Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019

ODE Starflex & Evomineral 032

Glasswool Insulation Materials

Programme:
The International EPD® System
www.environdec.com

Programme Operator:
EPD Turkey, fully aligned
with International EPD System

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Geographical Scope:
Global

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

TURKEY EPD®
ENVIRONMENTAL PRODUCT DECLARATIONS

ECO PLATFORM EPD
EN 15804 VERIFIED

ODE®
INSULATES THE FUTURE

Programme Information

Programme	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden www.environdec.com info@environdec.com	EPD Turkey, managed and run by: SÜRATAM, www.suratam.org Nef 09 B Blok No:7/15 34415 Kağıthane/Istanbul, Turkey www.epdturkey.org info@epdturkey.org
Product Category Rules (PCR):	2019:14 Version 1.11, 2021-02-05, Construction Products and CPC 54 Construction Services, EN 15804:2012 + A2:2019 Sustainability of Construction Works	
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	EPD process certification EPD verification **X**	
Third party verifier:	Professor Vladimír Kocí	
Approved by:	The International EPD® System	

Procedure for follow-up of data during EPD validity involves third party verifier: NO

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 ODE

ODE embarked on its business journey in 1985 with contracting operations. In 1998, ODE decided to move forward in the insulation industry, one that would serve Turkey's need. Having become an importer in 1990 and a manufacturer in 1996, ODE now manufactures products in 2 main categories, Building and HVAC insulation. ODE is now among the largest manufacturers of the insulation industry with 5 state-of-the-art manufacturing facilities, over 4 thousand product varieties, and expert workforce.

We manufacture extruded polystyrene thermal insulating material under the brand of ODE Isıpan; polymer modified bituminous waterproofing blankets under the brand of ODE Membrane, glass wool products used for heat and sound insulation and fire safety under the brand of ODE Starflex; and elastomeric rubber foam insulating material under the brand of ODE R-Flex.

As its Eskişehir Manufacturing Facility comes into play, ODE which currently exports to 5 continents aims to increase its export capacity even further, and become the leader in waterproofing in Turkey.

ODE reflects its social responsibility awareness to all its operations, and is the first company in the insulation industry of Turkey to publish a "Corporate Social Responsibility Report". Furthermore, ODE has been the first among its peers to earn the internationally recognized Environmental Product Declaration (EPD) certificate which is compatible with European standards and which applies for all markets to all heat and water insulation products manufactured by ODE in its facilities in Çorlu.

Having implemented pioneering efforts toward raising public awareness of insulation and energy awareness, and taking care to be involved in projects that will hand down permanent value to the future, ODE changed its company motto to "Insulates the Future" in 2014. In knowledge of the universal responsibility of being in the global market, ODE continues to operate as a company which encourages its social stakeholders through visionary and innovative work.

ODE Çorlu/Tekirdağ, Turkey Production Facilities

ODE Eskişehir, Turkey Production Facilities

About Product

ODE Glasswool blankets and boards are the insulating blankets and boards, used forthermal and sound insulation of buildings and HVAC ducts from outside. ODE Glasswool has products with facing and without facing.

The ODE Glasswool Blanket Group is manufactured in the thermal conductivity range of λ = 0.032-0.044 W/(m.K).

The weight providing 1 m^2K/W thermal insulation is 0.77 kg.

ADVANTAGES

- It is used for thermal insulation, sound insulation, acoustic design, and for the purposes of fire safety.
- Its classification as a "Class A1 Non-Combustible" (EN 13501-1) material is a very significant advantage for fire safety.*
- It easily conforms to all types of wooden and metal roofs.
- Since it is lightweight, it is very easy to lift up to the roof and to cut and install.
- Due to the properties of glass wool, it does not tear or produce wastage during installation.
- It does not degrade, decompose, become mouldy in time.
- Thanks to its natural content, it does not degrade and is user friendly.
- It is EUCEB certified as not harmful to human health.

* Unfaced types.

For product accessories, certificates and detailed information, please click or scan the QR code

Technical Specifications

	UNIT	Value
Thickness	mm	25-180
Reaction to Fire	Euro Class	A1
Thermal Conductivity (λ) (10°C)	W/(m.K)	0.032
Thermal Resistance (R)	$(m^2K)/W$	0.75-5.60
Water Vapor Permeability	μ	1.1
Maximum Service Temperature	°C	250

APPLICATION AREA

Depending on the field and purpose of application, blankets and panels with different coating materials are available at different sizes and technical properties. ODE Starflex Glasswool insulation products are mainly used for thermal insulation whereas they can be used for acoustic insulation.

PRODUCT CONTENT

Components	Amount, %
Cullet	70-80
Borax	<10
Sand	<7
Soda Ash	<5
Additives	<5

Why do I need insulation?

The cheapest energy is the one that is unexpended. Apart from energy efficiency, there are also additional benefits of insulation construction, which are determined below.

• Insulation prevents fuel consumption, therefore decreases waste-gas emissions, which cause global warming and environmental pollution.

• Insulation provides concrete resistivity by averting concrete corrusion. Thus, it increases the durability and the safety of the building against earthquakes.

• Insulation saves %60 of the expenditure on heating & cooling the building. It assists better quality of heating during winter, and better quality of cooling during summer.

• Insulation assists on avoiding the formation of mould growth, black spots and whitcomb in houses by preventing condensation.

• Insulation raises the life standard by balancing the temperature of the building. Thus, it provides a snugy and heathy environment in our life time ritual.

• Insulation plays crucial role in country's economy by decreasing energy dependency on other countries.

LCA Information

Functional Unit	1 R (m^2K/W) ODE Starflex & Evomineral 032 Glasswool Insulation Materials
Time Representativeness	2020
Database(s) and LCA Software Used	Ecoinvent 3.6, SimaPro 9.1

X	A1	Raw Material Supply	Product Stage
X	A2	Transport	
X	A3	Manufacturing	
X	A4	Transport	Constrcution Process Stage
X	A5	Construction Installation	
ND	B1	Use	Use Stage
ND	B2	Maintenance	
ND	B3	Repair	
ND	B4	Replacement	
ND	B5	Refurbishment	
ND	B6	Operational Energy Use	
ND	B7	Operational Water Use	
X	C1	Deconstruction, demolition	End of Life Stage
X	C2	Transport	
X	C3	Waste Processing	
X	C4	Disposal	
X	D	Future reuse, recycling or energy recovery potentials	Benefits and Loads

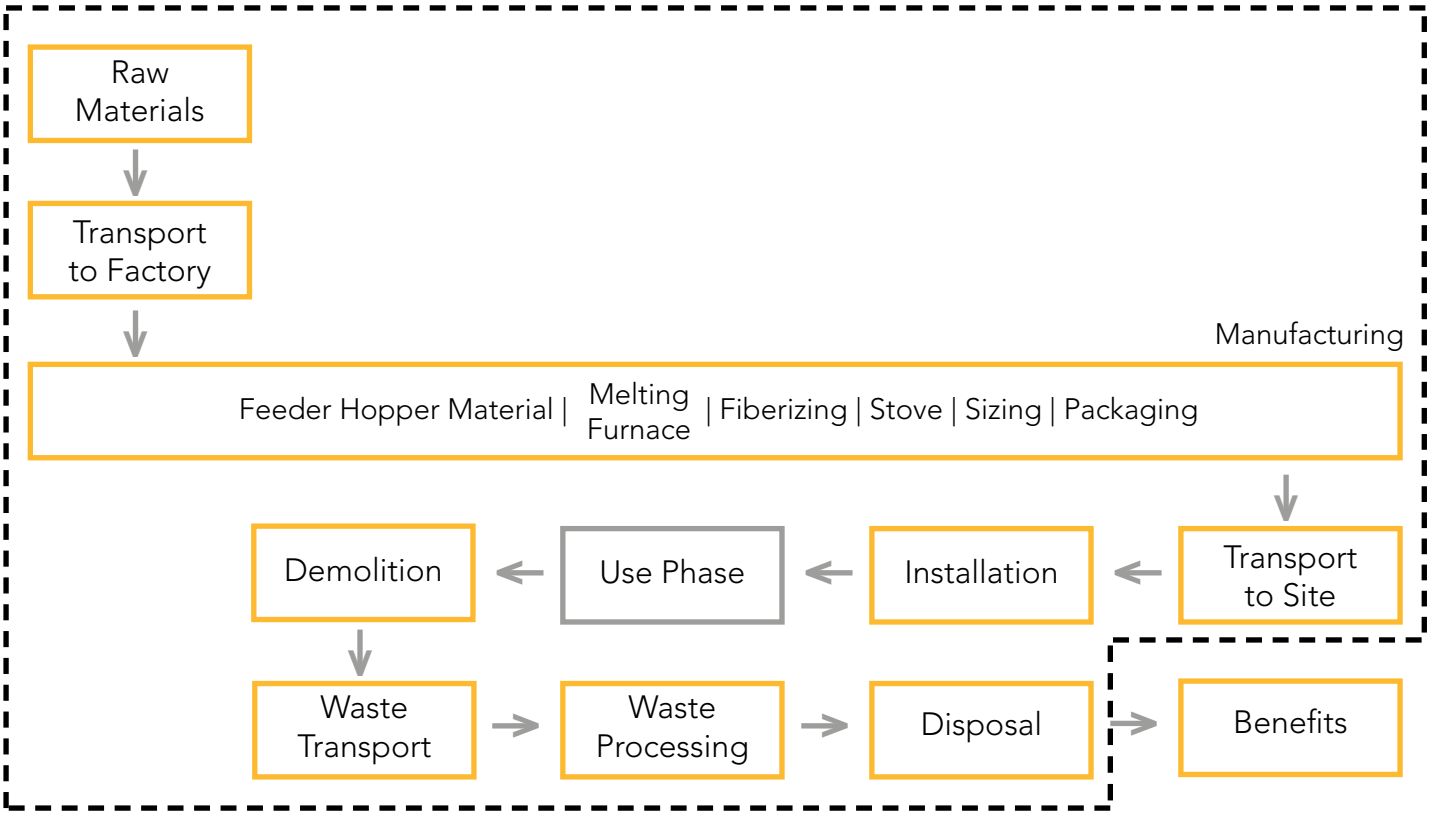
X = Included in LCA, ND = Not Declared

The EPD evaluates the environmental impacts of 1 m^2K/W ODE Starflex & Evomineral 032 Glasswool products and during the modeling, all values are taken into account for this unit.

The inventory for the LCA study is based on the 2020 production figures for Starflex and Evomineral 032 Glasswool by ODE.

The system boundaries in tabular form for all modules are shown in the table left. This EPD's system boundary is cradle to grave. The system boundary covers A1 - A3 Product Stages, A4-A5 Construction Process Stage and C1-C4 End of Life Stage.

System Boundary



A1: Raw Material Supply
ODE Glaswool products production starts with raw materials, mainly locally sourced but some transported from other parts of the world. Environmental impacts during the production of all raw materials are reflected in this EPD.

A2: Transport to Factory
Transport is relevant for delivery of raw materials to the plant and internal transport within the manufacturing plant for each product.

A3 : Manufacturing
Manufacture of glasswool products are starts with feeder continues with melting silica sand at high temperatures and making it fibres. Both natural gas and electricity are consumed during the production of glasswool insulation materials. Electricity consumed within the packaging process is also considered in manufacturing stages.

A4 : Transport to Site
Manufactured products are sent to customers in different parts of the world. 200 km of road transport and 2000 km (1243 miles) of sea transport are assumed for transportation to clients or to the construction site.

A5 : Installation
Glasswool products are direct applied to the surface. For installation of glasswool products, 100g/m^2 plastic fixing pin using is assumed.

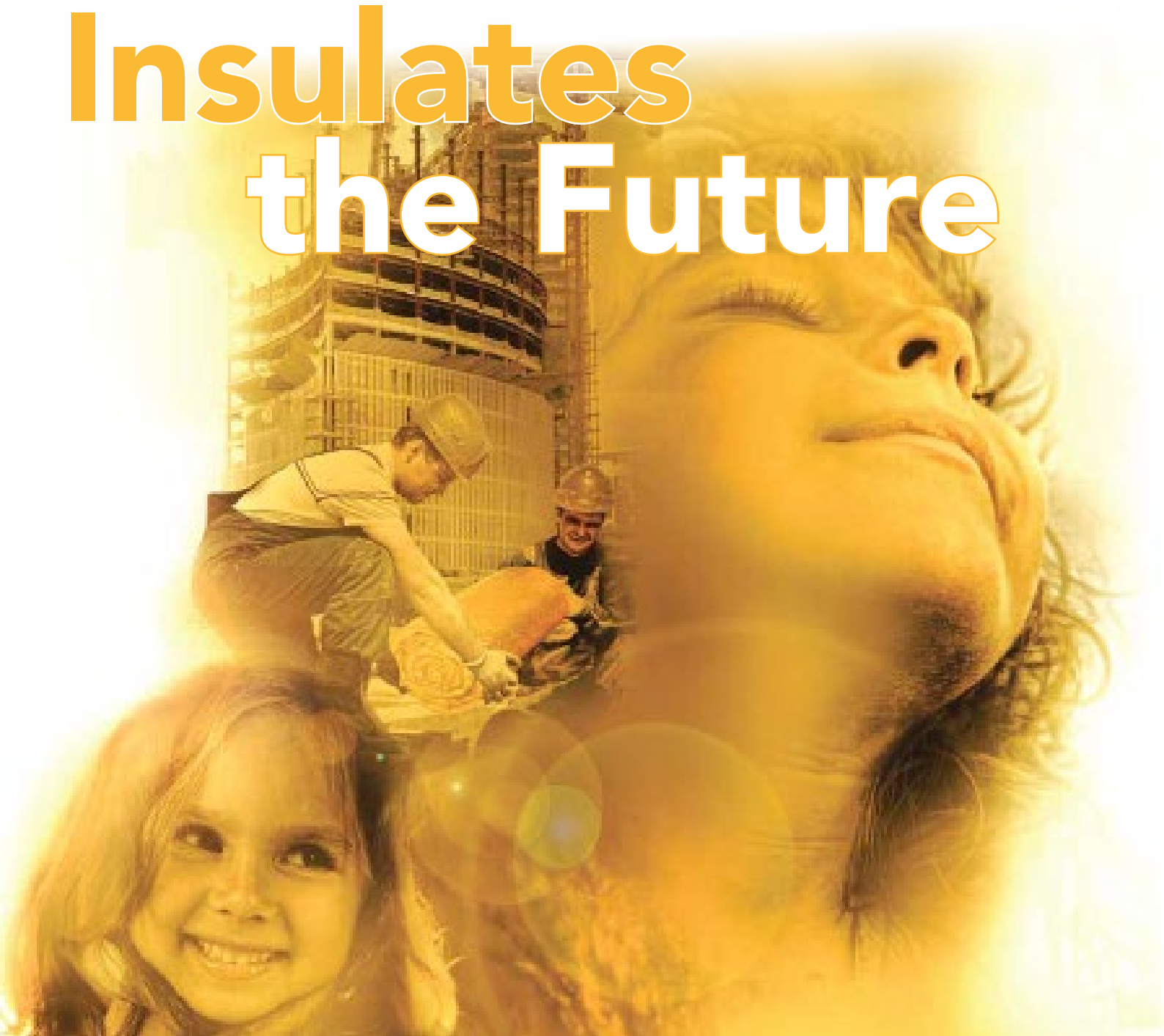
C1 : Demolition
It is assumed that there is no energy use during uninstallation process. This stage is usually done by manpower.

C2 : Waste Transport
Average distance from demolition site to final destination is assumed as 100 km.

C3 : Waste Processing
There is no need for any waste process.

C4 : Disposal
For XPS products, relevant disposal scenarios are modelled by taking into consideration the fate of the construction and packaging wastes. All construction products disposed into a landfill, which is modelled as such in this LCA. Packaging waste is assumed to end up at packaging recycling.

D : Benefits & Loads
There is no potential benefit as the products go completely to the landfill at the end of life. Only the benefit from packaging recycling is taken into account in this LCA model.



More Information

Allocations
There are no co-producs in the production of ODE. Hence, there is no need for co-product allocation. Transport is allocated according to tonnages for almost all raw materials bought by ODE. For the manufacturing of product, no allocation for energy consumption or water consumption was made as the product specific data was available.

Water consumption, energy consumption and raw material transportation were weighted according to 2020 production figures.

In addition, hazardous and non-hazardous waste amounts were also allocated from the 2020 total waste generation.

Cut-Off Criteria
1% cut-off rule is applied to raw materials less than 1% in the composition but making sure their total is below this threshold.

REACH Regulation
No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0.1 % (wt/wt).

LCA Modelling, Calculation and Data Quality
The results of the LCA with the indicators as per EPD requirement are given in the LCA result tables. All energy calculations were obtained using Cumulative Energy Demand (LHV) methodology, while fresh water use is calculated with selected inventory flows in SimaPro according to the PCR.

The SimaPro 9.1 LCA software and the Ecoinvent 3.6 LCA database were used to calculate the environmental impacts. Ecoinvent database were used as generic background data source.

The regional energy datasets were used for all energy calculations.

Geographical Scope
The geographical scope of this EPD is global.

Comperability
A comparision or an evaluation of EPD data is only possible where EN 15804 has been followed, and the same building context and product-specific characteristics of performance are taken into account and the same stages have been included in the system boundary. According to EN 15804, EPD of construction products may not be comperable if they do not comply with the standards.

LCA
Results

Environmental Impacts for 1 m^2K/W ODE Starflex & Evomineral 032 Glaswool Insulation Materials (Without Facing)									
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	D
GWP - Fossil	kg CO_2 eq	1.47	0.048	0.859	0	0.013	0	0.046	-0.013
GWP - Biogenic	kg CO_2 eq	0.011	8.45E-6	0.003	0	5.14E-6	0	0.69	324E-6
GWP - Luluc	kg CO_2 eq	0.007	22.0E-6	617E-9	0	4.80E-6	0	13.9E-6	-10.1E-6
GWP - Total	kg CO_2 eq	1.49	0.048	0.863	0	0.013	0	0.737	-0.013
ODP	kg CFC-11 eq	156E-9	10.2E-9	248E-12	0	2.90E-9	0	2.78E-9	-423E-12
AP	mol H+ eq	0.006	0.001	0.004	0	55.5E-6	0	138E-6	-57.4E-6
EP - Freshwater	kg P eq	0.001	3.37E-6	44.4E-6	0	1.12E-6	0	12.6E-6	-3.93E-6
*EP - Freshwater	kg PO_4 eq	0.002	10.3E-6	136E-6	0	3.43E-6	0	38.7E-6	-12.0E-6
EP - Marine	kg N eq	0.001	157E-6	0.001	0	16.3E-6	0	0.001	-11.3E-6
EP - Terrestrial	mol N eq	0.011	0.002	0.007	0	178E-6	0	376E-6	-116E-6
POCP	kg NMVOC	0.003	470E-6	0.002	0	54E-6	0	270E-6	-52.6E-6
ADPE	kg Sb eq	9.14E-6	986E-9	291E-9	0	351E-9	0	115E-9	-125E-9
ADPF	MJ	23.8	0.68	12.6	0	0.197	0	0.262	-0.368
WDP	m^3 depriv.	1.07	0.002	0.971	0	0.001	0	0.009	-0.010
PM	disease inc.	48.9E-9	2.75E-9	30.2E-9	0	923E-12	0	1.63E-9	-450E-12
IR	kBq U-235 eq	0.061	0.003	113E-6	0	0.001	0	0.002	-0.001
ETP - FW	CTUe	18.6	0.553	1.11	0	0.173	0	3.95	-0.157
HTTP - C	CTUh	656E-12	19.4E-12	82.2E-12	0	4.47E-12	0	24.6E-12	-3.91E-12
HTTP - NC	CTUh	9.76E-9	531E-12	1.56E-9	0	174E-12	0	1.23E-9	-108E-12
SQP	Pt	2.44	0.358	0.012	0	0.133	0	0.470	-0.058
Acronyms	GWP-total: Climate change, GWP-fossil: Climate change- fossil, GWP-biogenic: Climate change - biogenic, GWP-luluc: Climate change - land use and transformation, ODP: Ozone layer depletion, AP: Acidification terrestrial and freshwater, EP-freshwater: Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical oxidation, ADPE: Abiotic depletion - elements, ADPF: Abiotic depletion - fossil resources, WDP: Water scarcity, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, ETP-FW: Ecotoxicity freshwater, HTP-c: Cancer human health effects, HTP-nc: Non-cancer human health effects, SQP: Land use related impacts, soil quality.								
Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A2-A3: Sum of A1, A2 and A3, A4:Transport to Site, A5: Installation, C1: Demolition, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads.								

**This indicator has been calculated as "kg P eq" as required in the characterization model. (EUTREND model, Struijs et al, 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml)*

Resource Use for 1 m^2K/W 1 m^2K/W ODE Starflex & Evomineral 032 Glaswool Insulation Materials (Without Facing)									
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.67	0.007	0.133	0	0.002	0	0.011	-0.016
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	1.67	0.007	0.133	0	0.002	0	0.011	-0.016
PENRE	MJ	23.8	0.678	12.6	0	0.197	0	0.262	-0.368
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	23.8	0.678	12.6	0	0.197	0	0.262	-0.368
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	0.005	102E-6	0.017	0	34.0E-6	0	241E-6	-47.0E-6
Waste & Output Flows for 1 m^2K/W ODE Starflex & Evomineral 032 Glaswool Insulation Materials (Without Facing)									
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	81.0E-6	0	0	0	0	0	0	0
NHWD	kg	0.087	0	0	0	0	0	0	0
RWD	MJ	0	0	0	0	0	0	0	0
CRU	MJ	0	0	0	0	0	0	0	0
MFR	MJ	0	0	0	0	0	0	0	0
MER	MJ	0	0	0	0	0	0	0	0
EE (Electrical)	kg	0	0	0	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0	0	0	0
Acronyms	PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy, PENRE: Use of non-renewable primary energy excluding 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, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water, HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy, Thermal.									
Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A2-A3: Sum of A1, A2 and A3, A4:Transport to Site, A5: Installation, C1: Demolition, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads.								

Environmental Impacts for 1 m^2K/W ODE Starflex & Evomineral 032 Glaswool Insulation Materials (With Aluminium Foil Facing)									
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	D
GWP - Fossil	kg CO_2 eq	2.02	0.048	0.859	0	0.013	0	0.052	-0.013
GWP - Biogenic	kg CO_2 eq	0.011	8.45E-6	0.003	0	5.14E-6	0	0.77	324E-6
GWP - Luluc	kg CO_2 eq	0.008	22.0E-6	617E-9	0	4.80E-6	0	15.5E-6	-10.1E-6
GWP - Total	kg CO_2 eq	2.04	0.048	0.863	0	0.013	0	0.823	-0.013
ODP	kg CFC-11 eq	181E-9	10.2E-9	248E-12	0	2.90E-9	0	3.10E-9	-423E-12
AP	mol H+ eq	0.009	0.001	0.004	0	55.5E-6	0	154E-6	-57.4E-6
EP - Freshwater	kg P eq	0.001	3.37E-6	44.4E-6	0	1.12E-6	0	14.1E-6	-3.93E-6
*EP - Freshwater	kg PO_4 eq	0.002	10.3E-6	136E-6	0	3.43E-6	0	43.2E-6	-12.0E-6
EP - Marine	kg N eq	0.002	157E-6	0.001	0	16.3E-6	0	0.002	-11.3E-6
EP - Terrestrial	mol N eq	0.018	0.002	0.007	0	178E-6	0	420E-6	-116E-6
POCP	kg NMVOC	0.005	470E-6	0.002	0	54E-6	0	302E-6	-52.6E-6
ADPE	kg Sb eq	280E-6	986E-9	291E-9	0	351E-9	0	128E-9	-125E-9
ADPF	MJ	29.3	0.678	12.6	0	0.197	0	0.293	-0.368
WDP	m^3 depriv.	1.20	0.002	0.971	0	0.001	0	0.010	-0.010
PM	disease inc.	87.5E-9	2.75E-9	30.2E-9	0	923E-12	0	1.81E-9	-450E-12
IR	kBq U-235 eq	0.083	0.003	113E-6	0	0.001	0	0.002	-0.001
ETP - FW	CTUe	34.5	0.553	1.11	0	0.173	0	4.41	-0.157
HTTP - C	CTUh	1.39E-9	19.4E-12	82.2E-12	0	4.47E-12	0	27.5E-12	-3.91E-12
HTTP - NC	CTUh	23.9E-9	531E-12	1.56E-9	0	174E-12	0	1.37E-9	-108E-12
SQP	Pt	3.72	0.358	0.012	0	0.133	0	0.525	-0.058
Acronyms	GWP-total: Climate change, GWP-fossil: Climate change- fossil, GWP-biogenic: Climate change - biogenic, GWP-luluc: Climate change - land use and transformation, ODP: Ozone layer depletion, AP: Acidification terrestrial and freshwater, EP-freshwater: Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical oxidation, ADPE: Abiotic depletion - elements, ADPF: Abiotic depletion - fossil resources, WDP: Water scarcity, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, ETP-FW: Ecotoxicity freshwater, HTP-c: Cancer human health effects, HTP-nc: Non-cancer human health effects, SQP: Land use related impacts, soil quality.								
Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A2-A3: Sum of A1, A2 and A3, A4:Transport to Site, A5: Installation, C1: Demolition, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads.								

**This indicator has been calculated as "kg P eq" as required in the characterization model. (EUTREND model, Struijs et al, 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml)*

Resource Use for 1 m²K/W 1 m²K/W ODE Starflex & Evomineral 032 Glaswool Insulation Materials Materials (With Aluminium Foil Facing)									
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2.33	0.007	0.133	0	0.002	0	0.013	-0.016
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	2.33	0.007	0.133	0	0.002	0	0.013	-0.016
PENRE	MJ	29.3	0.678	12.6	0	0.197	0	0.293	-0.368
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	29.3	0.678	12.6	0	0.197	0	0.293	-0.368
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	0.010	102E-6	0.017	0	34.0E-6	0	269E-6	-47.0E-6
Waste & Output Flows for 1 m²K/W ODE Starflex & Evomineral 032 Glaswool Insulation Materials Materials (With Aluminium Foil Facing)									
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	81.0E-6	0	0	0	0	0	0	0
NHWD	kg	0.087	0	0	0	0	0	0	0
RWD	MJ	0	0	0	0	0	0	0	0
CRU	MJ	0	0	0	0	0	0	0	0
MFR	MJ	0	0	0	0	0	0	0	0
MER	MJ	0	0	0	0	0	0	0	0
EE (Electrical)	kg	0	0	0	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0	0	0	0
Acronyms	PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy, PENRE: Use of non-renewable primary energy excluding 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, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water, HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy, Thermal.									
Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A2-A3: Sum of A1, A2 and A3, A4:Transport to Site, A5: Installation, C1: Demolition, C2: Waste Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads.								

References

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/ISO 14001/ Enviroment Management System- Requirements

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/ISO 27001/ ISO 27001-2013 Information Security Management System - Requirements

/ISO 45001/ Health and Safety Management System - Requirements

/ISO 50001/ Energy Management Certificate - Requirements

/PCR for Construction Products and CPC 54 Construction Services/ Prepared by IVL
IVL Swedish Environmental Research Institute Secretariat of the International EPD® System, 2019:14 Version 1.11, DATE 2021-02-05

/Ecoinvent/ Ecoinvent Centre, www.ecoinvent.org

/SimaPro/ SimaPro LCA Package, Pré Consultants, the Netherlands, www.pre-sustainability.com

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