# **Environmental Product**Declaration

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

## ODE Starflex & Evomineral 044 Glasswool Insulation Materials

#### **Programme:**

The International EPD® System www.environdec.com

#### **Programme Operator:**

EPD Turkey, fully aligned with International EPD System

#### S-P Code:

S-P-03944

#### **Publication Date:**

16.06.2021

#### **Validity Date:**

15.06.2026

#### **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







# Programme Information

	The International EPD® System	EPD Turkey, managed and run by:
Programme	EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden	SÜRATAM, www.suratam.org Nef 09 B Blok No:7/15 34415 Kağıthane/Istanbul, Turkey
	www.environdec.com info@environdec.com	www.epdturkey.org info@epdturkey.org
Product Category Rules (PCR):		, Construction Products and CPC 804:2012 + A2:2019 Sustainability of
Independent third- party verification of the declaration and	EPD process certification	
data, according to ISO 14025:2006:	EPD verification <b>X</b>	
Third party verifier:	Professor Vladimír Kocí	
Approved by:	The International EPD® System	
Procedure for follow-up o	f data during EPD validity involves	s 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 Isipan; 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  $\lambda$  = 0.032-0.044 W/(m.K).

The weight providing 1 m<sup>2</sup>K/W thermal insulation is 1.52 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.





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

<sup>\*</sup> Unfaced types.

## **Technical Specifications**

	UNIT	Value
Thickness	mm	50-200
Reaction to Fire	Euro Class	A1
Thermal Conductivity ( $\lambda$ ) (10°C)	W/(m.K)	0.044
Thermal Resistance (R)	(m <sup>2</sup> K)/W	1.10-4.50
Water Vapor Permeability	μ	1.1
Maximum Service Temperature	°C	250

## PPLICATION 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



## **LCA** Information

Functional Unit 1 R (m<sup>2</sup>K/W) ODE Starflex & Evomineral 044 Glasswool

Insulation Materials

Time Representativeness 2020

Database(s) and LCA Software Used Ecoinvent 3.6, SimaPro 9.1

Х	A1	Raw Material Supply	
Х	A2	Transport	Product Stage
Х	А3	Manufacturing	
Х	A4	Transport	Constrcution Process
X	A5	Construction Installation	Stage
ND	B1	Use	
ND	B2	Maintenance	
ND	ВЗ	Repair	
ND	В4	Replacement	Use Stage
ND	B5	Refurbishment	
ND	B6	Operational Energy Use	
ND	В7	Operational Water Use	
Х	C1	Deconstruction, demolition	
Х	C2	Transport	End of Life
Х	СЗ	Waste Processing	Stage
Х	C4	Disposal	
X	D	Future reuse, recycling or energy recovery potentials	Benefits and Loads

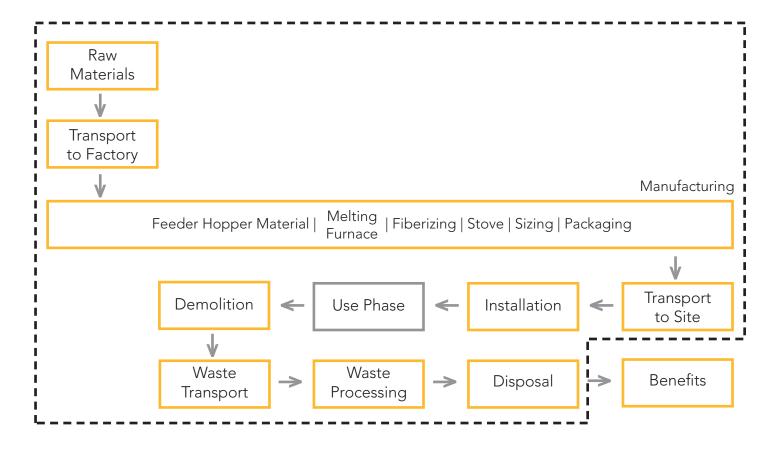
The EPD evaluates the environmental impacts of 1 m<sup>2</sup>K/W ODE Starflex & Evomineral 044 Glasswool products and during the modeling, all values are taken into account for this unit.

The inventory for the LCA study is based on the 2020 production figures for Starflex and Evomineral 044 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.

X = Included in LCA, ND = Not Declared

## **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/m² 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.

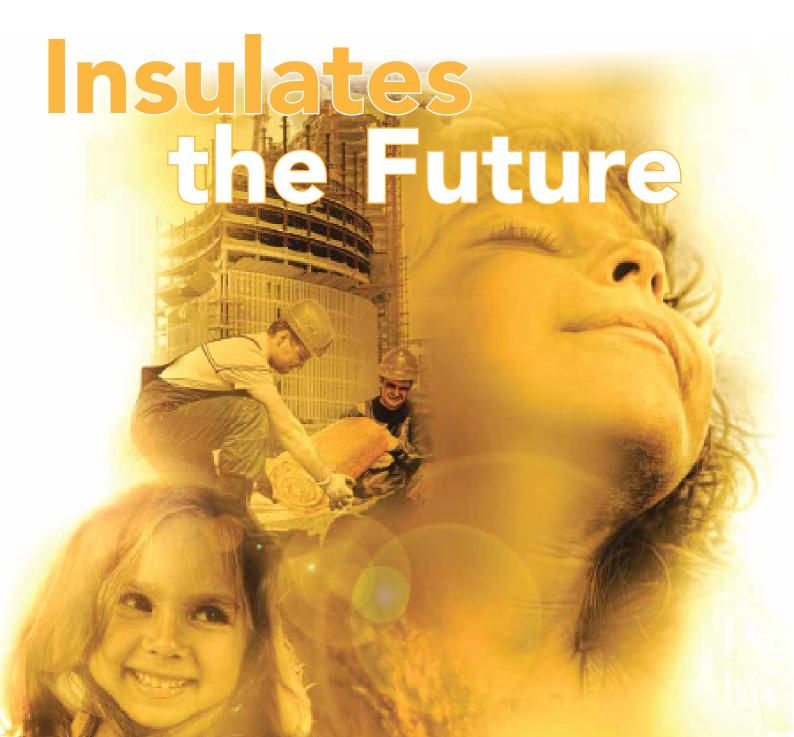
#### C4: Disposal

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

	Envird	Environmental Impacts for 1 m²K/W ODE Starflex &	m²K/W ODE Stan	flex & Evomineral 044	44 Glaswool Insu	Glaswool Insulation Materials (Without Facing	ithout Facing)		
Impact Category	Unit	A1-A2-A3	7Y	A5	C1	C2	C3	C4	D
GWP - Fossil	$kg CO_2 eq$	92'0	0.025	0.859	0	0.007	0	0.024	-0.007
GWP - Biogenic	kg CO <sub>2</sub> eq	900.0	4.39E-6	0.003	0	2.67E-6	0	0.359	168E-6
GWP - Luluc	kg CO <sub>2</sub> eq	0.003	11.4E-6	617E-9	0	2.49E-6	0	7.21E-6	-5.24E-6
GWP - Total	kg CO <sub>2</sub> eq	0.773	0.025	0.863	0	0.007	0	0.383	-0.007
ODP	kg CFC-11 eq	81.0E-9	5.28E-9	248E-12	0	1.51E-9	0	1.44E-9	-220E-12
AP	mol H+ eq	600.0	317E-6	0.004	0	28.9E-6	0	71.8E-6	-29.8E-6
EP - Freshwater	kg P eq	9-380E	1.75E-6	44.4E-6	0	583E-9	0	6.57E-6	-2.04E-6
*EP - Freshwater	kg PO₄ eq	0.001	5.36E-6	136E-6	0	1.78E-6	0	20.1E-6	-6.25E-6
EP - Marine	kg N eq	0.001	81.5E-6	0.001	0	8.48E-6	0	0.001	-5.85E-6
EP - Terrestrial	mol N eq	900.0	0.001	0.007	0	92.7E-6	0	196E-6	-60.2E-6
POCP	kg NMVOC	0.002	244E-6	0.002	0	28.2E-6	0	141E-6	-27.3E-6
ADPE	kg Sb eq	4.75E-6	512E-9	291E-9	0	183E-9	0	59.7E-9	-65.0E-9
ADPF	M	12.4	0.352	12.6	0	0.102	0	0.136	-0.191
WDP	m³ depriv.	0.555	0.001	0.971	0	331E-6	0	0.005	-0.005
PM	disease inc.	25.4E-9	1.43E-9	30.2E-9	0	479E-12	0	844E-12	-234E-12
IR	kBq U-235 eq	0.032	0.002	113E-6	0	0.000	0	0.001	-0.001
ETP - FW	CTUe	89.6	0.287	1.11	0	0.090	0	2.05	-0.082
HTTP - C	CTUh	341E-12	10.1E-12	82.2E-12	0	2.32E-12	0	12.8E-12	-2.03E-12
HTTP - NC	CTUh	5.07E-9	276E-12	1.56E-9	0	90.6E-12	0	638E-12	-56.1E-12
SQP	Pt	1.27	0.186	0.012	0	690.0	0	0.244	-0.030
Acronyms	GWP-total: Climate cha depletion, AP: Acidificat oxidation, ADPE: Abioti Ecotoxicity freshwater, H	GWP-total: Climate change, GWP-fossil: Climate change - 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, ADPE: 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, Non-cancer human health effects, SQP: Land use related impacts, soil quality.	e change- fossil, GW ter, EP-freshwater: E. DPF: Abiotic depleti alth effects, HTP-nc: I	P-biogenic: Climate of trophication freshwat on - fossil resources, Non-cancer human he	change - biogenic er, EP-marine: Eutr WDP: Water scarci salth effects, SQP:	GWP-biogenic: Climate change - biogenic, GWP-Juluc: Climate change - land use and transformation, ODP: Ozone layer : Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical letion - fossil resources, WDP: Water scarcity, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, ETP-FW: nc. Non-cancer human health effects, SQP: Land use related impacts, soil quality.	change - land use terrestrial: Eutroph rganics - particulat cts, soil quality.	and transformation, ication terrestrial, PC e matter, IR: Ionising	ODP: Ozone layer CP: Photochemical radiation, ETP-FW:
Legend	A1: Raw Material Supply, A2: Transpo C4: Disposal, D: Benefits and Loads.	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A2-C4: Disposal, D: Benefits and Loads.		Sum of A1, A2 and A	.3, A4:Transport to	A3: Sum of A1, A2 and A3, A4: Transport to Site, A5: Installation, C1: Demolition, C2: Waste Transport, C3: Waste Processing,	:1: Demolition, C2:	Waste Transport, C3	. Waste Processing,

\*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 <sup>2</sup> K/W 1 m <sup>2</sup> K/W ODE				Evomineral 044 Glaswool Insulation Materials (Without Facing)	/ithout Facing)		
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	О
PERE	ſW	298.0	0.004	0.133	0	0.001	0	900:0	-0.008
PERM	ſΜ	0	0	0	0	0	0	0	0
PERT	MJ	798.0	0.004	0.133	0	0.001	0	900.0	-0.008
PENRE	MJ	12.4	0.352	12.6	0	0.102	0	0.136	-0.191
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	ſW	12.4	0.352	12.6	0	0.102	0	0.136	-0.191
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	m³	0.002	53.2E-6	0.017	0	17.7E-6	0	125E-6	-24.4E-6
	Wast	te & Output Flows for 1	m²K/W ODE Star	flex & Evomineral	044 Glaswool Insu	ulation Materials (W	(ithout Facing)		
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	О
HWD	kg	58.9E-6	0	0	0	0	0	0	0
NHWD	kg	0.063	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)	ſW	0	0	0	0	0	0	0	0
Acronyms	PERE: Use of reneward Total use of renewab energy resources us renewable secondary CRU: Components for Thermal.	PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PENRM: Use of non-renewable primary energy excluding resources used as raw materials, PENRM: Use of non-renewable primary energy, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable primary energy, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Nat 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, EE (Thermal): Exported energy, Thermal.	xcluding resource: NE: Use of non-re ENRT: Total use c f fresh water, HWC I for recycling, ME	s used as raw ma newable primary e of non-renewable :: Hazardous wast R: Materials for er	terials, PERM: Us snergy excluding primary energy, <sup>§</sup> e disposed, NHW nergy recovery, EE	e of renewable prii resources used as r iM: Secondary mat /D: Non-hazardous : (Electrical): Export	mary energy resonaw materials, PEN erial, RSF: Renew waste disposed, ed energy electrii	urces used as raw IRM: Use of non-re able secondary fu RWD: Radioactive cal, EE (Thermal): f	materials, PERT: newable primary iels, NRSF: Non- waste disposed, Exported energy,
Legend	A1: Raw Material Supply, A2: Transpc C4: Disposal, D: Benefits and Loads.	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A2. C4: Disposal, D: Benefits and Loads.		3: Sum of A1, A2 and	A3, A4:Transport to	A3: Sum of A1, A2 and A3, A4: Transport to Site, A5: Installation, C1: Demolition, C2: Waste Transport, C3: Waste Processing	C1: Demolition, C2:	Waste Transport, C3	. Waste Processing,

	Environmen	Environmental Impacts for 1 m²K/W ODE Starfle	∞ ×	Evomineral 044 Gla	aswool Insulation	Glaswool Insulation Materials (With Aluminium Foil Facing)	minium Foil Faci	ng)	
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	D
GWP - Fossil	kg CO <sub>2</sub> eq	1.31	0.025	0.859	0	0.007	0	0.029	-0.007
GWP - Biogenic	$kg CO_2 eq$	900'0	4.39E-6	0.003	0	2.67E-6	0	0.440	168E-6
GWP - Luluc	$kg CO_2 eq$	900.0	11.4E-6	617E-9	0	2.49E-6	0	8.83E-6	-5.24E-6
GWP - Total	$kg CO_2 eq$	1.324	0.025	0.863	0	0.007	0	0.469	-0.007
ODP	kg CFC-11 eq	105.9E-9	5.28E-9	248E-12	0	1.51E-9	0	1.77E-9	-220E-12
AP	mol H+ eq	900.0	317E-6	0.004	0	28.9E-6	0	88.0E-6	-29.8E-6
EP - Freshwater	kg P eq	503E-6	1.75E-6	44.4E-6	0	583E-9	0	8.04E-6	-2.04E-6
*EP - Freshwater	kg PO <sub>4</sub> eq	0.002	5.36E-6	136E-6	0	1.78E-6	0	24.6E-6	-6.25E-6
EP - Marine	kg N eq	0.001	81.5E-6	0.001	0	8.48E-6	0	0.001	-5.85E-6
EP - Terrestrial	mol N eq	0.012	0.001	0.007	0	92.7E-6	0	240E-6	-60.2E-6
POCP	kg NMVOC	0.004	244E-6	0.002	0	28.2E-6	0	172E-6	-27.3E-6
ADPE	kg Sb eq	275E-6	512E-9	291E-9	0	183E-9	0	73.1E-9	-65.0E-9
ADPF	ſW	17.9	0.352	12.6	0	0.102	0	0.167	-0.191
WDP	m³ depriv.	689'0	0.001	0.971	0	331E-6	0	900:0	-0.005
PM	disease inc.	64.0E-9	1.43E-9	30.2E-9	0	479E-12	0	1.03E-9	-234E-12
IR	kBq U-235 eq	0.054	0.002	113E-6	0	0.000	0	0.001	-0.001
ETP - FW	CTUe	25.55	0.287	1.11	0	0.090	0	2.51	-0.082
HTTP - C	CTUh	1.08E-9	10.1E-12	82.2E-12	0	2.32E-12	0	15.6E-12	-2.03E-12
HTTP - NC	CTUh	19.16E-9	276E-12	1.56E-9	0	90.6E-12	0	782E-12	-56.1E-12
SQP	Pt	2.54	0.186	0.012	0	690'0	0	0.299	-0.030
Acronyms	GWP-total: Climate cha depletion, AP: Acidificat oxidation, ADPE: Abiotic Ecotoxicity freshwater, H	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 - fossil resources, WDP: Water scarcity, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, ETP-FW: Ecotoxicity freshwater, HTP-c: Cancer human health effects, Non-cancer human health effects, SQP: Land use related impacts, soil quality.	e change- fossil, GW ter, EP-freshwater: EL DPF: Abiotic depleti alth effects, HTP-nc: l	P-biogenic: Climate itrophication freshwar on - fossil resources, Non-cancer human h	change - biogenic ter, EP-marine: Eutr WDP: Water scarci salth effects, SQP:	GWP-biogenic: Climate change - biogenic, GWP-luluc: Climate change - land use and transformation, ODP: Ozone layer r: Eutrophication freshwater, EP-marine: Eutrophication marine, EP-terrestrial: Eutrophication terrestrial, POCP: Photochemical oletion - fossil resources, WDP: Water scarcity, PM: Respiratory inorganics - particulate matter, IR: Ionising radiation, ETP-FW: nc: Non-cancer human health effects, SQP: Land use related impacts, soil quality.	change - land use terrestrial: Eutroph rganics - particulat cts, soil quality.	and transformation, ication terrestrial, PO e matter, IR: Ionising	ODP: Ozone layer CP: Photochemical radiation, ETP-FW:
Legend	A1: Raw Material Supply, C4: Disposal, D: Benefits	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.	Jfacturing, A1-A2-A3	Sum of A1, A2 and A	v3, A4:Transport to	Site, A5: Installation, C	:1: Demolition, C2:	Waste Transport, C3	Waste Processing,

\*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 <sup>2</sup> K/W 1 m <sup>2</sup> K/W ODE			ool Insulation Mat	omineral 044 Glaswool Insulation Materials Materials (With Aluminium Foil Facing)		l Facing)	
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	О
PERE	ſW	1.53	0.004	0.133	0	0.001	0	0.007	-0.008
PERM	ſW	0	0	0	0	0	0	0	0
PERT	MJ	1.53	0.004	0.133	0	0.001	0	0.007	-0.008
PENRE	MJ	17.9	0.352	12.6	0	0.102	0	0.167	-0.191
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	ſW	17.9	0.352	12.6	0	0.102	0	0.167	-0.191
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	ſW	0	0	0	0	0	0	0	0
FW	m³	0.007	53.2E-6	0.017	0	17.7E-6	0	153E-6	-24.4E-6
	Waste & Output	t Flows for 1 m²K/W OE	<b>JE Starflex &amp; Evon</b>	nineral 044 Glaswo	ool Insulation Mat	erials Materials (Wit	h Aluminium Foil	Facing)	
Impact Category	Unit	A1-A2-A3	A4	A5	C1	C2	C3	C4	О
НМБ	kg	58.9E-6	0	0	0	0	0	0	0
NHWD	kg	0.063	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)	ſW	0	0	0	0	0	0	0	0
Acronyms	PERE: Use of reneward Total use of reneward energy resources us renewable secondary CRU: Components for Thermal.	PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PENRM: Use of non-renewable primary energy excluding resources used as raw materials, PENRM: Use of non-renewable primary energy, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable primary energy, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Nat 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, EE (Thermal): Exported energy, Thermal).	xcluding resource: IRE: Use of non-re ENRT: Total use o fresh water, HWC I for recycling, ME	s used as raw mar newable primary e if non-renewable   ): Hazardous wast R: Materials for en	terials, PERM: Us- snergy excluding primary energy, S e disposed, NHM nergy recovery, EE	e of renewable prir resources used as raids: Secondary mat 7D: Non-hazardous (Electrical): Export	nary energy reso w materials, PEN erial, RSF: Renew waste disposed, ed energy electri	urces used as raw IRM: Use of non-re able secondary fu RWD: Radioactive cal, EE (Thermal): f	materials, PERT: newable primary tels, NRSF: Non- waste disposed, Exported energy,
Legend	A1: Raw Material Supply, A2: Transpc C4: Disposal, D: Benefits and Loads.	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A1-A2-C4: Disposal, D: Benefits and Loads.		s: Sum of A1, A2 and	A3, A4:Transport to	A3: Sum of A1, A2 and A3, A4:Transport to Site, A5: Installation, C1: Demolition, C2: Waste Transport, C3: Waste Processing	C1: Demolition, C2:	Waste Transport, C3	: Waste Processing,

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