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ECO PLATFORM EPD VERIFIED

Owner:	Taasinge Elementer A/S
No.:	MD-23222-EN_rev1
Issued:	05-03-2024
Revised:	16-04-2024
Valid to:	05-03-2029

3rd PARTY **VERIFIED**

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | **ISO 14025 & EN 15804**

Owner of declaration
Taasinge Elementer A/S
Bjernemarksvej 54
5700 Svendborg, Denmark.
VAT: DK33510691

Programme
EPD Danmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

Declared product(s)
Taasinge Elements A/S prefabricated roof element T-3a (wooden ventilated roof element without roofing)

Number of declared datasets/product variations: 1

Production sites
Bjernemarksvej 54
5700 Svendborg, Taasinge, Danmark

Burskovvej 17
9870 Sindal, Danmark

Palsgårdvej 5,
7362 Hampen, Danmark

Rūpniecības iela 39
3008 Jelgava, Latvia

Product(s) use
The prefabricated roof element (T-3a) can be installed in buildings hence being part of the building roof.

Declared/ functional unit
1 m^2 prefabricated roof element (T-3a)

Year of production site data (A3)
2021

EPD version
Second edition. Minor changes in text and materials. Results remain the same.

Issued: 05-03-2024
Valid to: 05-03-2029

Basis of calculation
This EPD is developed in accordance with the European standard EN 15804+A2.

Comparability
EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

Validity
This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

Use
The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

EPD type
☒Cradle-to-gate with modules C1-C4 and D
☐Cradle-to-gate with options, modules C1-C4 and D
☐Cradle-to-grave and module D
☐Cradle-to-gate
☐Cradle-to-gate with options

CEN standard EN 15804 serves as the core PCR

Independent verification of the declaration and data, according to EN ISO 14025

☐ internal ☒ external

Third party verifier:

Guangli Du

Martha Katrine Sørensen
EPD Danmark

Life cycle stages and modules (MND = module not declared)																
Product			Construction process		Use							End of life				Beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Product information

Product description

The main product components are shown in the table below.

Material	Weight-% of declared product
Spruce plywood	19,4
Spruce wood (beams/battens)	47,5
Bituminous membrane	12,2
Glass wool insulation (incl. glass wool tape)	19,7
Vapour barrier (plastic) & screws and nails	<2

Product packaging:

The composition of the sales- and transport packaging of the product is shown in the table below.

Material	Weight-% of packaging
Spruce wood	55
LDPE film	43
Metalic fasteners	2

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of Taasinge Elementer A/S prefabricated T-3a roof element in Denmark or Latvia. Product specific data are based on values collected in the period 2021, and economic allocation is applied complying with EN 15804 and EN 16485. The EPD is a product specific EPD declaration. Background data are based on LCA for Experts 10.7 with Sphera database and Ecoinvent 3.8 database and are less than 10 years old. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

The products are produced in Denmark/Latvia and also sold in Denmark. Therefore, a Danish EoL scenario is included, and the geographical region covered is primarily Denmark.

Hazardous substances

Taasinge Elementer A/S T-3a prefabricated roof element does not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation"

(http://echa.europa.eu/candidate-list-table)

Essential characteristics

Taasinge Elementer A/S T-3a prefabricated roof element is covered by harmonised technical specification EN 16485. Declaration of performance according to EU regulation 305/2011 is available for all declared product variations.

The products comply with the requirements of prEN 14732-1:2006 Timber structures – prefabricated wall, floor and roof elements – part 1: Product requirements. The used wood is FSC or PEFC certified.

Further technical information can be obtained by contacting the manufacturer or on the manufacturers website:

www.taasingeelementer.dk

Reference Service Life (RSL)

No RSL is declared. This EPD is based on a cradle to gate with modules C1-4 and D and does not include the use stage.

Picture of product(s)

Figure 1: Taasinge Elementer A/S prefabricated roof (T-3a).

LCA background

Declared unit

The LCI and LCIA results in this EPD relates to 1 m^2 roof element (T-3a).

Name	Value	Unit
Declared unit	1	m^2
Weight per declared unit	32,4	kg/m^2
Density	74,2	kg/m^3
Thickness	431	mm
Conversion factor to 1 kg.	0,031	-
Moisture content	14	%

Functional unit

Not defined.

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and EN 16485:2014.

Guarantee of Origin – certificates

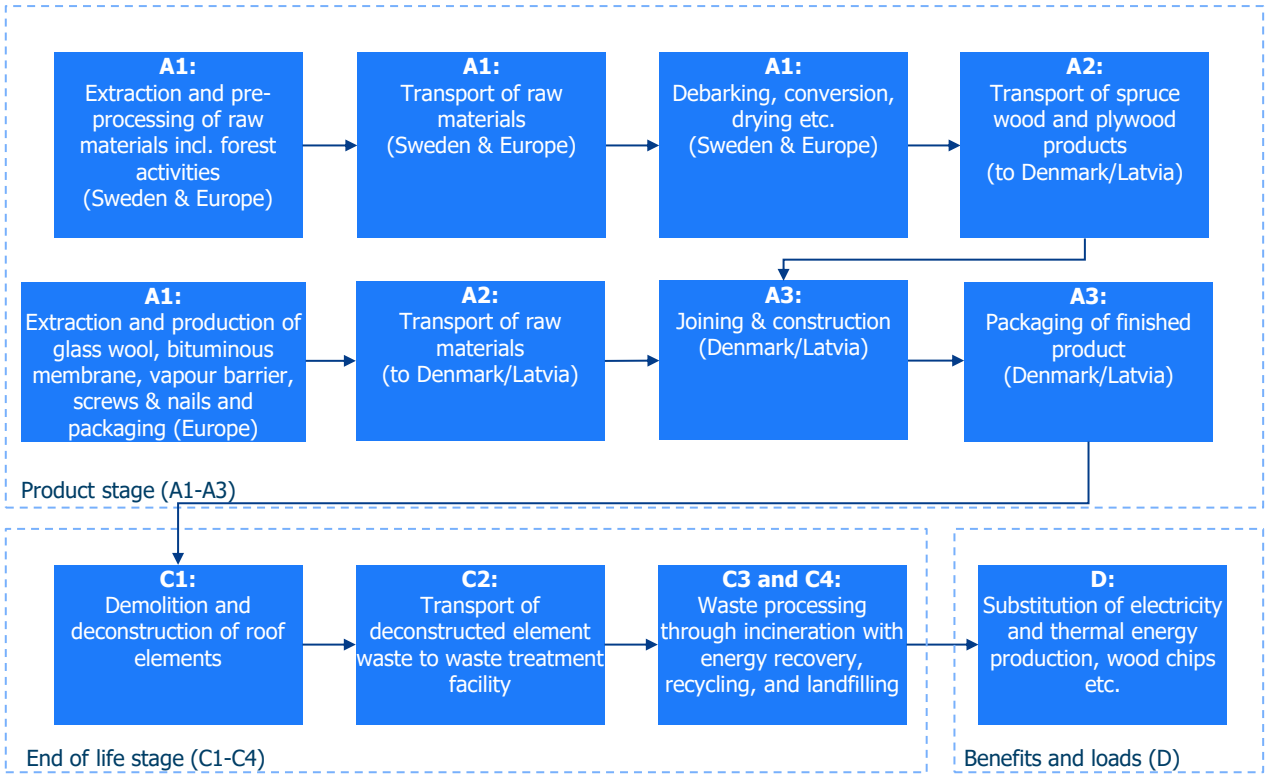
Foreground system:

The product is produced using 100% wind power certified electricity, in Taasinge and Sindal factories. While for the latter factories (Hampen & Latvia) it is modelled with a residual grid mix approach.

Background system:

Upstream processes are modelled using residual grid mix. Downstream processes are modelled using consumption mix.

Flowdiagram



System boundary

This EPD is based on a cradle-to-gate LCA with options, where modules C1-C4 and D are also considered, in which 100 %-weight of the product has been accounted for.

Specific application of the roof element, if windows are included in there, can further include the use of vapor membrane tape and sealant. However, these are not considered in the EPD as it is within the exclusion (cut-off) limit.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the ”end-of-waste” state or final disposal.

Taasinge Elementer A/S receives spruce timber and plywood from Sweden. At the production sites in Denmark and Latvia, the wood is built together with glass wool insulation, bituminous membrane, vapour barrier, and screws and nails.

In module A3, for production at Taasinge and Sindal, 100% wind power is modelled. While for Hampen and Latvia production sites residual grid mix electricity supply is used.

Construction process stage (A4-A5) includes:

Modules are not included in this study.

Use stage (B1-B7) includes:

Modules are not included in this study.

End of Life (C1-C4) includes:

When the buildings are being demolished the roof element is deconstructed and sorted at site. There after the different constituents are either sent for recycling, incineration (w. energy recovery), and landfilling.

Wood is recycled into wood chips and incinerated (w. energy recovery). Glass wool, and other materials are considered landfilled.

Re-use, recovery and recycling potential (D) includes:

During the incineration process of wood, heat and electricity is produced. Recycling of wood also occurs, where the production of wood chips is avoided.

LCA results

The LCA results are presented for the T-3a prefabricated roof element product.

Roof element, prefabricated (T-3a)

ENVIRONMENTAL IMPACTS PER m^2									
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	-2,03E+01	4,12E+00	3,74E+00	2,32E-02	5,98E-01	3,82E+01	1,54E-01	-4,90E+00
GWP-fossil	[kg CO_2 eq.]	2,26E+01	4,15E+00	2,07E+00	2,30E-02	6,01E-01	4,58E+00	1,59E-01	-4,82E+00
GWP-biogenic	[kg CO_2 eq.]	-4,08E+01	-6,10E-02	1,67E+00	1,81E-04	-8,83E-03	3,36E+01	-5,47E-03	-7,44E-02
GWP-luluc	[kg CO_2 eq.]	2,34E-02	3,83E-02	9,47E-04	1,01E-05	5,55E-03	5,88E-05	5,01E-04	-2,75E-03
ODP	[kg CFC 11 eq.]	2,01E-08	5,38E-13	7,01E-12	1,90E-14	7,79E-14	3,40E-12	4,14E-13	-4,49E-11
AP	[mol H^+ eq.]	1,13E-01	5,87E-03	7,69E-03	1,01E-04	2,14E-03	1,06E-02	1,14E-03	-2,11E-02
EP-freshwater	[kg PO_4 eq.]	1,58E-04	1,51E-05	4,13E-05	3,89E-08	2,19E-06	1,12E-06	3,26E-07	-1,02E-04
EP-marine	[kg N eq.]	2,65E-02	2,09E-03	2,52E-03	2,45E-05	9,79E-04	4,77E-03	2,95E-04	-7,06E-03
EP-terrestrial	[mol N eq.]	4,47E-01	2,49E-02	2,21E-02	2,69E-04	1,10E-02	5,78E-02	3,25E-03	-6,07E-02
POCP	[kg NMVOC eq.]	7,91E-02	5,13E-03	5,76E-03	9,54E-05	1,93E-03	1,22E-02	8,91E-04	-1,56E-02
ADPm[1]	[kg Sb eq.]	3,85E-05	2,74E-07	4,69E-07	1,99E-09	3,97E-08	5,20E-08	7,47E-09	-1,54E-06
ADPf[1]	[MJ]	3,88E+02	5,63E+01	2,20E+01	2,31E+00	8,16E+00	6,06E+00	2,15E+00	-5,21E+01
WDP[1]	[m^3 world eq. deprived]	3,43E+00	5,00E-02	2,75E-02	3,87E-04	7,24E-03	2,10E+00	1,77E-02	-1,13E+00
Caption	GWP-total = Global Warming Potential - total; 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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use								
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.								
Disclaimer	[1] The results of this environmental 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 impacts, as declared in the project report of this EPD:

ADDITIONAL ENVIRONMENTAL IMPACTS PER m^2									
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	5,87E-06	4,22E-08	5,75E-08	8,12E-10	1,13E-08	3,45E-08	1,41E-08	-3,43E-07
IRP[2]	[kBq U235 eq.]	1,94E+00	1,58E-02	1,34E-01	5,70E-04	2,29E-03	2,11E-02	2,74E-03	-3,06E-01
ETP-fw[1]	[CTUe]	3,13E+02	4,04E+01	3,90E+00	1,66E+00	5,85E+00	1,23E+00	1,16E+00	-2,16E+01
HTP-c[1]	[CTUh]	3,99E-07	8,19E-10	1,02E-09	3,06E-11	1,19E-10	3,31E-10	1,80E-10	-2,05E-09
HTP-nc[1]	[CTUh]	2,31E-07	3,64E-08	3,15E-08	9,85E-10	5,28E-09	2,02E-08	1,90E-08	-4,27E-08
SQP[1]	-	9,36E+03	2,35E+01	1,82E+02	1,44E-02	3,41E+00	3,28E+00	5,41E-01	-5,33E+02
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)								
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.								
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.								
	[2] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.								

RESOURCE USE PER m^2									
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	5,21E+02	4,10E+00	6,35E+01	1,49E-02	5,94E-01	4,21E+00	3,51E-01	-3,67E+02
PERM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	5,21E+02	4,10E+00	6,35E+01	1,49E-02	5,94E-01	4,21E+00	3,51E-01	-3,67E+02
PENRE	[MJ]	3,89E+02	5,65E+01	2,20E+01	2,32E+00	8,19E+00	6,06E+00	2,15E+00	-5,22E+01
PENRM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	3,89E+02	5,65E+01	2,20E+01	2,32E+00	8,19E+00	6,06E+00	2,15E+00	-5,22E+01
SM	[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
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	1,12E-01	4,49E-03	1,52E-02	1,73E-05	6,50E-04	4,98E-02	5,41E-04	-4,44E-02
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 = Net use of fresh water								
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^{2}$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.								

WASTE CATEGORIES AND OUTPUT FLOWS PER m^2									
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	4,01E-09	1,75E-10	-7,95E-09	4,27E-12	2,54E-11	-9,70E-10	4,62E-11	2,07E-08
NHWD	[kg]	5,65E-01	8,62E-03	9,87E-01	0,00E+00	1,25E-03	1,43E-01	1,07E+01	-3,15E-01
RWD	[kg]	1,50E-02	1,06E-04	1,35E-03	3,87E-06	1,53E-05	1,88E-04	2,41E-05	-2,66E-03
CRU	[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
MFR	[kg]	0,00E+00	0,00E+00	1,38E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	[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
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,97E+01	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,28E+02	0,00E+00	0,00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy								
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^{2}$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.								

BIOGENIC CARBON CONTENT PER m^2		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in roof element product (T-3a)	[kg C]	9,31
Biogenic carbon content in accompanying packaging for roof element product*	[kg C]	0,58
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Additional information

LCA interpretation

The raw material which is of most importance is spruce wood, which also constitute most of the column and beam products. The manufacturing stage (A3) taking place in Denmark includes trimming, assembly and packaging the final products. These activities are not linked with high consumption of energy or waste generation, hence they are not linked with high environmental impacts as can be confirmed by the results.

Technical information on scenarios

End of life (C1-C4)

Scenario information	Value	Unit
Collected separately	21,66	kg
Collected with mixed waste	10,73	kg
For reuse	-	kg
For recycling	10,18	kg
For energy recovery	11,48	kg
For final disposal	10,73	kg
Assumptions for scenario development	-	As appropriate

Re-use, recovery and recycling potential (D)

Scenario information/Materiel	Value	Unit
Electricity from incineration	29,7	MJ
Heat from incineration	128	MJ
Wood chips (substitution)	10,2	Kg

Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.1.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.2.

References

Publisher	epddanmark www.epddanmark.dk Template version 2023.1
Programme operator	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	Mirko Miseljic Gritt Cortnum Andersen FORCE Technology Park Allé 345 2605 Brøndby, Denmark. www.forcetechnology.com FORCE TECHNOLOGY
LCA software /background data	*LCA for Experts 10.7 incl. Sphera 2023.1 & Ecoinvent 3.8 databases* https://sphera.com/product-sustainability-gabi-data-search/
3rd party verifier	Guangli Du BUILD – Institut for Byggeri, By og Miljø, Aalborg Universitet København

General programme instructions
General Programme Instructions, version 2.0, spring 2020
www.epddanmark.dk

EN 15804
DS/EN 15804 + A2:2019 - ”Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products”

EN 16485
DS/EN 16485:2014 – “Wood and wood-based products for use in construction”.

EN 15942
DS/EN 15942:2011 – ” Sustainability of construction works – Environmental product declarations – Communication format business-to-business”

ISO 14025
DS/EN ISO 14025:2010 – ” Environmental labels and declarations – Type III environmental declarations – Principles and procedures”

ISO 14040
DS/EN ISO 14040:2008 – ” Environmental management – Life cycle assessment – Principles and framework”

ISO 14044
DS/EN ISO 14044:2008 – ” Environmental management – Life cycle assessment – Requirements and guidelines”