

Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

TENAX W MW S, TENAX W MW T, TENAX W MW H

Self-supporting double skin metal faced insulating sandwich panels with an insulation core made of mineral wool

EPD of multiple products, based on a representative product (production volume)

from



Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of product recently on the market EPD of multiple products from a company
EPD registration number:	EPD-IES-0034261
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Validity date:	2031-08-23

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

Product recently on the market – Results of this EPD shall be used with care as the LCI data is not yet based on 1 year of production which may result in increased uncertainty

EPD of multiple products, based on a representative product (production volume)



GENERAL INFORMATION

Programme Information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <i>Construction Products, PCR 2019:14 Version 2.0.1</i>
PCR review was conducted by: <i>The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair - Rob Rouwette, co-chair - Noa Meron</i>
c-PCR, if applicable: <i>Thermal insulation products (EN 16783) (c-PCR to PCR 2019:14), c-PCR-005, version 1.0.0.</i>

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
☒ Individual EPD verification without a pre-verified LCA/EPD tool Third-party verifier: <i>Elisabet Amat Guasch, GREENIZE</i> Approved by: International EPD System 
Procedure for follow-up of data during EPD validity involves third party verifier:
☒ Yes ☐ No

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

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD:

TENAX PANEL SIA

Address:

Spodrības iela 1, Dobeles Latvija, LV-3701

Contact:

Tenax Panel

+371 63720957, tenaxpanel@tenaxgrupa.lv

Address and contact information of the LCA practitioner commissioned by the EPD owner:

Aleksandrs Šiškins, Bureau Veritas Latvia SIA, riga@bureauveritas.com

Description of the organisation:

TENAX PANEL, SIA is a sandwich panel manufacturer and a subsidiary of TENAX, SIA as part of a group of companies producing construction and industrial materials based in Dobeles, Latvia.

Product-related or management system-related certifications:

TENAX PANEL, SIA is committed to providing reliable and sustainable products and services. The company has an ISO 14001 certified Environmental management system, ISO 9001 certified Quality management system and ISO 45001 certified Occupational health and safety management system.

TENAX group. The company has an ISO 50001 certified Energy management system and ISO 27001 certified Information security, cybersecurity and privacy protection system.

PRODUCT INFORMATION

Product name:

Self-supporting double skin metal faced insulating sandwich panels with an insulation core made of mineral wool. Product considered in this EPD is a *Product recently on the market* – results of this EPD shall be used with care as the LCI data is not yet based on 1 year of production which may result in increased uncertainty

Product identification:

TENAX W MW S, TENAX W MW T, TENAX W MW H

UN CPC code:

412 - Structural metal products

Product description:

Prefabricated double skin steel faced sandwich panels with a core made of mineral wool used for self-supporting application in wall (facade and partition), roof and ceiling structures. The internal and external facings of the panels are made of flat, lightly profiled or profiled steel sheets protected against corrosion with zinc and organic (polymer) coatings. The thermal insulating core material is made of mineral wool in accordance with European Standard EN 13162. The core is adhered on both sides with the coated steel facings to form the composite resistant to tensile, compressive and shear forces.

The product complies with Regulation (EU) No 305/2011 considering the harmonized technical specification EN 14509. The product is put on the market with a Declaration of performance and the CE-mark containing the required construction data.

The sandwich panels are manufactured and delivered as a project specific product, with width and length specified for the particular building. This allows to minimize cut-off waste during the installation.

Technical specifications for sandwich panels with a core made of mineral wool are given in:

- EN 14509:2013, Self-supporting double skin metal faced insulating panels
- EN 13162:2012+A1:2015 – Thermal insulation products for buildings-Factory made mineral wool (MW) products

Characteristic	Value	Unit
Density of the insulating layer	70	kg/m ³
Thickness of panel*	50–300	mm
Modular width of panel	1000–1200	mm
Thickness of internal facing	0,5–0,8	mm
Thickness of external facing	0,5–0,7	mm
Thermal conductivity of the insulating material	0,038	W/(m·K)
Heat transfer coefficient	0,73-0,12	W/(m ² ·K)

*when the outer layers are even, this is the overall height of the panel (D);
 on heavily profiled panels, this is the consistent core thickness without profile (dc)

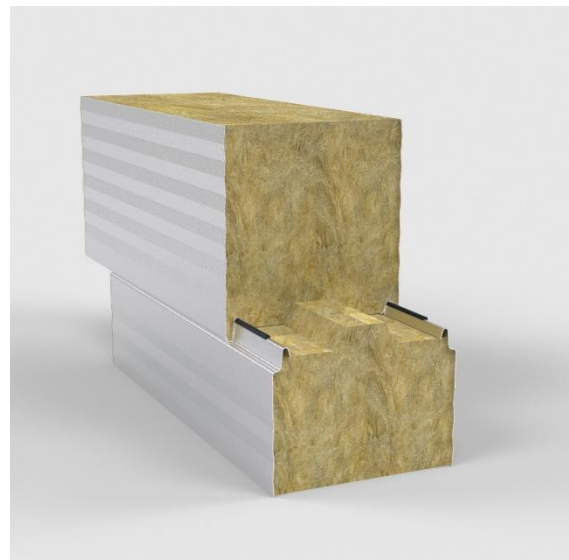
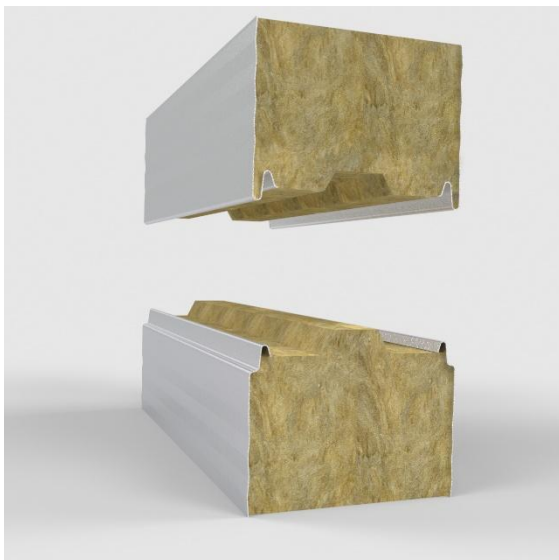
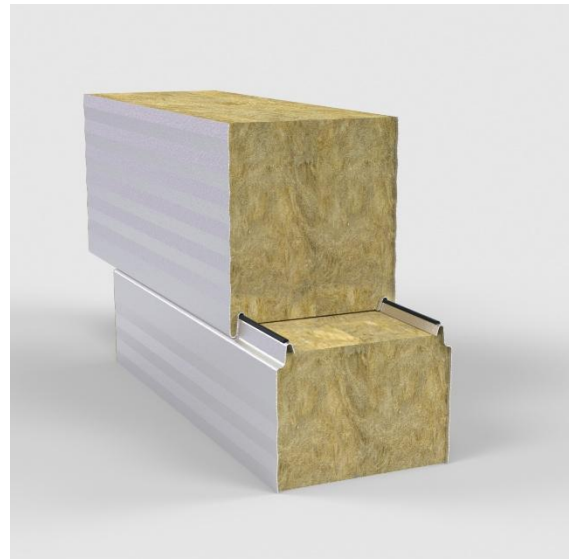
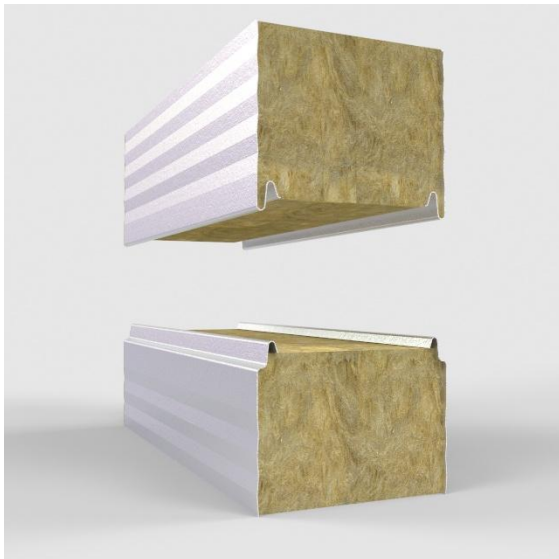
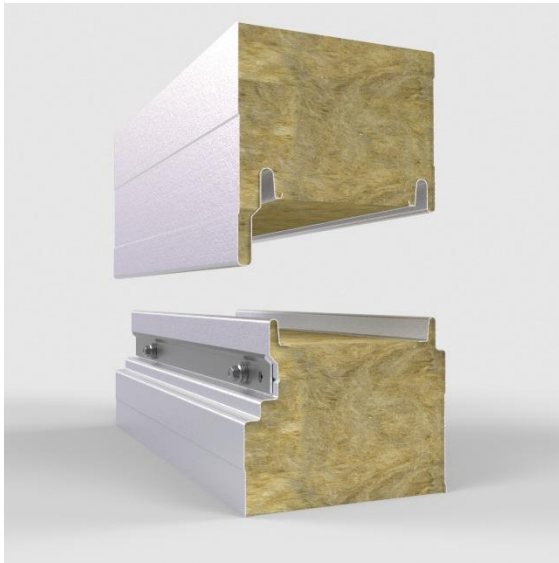
Name and location of production site(s):

Lauku iela 23, Dobeles, Latvia, LV-3701

References to any relevant websites for more information or explanatory materials:

<https://tenaxpanel.lv/en/>

Product visual representation:



CONTENT DECLARATION

Product content and packaging materials in the Tables below are displayed per declared unit of representative product – **1 m² of 200 mm thick sandwich panel with mineral wool core.**

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material	
			mass-% of product	kg C/DU
Steel facings	8,35	90,9%	0%	0
Insulation (mineral wool)	14,35	0%	0%	0
TOTAL	22,70	33,4%	0%	0

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/DU
Wood	0,03	0,11%	0,01
EPS	<0,01	0,02%	0,00
Adhesive tape	<0,01	0,01%	0,00
LDPE film	<0,01	0,01%	0,00
White LDPE film	0,01	0,06%	0,00
TOTAL	0,05	0,21%	0,01

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO₂.

The product does not contain any substances listed on the Candidate List of Substances of Very High Concern (SVHC) in concentrations above 0.1% by weight, at any stage of its life cycle.

LCA INFORMATION

Declared unit:

1 m² self-supporting double skin metal faced insulating sandwich panel with an insulation core made of mineral wool with area density of 22,7 kg/m² and a reference thickness of 200 mm. Conversion factor to mass – 0,044. This product is considered as a representative product and is based on production volume for the data period.

Reference service life:

It has been assumed that the reference service life of the sandwich panel is generally the same as the technical life for the buildings this product is intended for. Therefore, reference service life has been declared as equal to the building service life. TENAX sandwich panels have an estimated lifespan of 50 years depending on the conditions of use, according to BBSR.

Time representativeness:

Data represents the manufacturing of the products in first quarter of year 2026. The database used for proxy data is Ecoinvent v3.12. This database data is compiled in March 2026.

Geographical scope:

This EPD has European scope.

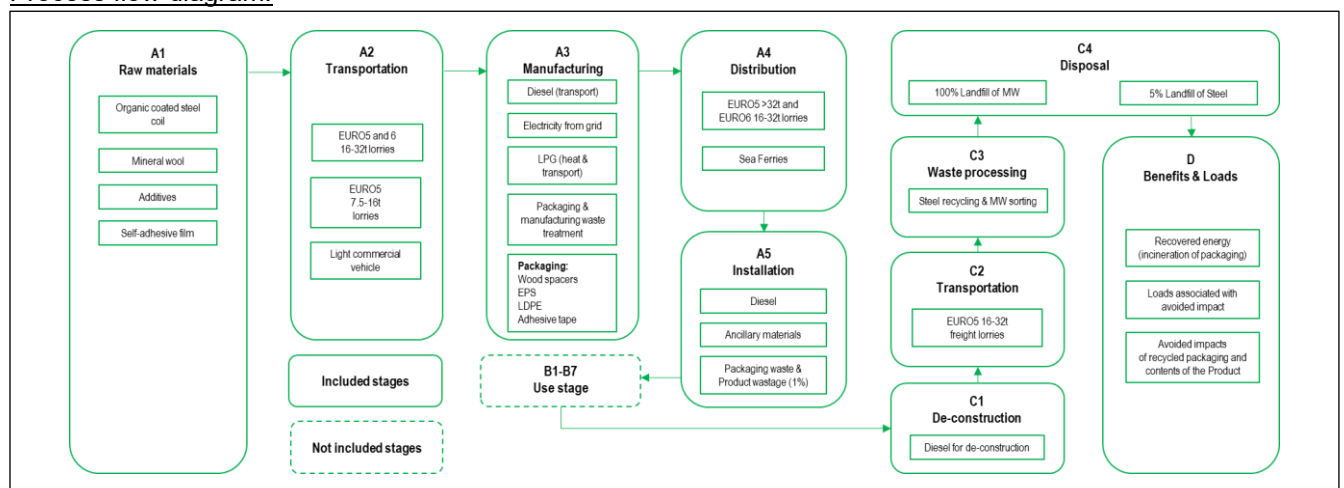
Database(s) and LCA software used:

Ecoinvent v3.12 has been used to conduct quantitative evaluation in this study. This database provided the background system's life cycle inventory data for raw and processed materials. The LCA software used - SimaPro Analyst 10.4.

Description of system boundaries:

This LCA study has been performed as “Cradle to gate with options, modules C1–C4, module D and with optional modules”, also considering Transportation module A4 and Installation module A5.

Process flow diagram:



Process flow diagram displays the **main** End-of-Life scenario of the product considered in this EPD.

Data quality:

The foreground data has been collected internally, considering the latest available average production volume and measurements during the time period of first quarter of 2026. Data regarding waste processing has been taken from waste scenarios for closest locations in Ecoinvent v3.12. The quality level in this study is qualified as Good. Data quality rating procedure has been performed using a rating system where “1” means Excellent quality, and “5” means Poor quality. Data quality information used in this EPD is compliant with EN 15941.

Technological Representativeness, TeR	Geographic representativeness, GeR	Time Representativeness, TiR	Precision, P	Average DQR
1,9	2,0	2,0	2,8	2,2

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

The reported share of primary data is associated with uncertainty, as several EPDs used as data source lack information on the share of primary data. Share of primary data displayed below is displayed for a representative product (based on production volume), for other included products primary data share varies from 12,0% to 14,8%.

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Transport of raw materials and packaging to the production site	Collected data	EPD owner, Ecoinvent v3.12	2026	Secondary data	0%
Steel coil	EPD	Confidential		Primary data	3,6%
Mineral wool	EPD	Confidential		Primary data	4,3%
EPS packaging	EPD	Confidential		Primary data	0,1%
Additive	EPD	Confidential		Primary data	0,1%
Manufacturing of product	Collected data	EPD owner	2026	Primary and Secondary data	4,3%
Generation of electricity used in manufacturing of product	Database	Ecoinvent v3.12	2025		
Production of packaging	Database	Ecoinvent v3.12	2025		
Other processes	Database	Ecoinvent v3.12	2025		
Total share of primary data, of GWP-GHG results for A1-A3					12,4%

Cut-off criteria:

To LCA practitioner knowledge there is no missing data for processes within the system boundaries. All the materials and processes which have been accounted for by the manufacturing company for the relevant manufacturing process are included in the LCI. The cut-off in LCA is according to PCR:” General cut-off criteria are given in standard EN 15804:2012+A2, clause 6.3.6.

The processes related to infrastructure, construction, and production of equipment, as well as tools that are not directly consumed in the production process, have been excluded. Personnel-related activities, such as transportation to and from work, have also been excluded.

Allocation:

General allocation principles have been applied according to ISO 14044:2006 4.3.4 and in line with the provisions of EN 15804:2012+A2. Inputs and outputs are allocated equally among all products using production volumes. The methodological choices for allocation for reuse, recycling and recovery have been set according to the polluter pays principle (PPP).

Considering the use of recycled material, i.e., steel coil, in production of the sandwich panel and following the requirements of PCR 2019:14 v2.0.1, it is necessary to declare GWP-GHG intensity of that recycled material (1,03E+03 kgCO₂eq/tonne), if it contributes more than 10% to the GWP-GHG results of Product stage A1-A3.

Stages and Production description

Product Stage

Module A1-A3 | Production stage

The panels are produced using the following materials:

- galvanized and coated steel (post-consumer) sheet coils;
- backing film/filament tape made of HDPE attached to the steel sheet;
- polyurethane adhesive and adhesive hardener for bonding mineral wool with steel sheets;
- standard packaging of EPS, stretch wrap, adhesive tape, spacer boards and optional cargo straps.

The production stage accounts for all upstream burdens of raw materials supply until panel manufacturing, including transportation to the production site in Dobeles. The main inputs include the organic coated steel sheets and the insulation material. Electrical energy is obtained directly from the Latvian electricity grid. As per “*Electricity, medium voltage {LV} | electricity, medium voltage, residual mix | Cut-off, U*”, GWP-GHG of Latvian residual grid mix is 0,624 kgCO₂eq per 1 kWh.

Construction process Stage

Module A4 | Transport

Transportation of the final product, i.e., sandwich panel with MW insulation core and respective packaging, from TENAX PANEL manufacturing plant in Latvia to its customers considers the use of various types of freight lorries (EURO5 – EURO6) and Sea ferry on some routes

Table below describes scenarios considered in module A4 for a representative product.

Vehicle	kg*km	Distance, km	Fuel consumption, l/tkm	Value, l/t
Lorry >32t, EURO5, RER	1,20E+03	405	0,0226	9,13
Sea Ferry	1,21E+03	409	0,0298	12,18
Lorry 16-32t, EURO6	2,32E+03	392	0,0431	16,90
Lorry >32t, EURO5, RER	8,19E+02	100	0,0226	2,26
Lorry 16-32t, EURO6	1,54E+03	271	0,0431	11,68
Sea Ferry	1,45E+03	255	0,0298	7,60

Module A5 | Construction installation

According to EN 16783, ancillary materials used in the process shall be taken into account along with impact of installation equipment and product wastage. Data for this module has been provided by manufacturing company's partner responsible for installation activities and it includes:

- environmental impact of using the equipment to install panels has been considered as 0,25 liters of Diesel per 1 m² of the product;
- a determined standard waste percentage (1%), i.e., product wastage or loss;
- ancillary materials have been considered, i.e., 0,274 kg per 1 m² of the product.

Activities regarding waste treatment of the product wastage are the same as described in main EoL scenario of the product itself. Activities and shares of recycling, incineration and disposal for packaging waste have been sourced from Annex C v2.1 of PEF:

Waste	Recycling	Incineration	Disposal
EPS packaging		100%	
Wood packaging		100%	
Plastic packaging	29%	33%	38%
Mineral wool (product wastage)			100%
Steel (product wastage)	95%		5%

Use Stage:

Modules B1-B7, that define use stage of the product, are not declared for this study – these are not mandatory for LCA “Cradle-to-gate with options” form.

End of Life Stage:

Modules C1-C4 and Module D are mandatory for considered EPD type, therefore, have also been considered for the purpose of this study. Default data for modelling modules C1-C4 has been considered in accordance with PCR 2019:14 v2.0.1. Environmental performance results have been considered both for main and alternative scenarios of End-of-Life stage:

- **Main scenario.** It is assumed that product is dismantled and transported to the waste treatment facility (80 km) where it is disassembled and sorted. As per Annex C v2.1 of PEF, 95% of steel has been considered for recycling, but 5% of steel and 100% of mineral wool has been considered for disposal. Module D considers benefits and loads of recycling in this case.
- **Alternative scenario #1 – 100% Disposal.** It is assumed that product is dismantled, transported (80 km) to the waste sorting facility (module C3) and disposed of in a sanitary landfill (module C4) afterwards. Module D considers no benefits in this case.
- **Alternative scenario #2 – 100% Recycling.** It has been assumed that loading/unloading activities and mechanical sorting activities at the sorting plant are to be considered in this scenario in accordance with PCR 2019:14 v2.0.1 default values. 100% recycling is a theoretical scenario, not necessarily technically and economically justified one. In this scenario, module C4 has no impact, module D considers net benefits of recycled steel and benefits and loads of mineral wool recycled into loose insulation. As a burden - 30.98 kWh/t for milling equipment has been considered as per *Circular economy strategy for mineral wool wastes* (Shuning Zhao).

Disassembly in **module C1** is assumed to be carried out considering default values provided in PCR 2019:14 v2.0.1 – 1,1 kWh/t.

Sandwich panel is assumed to be sent (**module C2**) to the closest waste treatment facilities, assuming 80km distance for products not to be incinerated. Distance is assumed to be covered by 16-32t EURO5 Freight lorry.

As per Annex C v2.1 of PEF, 95% of steel facings have been considered for recycling (**module C3**) with remaining share being disposed of in a landfill. Waste processing considers waste loading and unloading activities for all scenarios. For disposal scenario in **module C4** product is assumed to be disposed via landfill, no pre-treatment activities are required. Energy, that is necessary for the compacting of the waste in the landfill, has been considered in accordance with PCR 2019:14 v2.0.1, i.e., 1,6 kWh/t.

Benefits and loads beyond the system boundaries:

Module D considers the benefits of packaging & product recycling and packaging incineration scenarios considered in both Installation and EoL stages. Energy generated from incineration activities has been considered as follows:

- Electric energy – 3,93 MJ/kg for plastic, 4,07 MJ/kg for EPS and 1,74 MJ/kg for wood
- Natural gas as thermal energy – 7,67 MJ/kg for plastic, 7,89 MJ/kg for EPS and 3,50 MJ/kg for wood.

Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Distribution/ installation stage		Use stage							End-of-life stage				Beyond product life cycle
	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	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU	EU	LV	EU	EU	ND	ND	ND	ND	ND	ND	ND	EU	EU	EU	EU	EU
Share of primary data	12,4%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-36% / +23%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

ENVIRONMENTAL PERFORMANCE

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Biogenic carbon leaving the product system in modules A5 has been balanced out already in modules A1-A3.

Mandatory impact category indicators according to EN 15804 (EF 3.1 reference package)

Results per declared unit – 1 m ² of 200mm MW sandwich panel									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	2,45E+01	1,08E+00	1,93E+00	8,51E-03	2,79E-01	3,07E-02	4,82E-02	-5,72E-01
GWP-fossil	kg CO ₂ eq.	2,45E+01	1,08E+00	1,92E+00	8,51E-03	2,79E-01	3,07E-02	4,82E-02	-5,72E-01
GWP-biogenic	kg CO ₂ eq.	2,80E-03	3,96E-05	7,07E-03	4,26E-07	9,54E-06	3,75E-05	4,11E-06	-1,16E-04
GWP-luluc	kg CO ₂ eq.	1,28E-02	2,25E-05	8,20E-04	3,33E-07	4,33E-06	4,79E-05	2,27E-06	-7,12E-05
ODP	kg CFC 11 eq.	1,23E-07	2,19E-08	2,00E-05	1,33E-10	6,37E-09	4,63E-10	7,20E-10	-3,33E-09
AP	mol H ⁺ eq.	7,73E-02	7,59E-03	1,16E-02	7,86E-05	7,01E-04	2,07E-04	4,36E-04	-1,97E-03
EP-freshwater	kg P eq.	8,36E-05	7,62E-07	2,59E-05	8,23E-09	1,81E-07	1,74E-06	1,40E-07	-3,29E-05
EP-marine	kg N eq.	1,63E-02	3,04E-03	4,48E-03	3,73E-05	2,77E-04	7,15E-05	2,01E-04	-4,39E-04
EP-terrestrial	mol N eq.	2,67E-01	3,35E-02	4,98E-02	4,08E-04	3,03E-03	7,85E-04	2,20E-03	-5,08E-03
POCP	kg NMVO C eq.	5,42E-02	9,99E-03	1,53E-02	1,22E-04	1,22E-03	2,37E-04	6,68E-04	-1,78E-03
ADP-minerals&metals*	kg Sb eq.	1,88E-03	2,30E-08	2,22E-05	3,06E-10	7,49E-09	1,56E-09	1,66E-09	-5,56E-06
ADP-fossil*	MJ	3,10E+02	1,40E+01	2,83E+01	1,11E-01	3,68E+00	5,49E-01	6,16E-01	-5,66E+00
WDP*	m ³	2,65E+00	3,73E-03	1,22E+00	7,52E-05	9,73E-04	3,18E-03	4,84E-04	-7,72E-02
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 on these results are high or as there is limited experienced with the indicator.

Additional mandatory and voluntary impact category indicators

Results per declared unit – 1 m ² of 200mm MW sandwich panel									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	2,03E+01	3,18E+00	1,05E+00	1,08E+00	1,93E+00	8,51E-03	2,79E-01	3,07E-02
PM	Disease inc.	4,12E-06	4,69E-08	2,83E-07	2,24E-09	1,61E-08	3,85E-09	1,22E-08	-3,84E-08
IRP	kBq U-235 eq.	3,63E-01	1,32E-03	3,19E-02	1,02E-05	3,66E-04	3,26E-03	6,46E-05	4,14E-03
ETP-fw	CTUe	1,14E+02	7,87E-01	4,62E+01	8,70E-03	1,69E-01	4,89E-02	5,24E-02	-4,28E+00
HTP-c	CTUh	6,48E-08	8,91E-11	1,97E-09	4,69E-13	1,95E-11	2,61E-12	3,28E-12	-7,52E-10
HTP-nc	CTUh	3,84E-06	5,49E-09	4,37E-08	9,35E-12	1,73E-09	1,03E-10	6,63E-11	-3,30E-09
SQP	dimensionless	6,31E+02	1,86E-02	8,91E+00	2,00E-04	4,83E-03	4,37E-02	6,06E-01	-1,03E+00
Acronyms	PM = Particulate matter emissions; IRP = Ionising radiation, human health; ETP-fw = Ecotoxicity, freshwater; HTP-c = Human toxicity, cancer effects; HTP-nc = Human toxicity, non-cancer effects; SQP = Potential Soil quality index								

Resource use indicators

Results per declared unit – 1 m ² of 200mm MW sandwich panel									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	6,24E+02	2,85E-02	7,22E+00	2,08E-04	8,16E-03	7,73E-02	1,46E-03	-3,79E-01
PERM	MJ	4,89E+01	2,60E-03	1,00E+00	2,16E-05	7,55E-04	8,32E-03	9,69E-04	-4,00E-02
PERT	MJ	6,73E+02	3,11E-02	8,22E+00	2,29E-04	8,91E-03	8,56E-02	2,42E-03	-4,19E-01
PENRE	MJ	2,50E+02	1,40E+01	2,77E+01	1,11E-01	3,68E+00	5,49E-01	6,16E-01	-5,66E+00
PENRM	MJ	6,02E+01	7,44E-06	6,02E-01	2,64E-07	4,34E-07	1,25E-06	1,83E-06	-1,55E-04
PENRT	MJ	3,11E+02	1,40E+01	2,83E+01	1,11E-01	3,68E+00	5,49E-01	6,16E-01	-5,66E+00
SM	kg	1,68E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	9,03E-18	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	1,21E-16	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	7,82E-02	2,30E-04	3,19E-02	3,02E-06	6,26E-05	2,23E-04	1,86E-05	-2,17E-03
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								

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Waste indicators

Results per declared unit – 1 m ² of 200mm MW sandwich panel									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	7,02E-04	8,57E-05	2,13E-04	7,63E-07	2,46E-05	2,03E-06	4,12E-06	-6,63E-05
Non-hazardous waste disposed	kg	5,20E+00	4,01E-04	2,16E-01	3,89E-06	1,24E-04	2,64E-04	1,47E+01	-1,24E-02
Radioactive waste disposed	kg	6,70E-03	7,02E-07	8,75E-05	4,78E-09	2,06E-07	2,49E-06	3,14E-08	3,94E-06

Output flow indicators

Results per declared unit – 1 m ² of 200mm MW sandwich panel									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	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
Material for recycling	kg	2,33E-05	0,00E+00	8,48E-02	0,00E+00	0,00E+00	7,98E+00	0,00E+00	0,00E+00
Materials for energy recovery	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
Exported energy, electricity	MJ	0,00E+00	0,00E+00	8,38E-02	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	1,66E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

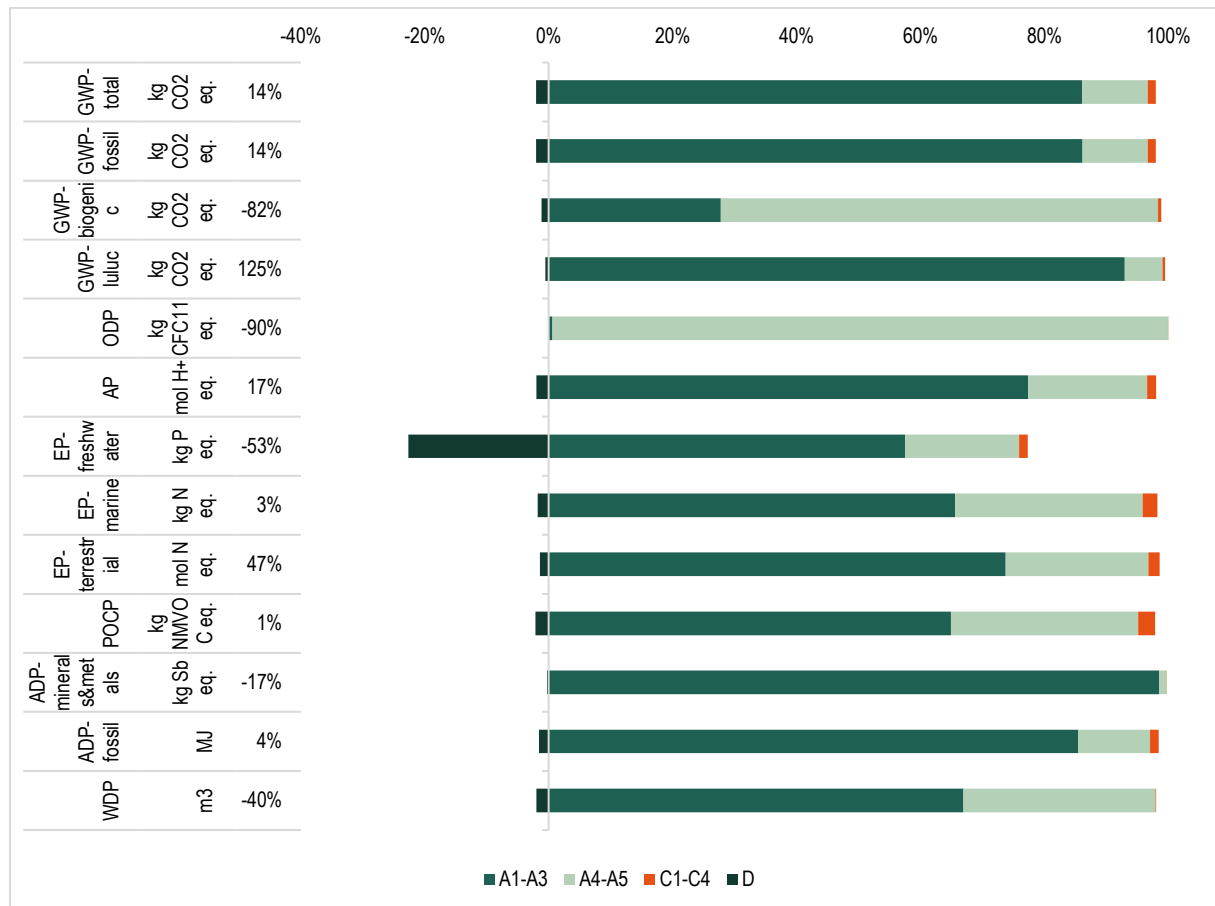
Biogenic carbon content

Results per declared unit – 1 m ² of 200mm MW sandwich panel	
Biogenic carbon content	Quantity
Carbon content in product, kg C	0,00E-00
Carbon content in accompanying packaging, kg C	1,16E-02

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg CO₂

LCA Interpretation

The estimated impact assessment results are only relative statements that do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins, or risks. Contribution to environmental impact per module for the declared unit of **1 m² of 200mm MW sandwich panel** is displayed in following Figure:



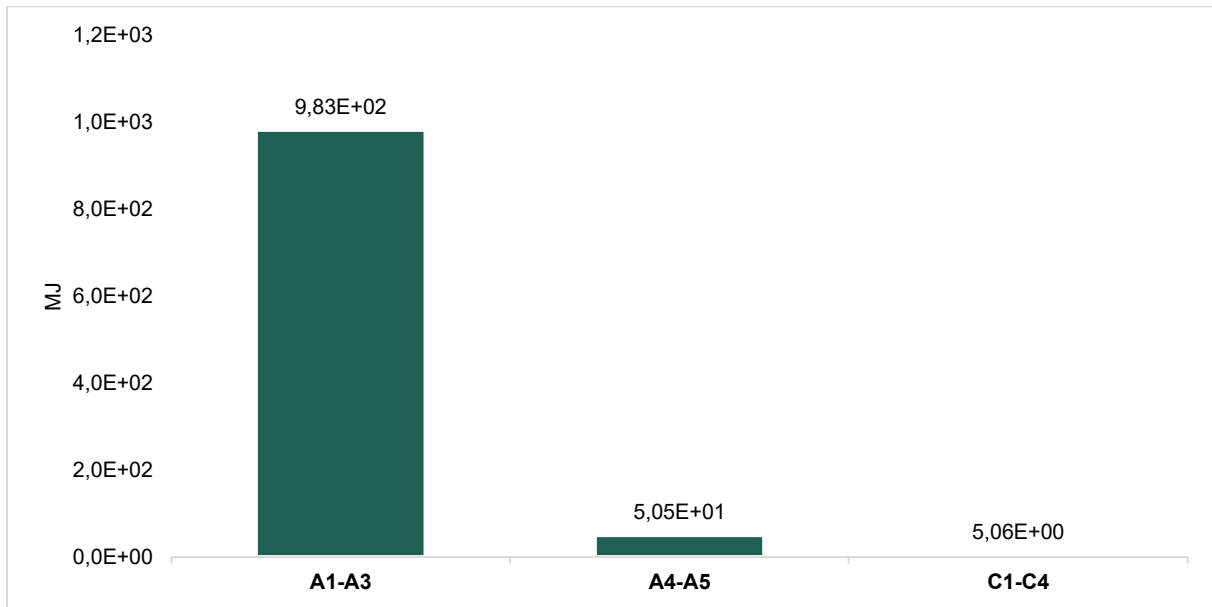
Contribution to the environmental impact, per Stage, for 1 m² of 200mm MW sandwich panel

Regarding Climate change, the highest impact is generated in Raw material module A1, while the whole **Product stage A1-A3 is generating 87,9%**. In total Installation stage A4-A5 is generating less significant impact than Product stage A1-A3 – 10,8% of Global warming potential. End-of-Life stage C1-C4 in terms of GWP is even less significant, mainly generating impact in waste transportation (module C2). With exclusion of GWP-biogenic, ODP and EP-freshwater, **Product stage A1-A3 is the main (>60%) driver** for all considered impact categories.

Nevertheless, it is necessary to note that there is some positive impact of module D, especially in such impact categories as Global warming potential, Abiotic depletion potential (fossil), Eutrophication potential and Acidification potential. In the main EoL scenario module D accounts for avoided impact of generated energy, both Electric and Thermal, from incineration of product packaging materials and partial recycling of the product itself, i.e., steel facings.

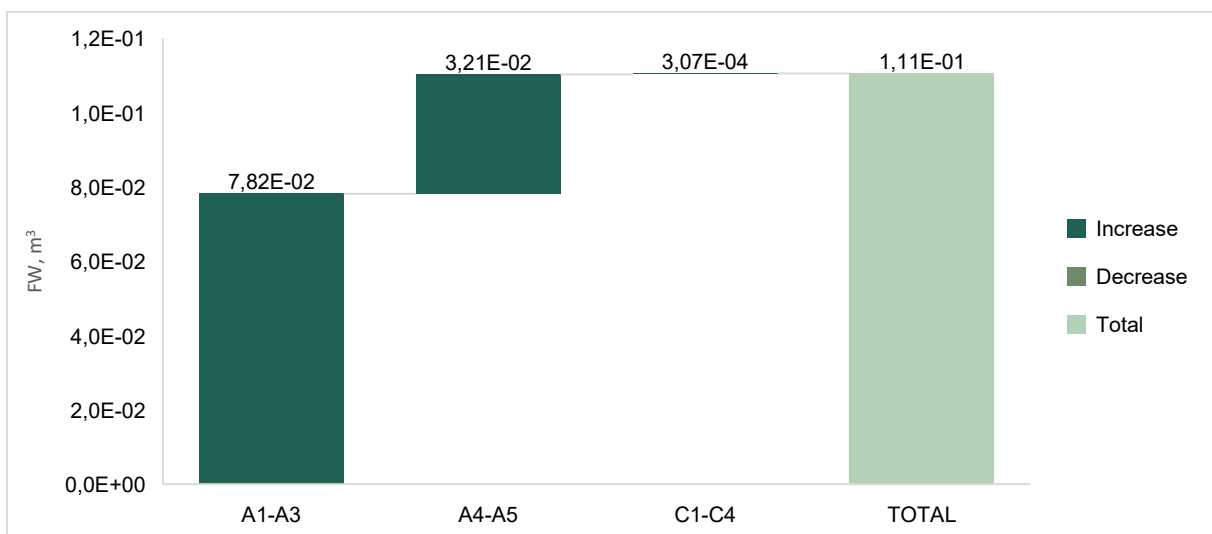
Considering total demand of primary energy per declared unit, demand of primary energy is displayed in following Figure. Product stage (A1-A3) is responsible for almost all (>94%) of the demand, with major share resulting in Raw material module A1.

- 94,6% for Product stage (A1-A3)
- 4,9% for Installation stage (A4-A5)
- 0,5% for End-of-Life stage (C1-C4)



Primary energy demand per 1 m² of 200mm MW sandwich panel

Other key effect factor is Freshwater consumption, that is displayed in following Figure as a Waterfall chart. A waterfall chart shows a running total as values are added or subtracted. It's useful for understanding how an initial value of net Freshwater use is affected by a series of positive and negative values. Similarly to Primary energy demand, in terms of freshwater use level **Product stage (A1-A3)** is also responsible for most of its demand.



Net freshwater use for 1 m² of 200mm MW sandwich panel

ADDITIONAL ENVIRONMENTAL INFORMATION

Alternative EoL scenario - Disposal (100%)

**Mandatory impact category indicators according to EN 15804
(EF 3.1 reference package)**

Results per declared unit – 1 m ² of 200mm MW sandwich panel						
Indicator	Unit	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	8,51E-03	2,79E-01	1,39E-02	7,44E-02	-3,48E-02
GWP-fossil	kg CO ₂ eq.	8,51E-03	2,79E-01	1,39E-02	7,44E-02	-3,48E-02
GWP-biogenic	kg CO ₂ eq.	4,26E-07	9,54E-06	6,97E-07	6,35E-06	-2,72E-05
GWP-luluc	kg CO ₂ eq.	3,33E-07	4,33E-06	5,44E-07	3,50E-06	-3,07E-05
ODP	kg CFC 11 eq.	1,33E-10	6,37E-09	2,18E-10	1,11E-09	-1,05E-09
AP	mol H ⁺ eq.	7,86E-05	7,01E-04	1,29E-04	6,72E-04	-1,01E-04
EP-freshwater	kg P eq.	8,23E-09	1,81E-07	1,35E-08	2,17E-07	-1,36E-06
EP-marine	kg N eq.	3,73E-05	2,77E-04	6,10E-05	3,10E-04	-2,05E-05
EP-terrestrial	mol N eq.	4,08E-04	3,03E-03	6,68E-04	3,39E-03	-2,23E-04
POCP	kg NMVOC eq.	1,22E-04	1,22E-03	2,00E-04	1,03E-03	-1,16E-04
ADP-minerals&metals*	kg Sb eq.	3,06E-10	7,49E-09	5,01E-10	2,56E-09	-5,75E-08
ADP-fossil*	MJ	1,11E-01	3,68E+00	1,81E-01	9,50E-01	-7,41E-01
WDP*	m ³	7,52E-05	9,73E-04	1,23E-04	7,46E-04	-5,99E-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 on these results are high or as there is limited experienced with the indicator.*

Alternative EoL scenario – Recycling (100%)

Mandatory impact category indicators according to EN 15804 (EF 3.1 reference package)

Results per declared unit – 1 m ² of 200mm MW sandwich panel						
Indicator	Unit	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	8,51E-03	2,79E-01	3,07E-02	0,00E+00	-1,76E+01
GWP-fossil	kg CO ₂ eq.	8,51E-03	2,79E-01	3,07E-02	0,00E+00	-1,75E+01
GWP-biogenic	kg CO ₂ eq.	4,26E-07	9,54E-06	3,75E-05	0,00E+00	-2,05E-02
GWP-luluc	kg CO ₂ eq.	3,33E-07	4,33E-06	4,79E-05	0,00E+00	-7,81E-03
ODP	kg CFC 11 eq.	1,33E-10	6,37E-09	4,63E-10	0,00E+00	-4,50E-09
AP	mol H ⁺ eq.	7,86E-05	7,01E-04	2,07E-04	0,00E+00	-5,31E-02
EP-freshwater	kg P eq.	8,23E-09	1,81E-07	1,74E-06	0,00E+00	-6,31E-05
EP-marine	kg N eq.	3,73E-05	2,77E-04	7,15E-05	0,00E+00	-8,78E-03
EP-terrestrial	mol N eq.	4,08E-04	3,03E-03	7,85E-04	0,00E+00	-9,69E-02
POCP	kg NMVOC eq.	1,22E-04	1,22E-03	2,37E-04	0,00E+00	-2,73E-02
ADP-minerals&metals*	kg Sb eq.	3,06E-10	7,49E-09	1,56E-09	0,00E+00	-1,27E-05
ADP-fossil*	MJ	1,11E-01	3,68E+00	5,49E-01	0,00E+00	-1,63E+02
WDP*	m ³	7,52E-05	9,73E-04	3,18E-03	0,00E+00	-7,45E-01
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 on these results are high or as there is limited experienced with the indicator.

ADDITIONAL ENVIRONMENTAL INFORMATION

A scaling factor can be applied to obtain valid results of impact assessment for a range of each product group, i.e., sandwich panel with MW core but of a different thickness. This extrapolation is possible because the product conforms to the rules of the PCR. Table below displays scaling factors that are given per each respective thickness of considered product.

Thickness of the sandwich panel	Scaling factor for GWP-GHG of the Product stage A1-A3
50mm	0,62
80mm	0,68
100mm	0,73
120mm	0,79
150mm	0,87
175mm	0,94
200mm	1,00
240mm	1,14
300mm	1,29

Optimal application of panels:

TENAX PANEL provides consultations and materials on the advantages and limitations of panel variations for specific use cases in order to ensure optimal performance, lifespan and value for the specific project.

Correct handling and installation of panels:

TENAX PANEL provides customers and users of the products with detailed documentation on storage, handling and installation of the sandwich panels. Furthermore, the Product Technical Details contain technical information useful in the design and installation phases. Each content can be consulted and downloaded from TENAX PANEL website: www.tenaxpanel.com

Maintenance:

TENAX sandwich panels have an estimated lifespan of 50 years depending on the conditions of use, according to BBSR. The product does not require special maintenance, but lifespan can be prolonged by carrying out maintenance as outlined in Product Use and Maintenance Manual. The products are easily washable and their cleaning does not require chemicals harmful to the environment. Content can be consulted and downloaded from TENAX PANEL website: www.tenaxpanel.com

Rating systems for sustainability of buildings:

The use of TENAX panels helps to obtain the prerequisites and credits for the most important building sustainability assessment systems, including LEED, BREEAM, Miljöbyggnad, DGNB. The technical characteristics and certificates of TENAX PANEL products provide credits for these certifications and make them comply with the environmental criteria required by many nations for construction products used on their territory.

A-C variation (%) for products considered in this EPD

Indicator	Unit	MW50	MW80	MW100	MW120	MW150	MW175	MW200	MW240	MW300
GWP-total	kg CO ₂ eq.	-36%	-29%	-26%	-22%	-13%	-8%	2,79E+01	13%	23%
GWP-fossil	kg CO ₂ eq.	-36%	-29%	-26%	-22%	-13%	-8%	2,79E+01	13%	23%
GWP-biogenic	kg CO ₂ eq.	-2%	-2%	-1%	-1%	0%	0%	9,97E-03	2%	3%
GWP-luluc	kg CO ₂ eq.	-16%	-14%	-11%	-9%	-5%	-2%	1,37E-02	7%	15%
ODP	kg CFC11 eq.	0%	0%	0%	0%	0%	0%	2,01E-05	0%	0%
AP	mol H+ eq.	-41%	-25%	-29%	-25%	-12%	-12%	9,79E-02	9%	18%
EP-freshwater	kg P eq.	-6%	-5%	-4%	-3%	-1%	0%	1,12E-04	7%	13%
EP-marine	kg N eq.	-37%	-15%	-27%	-25%	-9%	-16%	2,44E-02	5%	8%
EP-terrestrial	mol N eq.	-47%	-27%	-33%	-29%	-14%	-15%	3,57E-01	8%	18%
POCP	kg NMVOC eq.	-34%	-14%	-25%	-23%	-9%	-15%	8,18E-02	6%	9%
ADP- minerals & metals	kg Sb eq.	6%	-1%	0%	0%	1%	1%	1,90E-03	8%	9%
ADP-fossil	MJ	-30%	-24%	-22%	-18%	-11%	-7%	3,57E+02	13%	21%
WDP	m3	-4%	-5%	-4%	-3%	-1%	1%	3,88E+00	8%	15%
GWP-GHG	kg CO ₂ eq.	-36%	-29%	-26%	-22%	-13%	-8%	2,79E+01	13%	23%
PERE	MJ	-52%	-43%	-36%	-28%	-18%	-8%	6,31E+02	16%	35%
PERM	MJ	-72%	-57%	-48%	-38%	-24%	-11%	4,99E+01	18%	47%
PERT	MJ	-53%	-44%	-36%	-29%	-18%	-8%	6,81E+02	16%	36%
PENRE	MJ	-23%	-18%	-18%	-15%	-8%	-7%	2,97E+02	12%	17%
PENRM	MJ	-67%	-54%	-44%	-35%	-23%	-10%	6,08E+01	17%	41%
PENRT	MJ	-30%	-24%	-22%	-18%	-11%	-7%	3,58E+02	12%	21%
SM	kg	-37%	-32%	-27%	-21%	-13%	-6%	1,68E+01	14%	28%
RSF	MJ	-1%	0%	0%	0%	1%	1%	9,03E-18	1%	2%
NRSF	MJ	-1%	0%	0%	0%	1%	1%	1,21E-16	1%	2%
FW	m ³	-11%	-11%	-9%	-7%	-4%	-1%	1,11E-01	8%	15%
Hazardous waste	kg	-19%	-12%	-14%	-12%	-5%	-6%	1,03E-03	12%	19%
Non-hazardous waste	kg	-69%	-56%	-47%	-38%	-24%	-11%	2,01E+01	19%	47%
Radioactive waste	kg	-17%	-17%	-14%	-11%	-7%	-3%	6,79E-03	11%	19%
PM	Disease inc.	-69%	-54%	-46%	-37%	-23%	-11%	4,16E-06	18%	41%
IRP	kBq U-235 eq.	-57%	-45%	-37%	-30%	-19%	-8%	3,59E-01	16%	37%
ETP-fw	CTUe	-26%	-20%	-17%	-14%	-8%	-4%	1,18E+02	7%	16%
HTP-c	CTUh	-72%	-57%	-48%	-38%	-24%	-11%	6,56E-08	18%	43%
HTP-nc	CTUh	-75%	-60%	-50%	-40%	-25%	-12%	3,84E-06	19%	45%
SQP	Pt	-74%	-59%	-49%	-39%	-25%	-11%	6,32E+02	19%	47%
Components for re-use	kg	0%	0%	0%	0%	0%	0%	0,00E+00	0%	0%
Material for recycling	kg	-1%	-1%	-1%	0%	1%	0%	8,06E+00	0%	-1%
Material for energy recovery	kg	0%	0%	0%	0%	0%	0%	0,00E+00	0%	0%
Exported electric energy	MJ	-74%	-60%	-53%	-43%	-27%	-15%	8,38E-02	26%	319%
Exported thermal energy	MJ	-74%	-60%	-53%	-43%	-27%	-15%	1,66E-01	26%	321%

ABBREVIATIONS

Abbreviation	Definition
C	Carbon
CO ₂	Carbon dioxide
CPA	Statistical classification of products by activity
CPC	Central product classification
c-PCR	Complementary Product Category Rules
DQR	Data quality ratio
DU	Declared unit
EF	Environmental footprint
EN	European Norm
EPD	Environmental Product Declaration
EU	European Union
GHG	Greenhouse gas
GLO	Global
GPI	General Programme Instructions
GWP	Global warming potential
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
LCI	Life cycle inventory
LHV	Lower heating value
ND	Module not declared
PCR	Product Category Rules
PET	Polyethylene terephthalate
PPP	Polluter pays principle
REACH	Regulation on the registration, evaluation, authorization and restriction of chemicals
SVHC	Substances of Very High Concern
UN	United Nations
UNSPSC	United Nations Standard Products and Services Code
MW	Mineral wool

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VERSION HISTORY

Original Version of the EPD, 2026-08-24

