification terrestrial and freshwater; EP - freshwater = eutrophication potential (freshwater); EP - marine = eutrophication potential (marine); EP- terrestric = eutrophication potential (terrestrial); POCP = photochemical ozone formation; ADPF = abiotic depletion potential (fossil); ADPE = abiotic depletion potential (element); WDP = water depletion potential.

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RESULTS OF THE LCA – RESOURCE USE: 50 mm / 1 m² Thermo-teK LM CLD ALS (40 kg/m³)

Parameter	Unit	A1-3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	9.07E+00	3.93E–01	2.78E–01	0	0	0	0	0	0	0	0	7.91E–03	0	5.34E–02	–3.85E+00
PERM	[MJ]	6.41E+00	0	1.28E–01	0	0	0	0	0	0	0	0	0	0	0	0
PERT	[MJ]	1.55E+01	3.93E–01	4.06E–01	0	0	0	0	0	0	0	0	7.91E–03	0	5.34E–02	–3.85E+00
PENRE	[MJ]	4.00E+01	5.42E+00	1.18E+00	0	0	0	0	0	0	0	0	1.09E–01	0	4.58E–01	–3.32E+00
PENRM	[MJ]	1.32E+00	0	2.65E–02	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	[MJ]	4.13E+01	5.42E+00	1.21E+00	0	0	0	0	0	0	0	0	1.09E–01	0	4.58E–01	–3.32E+00
SM	[kg]	1.98E–01	0	3.96E–03	0	0	0	0	0	0	0	0	0	0	0	0
RSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	[m³]	1.49E–02	4.30E–04	1.37E–03	0	0	0	0	0	0	0	0	8.66E–06	0	8.72E–05	–6.01E–04

Caption 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 = Use of net fresh water.

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 50 mm / 1 m² Thermo-teK LM CLD ALS (40 kg/m³)

Parameter	Unit	A1-3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	3.37E–09	1.68E–11	6.40E–11	0	0	0	0	0	0	0	0	3.38E–13	0	7.24E–09	–1.91E–10
NHWD	[kg]	3.42E–01	8.26E–04	6.86E–02	0	0	0	0	0	0	0	0	1.66E–05	0	2.12E+00	2.86E–04
RWD	[kg]	1.17E–03	1.01E–05	4.41E–05	0	0	0	0	0	0	0	0	2.04E–07	0	6.25E–06	–1.82E–04
MFR	[kg]	0	0	1.55E–01	0	0	0	0	0	0	0	0	0	0	0	0
MER	[kg]	0	0	2.33E–01	0	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	5.74E–01	0	0	0	0	0	0	0	0	0	0	0	0
EET	[MJ]	0	0	1.03E+00	0	0	0	0	0	0	0	0	0	0	0	0

Caption Caption: HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

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