

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804:2012+A2:2019 & ISO
14025:2006 / ISO 21930:2017

**PREFABRICATED CEILING
ELEMENT**

SVENSKA TAKELEMENT AB



<i>Programme:</i> The International EPD [®] System, www.environdec.com	<i>Programme operator:</i> EPD International AB	<i>EPD registration number:</i> S-P-07400	<i>Publication date:</i> 2022-11-02	<i>Valid until:</i> 2027-11-02	<i>Geographical scope:</i> Sweden and Norway
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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.

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer EPD-008	Svenska Takelement AB
Address	Motorgränd 44, 721 32 Västerås
Contact details	info@svenskatakelement.se
Website	https://www.svenskatakelement.se/

PRODUCT IDENTIFICATION

Product name	Prefabricated Ceiling Element
Additional label(s)	-
Product number / reference	-
Place(s) of production	Västerås, Sweden
CPC code	544 Assembly and erection of prefabricated constructions

The International EPD System

EPDs within the same product category but from different programmes may not be comparable. 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.

EPD INFORMATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

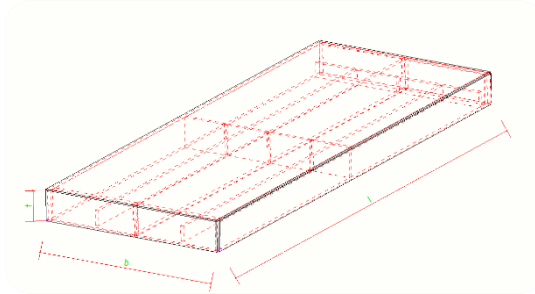
EPD program operator	EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. E-mail: info@environdec.com
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
PCR review was conducted by	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact
Product category rules	ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR). In addition, the Int'l EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021) is used.
EPD author	Georg Eriksson, Gidås Sustainability Agency
EPD verification	Independent third-party verification of the declaration and data, according to ISO 14025:2006: <input checked="" type="checkbox"/> External covering <input type="checkbox"/> Internal <input type="checkbox"/> EPD Process certification <input checked="" type="checkbox"/> EPD verification
EPD verification	Procedure for follow-up during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Third party verifier	Gloria FJ Kartikasari, PT Life Cycle Indonesia
EPD number	S-P-07400
Publication date	2022-11-02
EPD valid until	2027-11-02

PRODUCT INFORMATION

PRODUCT DESCRIPTION

The prefabricated ceiling elements are turnkey hybrid module constructions containing the following components:

- Structural plywood
- Laminated veneer lumber (LVL) with structural frames
- Waterproofing cardboard
- Galvanized steel sheet
- Mineral insulating wool



PRODUCT APPLICATION

This product is utilized as an isolated roof element in all types of constructions. Elements are delivered turnkey to the construction site and erected with prefabricated attachment links according to construction drawings. Benefits from using prefabricated elements are reduced building time, quality assured fires resistance, and construction cost effectiveness.

TECHNICAL SPECIFICATIONS

- Standard fire resistance class: REI90
- Span and heat retention tables can be found at:
<https://www.svenskakelement.se/wp-content/uploads/2020/10/Produktblad-STE-Takelement1.pdf>

PRODUCT STANDARDS

Product dimensioning is conducted according to BFS 2019: 1 European Design Standards EKS and associated Eurocode 5.

PHYSICAL PROPERTIES OF THE PRODUCT

Elements are factory produced and delivered turnkey in various dimensions depending on construction documents and client needs. For a typical standard ceiling element construction, the following dimensions apply:

- Width 2,4 m
- Length 5 – 23 m depending on selected framing system
- Beam height 200 – 600 mm
- Beam thickness: 45 mm

Detailed technical and physical information can be found at:

<https://www.svenskakelement.se/tillverkning>

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at: <https://www.svenskatakelement.se/wp-content/uploads/2020/10/Produktblad-STE-Takelement1.pdf>

PRODUCT MATERIAL COMPOSITION

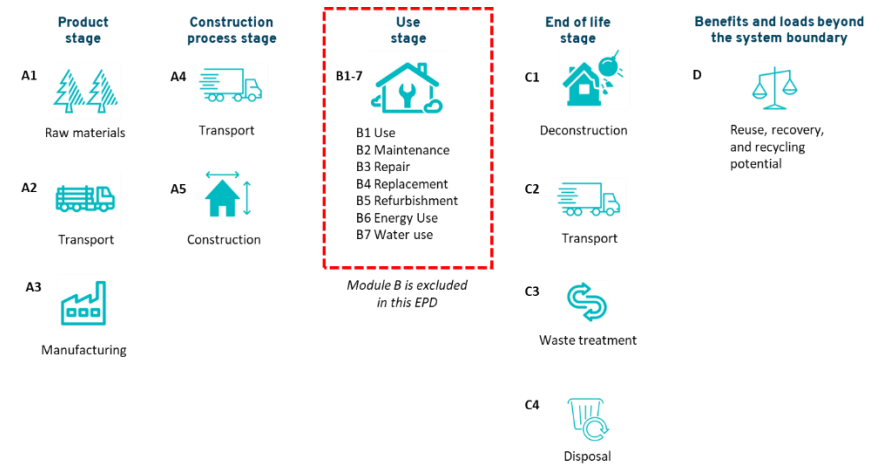
Product Components	Weight, kg	Post-consumer %	Renewable %	Country Region of origin
Wood materials	25,72	0%	100%	Nordic
Stone wool	11,91	0%	0%	Nordic
Steel	4,64	92%	20%	Nordic
Waterproofing	2,50	0%	0%	Nordic
Polyurethane adhesive	0,08	0%	0%	Nordic
Total	44,85	9,5%	59%	-

Packaging Materials	Weight, kg	Weight-% versus the product	Renewable %	Country Region of origin
Polyethylene	0,28	0,6%	0%	Nordic
Polyester straps	0,29	0,6%	0%	Nordic
Softwood beams	0,80	1,8%	100%	Nordic
Total	1,37	3%	58%	-

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

SYSTEM DIAGRAM



PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The product stage A1-A3 includes:

- Upstream raw material acquisition, transport, and processing of product components
- Transport of product components to manufacturing plant
- The production process at the manufacturing plant including energy and electricity consumption. Electricity consumption consists of 100% certified wind power generation and equals 0,0172 kg CO₂e/kWh.
- Waste generation from the production process including waste processing up to the end-of-waste state or disposal of waste residues
- Production of packaging

Relevant upstream material, transport and processes of the product components were primarily acquired from product specific EPD data. EPDs not fulfilled according to the standards EN 15804+A1 and +A2 received further modelling with generic data for A1+A2 compliance and representation.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The construction stage A4-A5 includes:

- Product transport to construction site (A4)
- Installation to the building (A5)

The transport in A4 was modelled according to the total annual produced, delivered units (in m²) and the total annual transport-to-site distance based on the reference year to obtain an average distance per declared unit.

Packaging waste is considered in module A5.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The end-of-life stage C1-C4 & D includes:

- Deconstruction/demolition (C1)
- Transport to waste management facility (C2)
- Waste processing for reuse, recovery and/or recycling (C3)
- Waste disposal (C4)

Waste processing and disposal credits are assigned to module D.

Module D includes reuse, recovery and/or recycling potentials conveyed as benefits and net impacts.

MANUFACTURING PROCESS

First, construction drawings, span width documents and specifications are developed. Second, materials are ordered and delivered to factory site in Västerås (SE). Third, wooden materials are sawn according to construction drawings. Metal is cut, and insulation is shaped to fit the ceiling element hybrid construction. Ceiling Elements are assembled on construction tables at the factory and later removed for packaging. Finally, elements are packaged and stored awaiting delivery to construction site.

Internal transport at factory level is conducted using electric four-way reach trucks. The manufacturing plant purchases electricity from 100% certified Wind power generation.

The client erects the element single-handed according to construction documents. Elements are linked together with prefabricated attachment points to fit any construction type. When elements are assembled, they form a weather proofed roof protecting the building form rain and temperature.

All wood used in product is assumed to be harvested sustainably and the wood in the studied system thus fulfils the criterium of biogenic carbon neutrality over its life cycle. Forestry takes approximately 100 years in Sweden from seed to harvest.

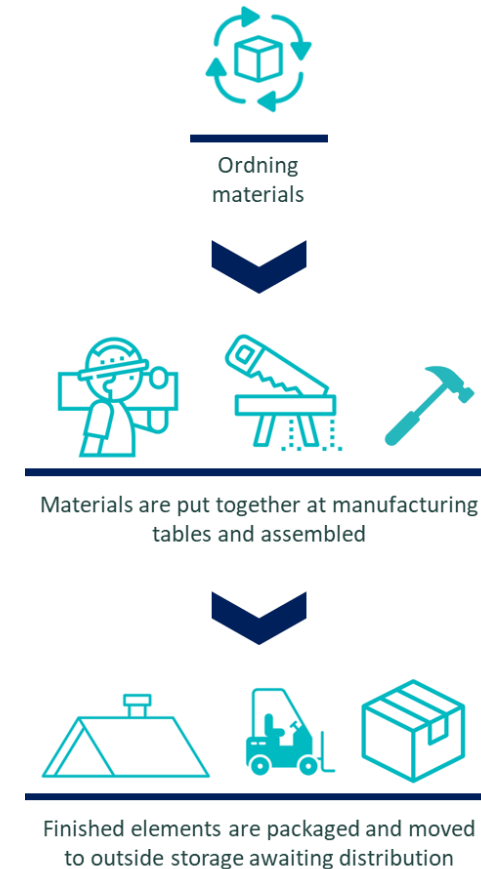


Figure 1, manufacturing of prefabricated ceiling elements is conducted in Västerås Sweden.

LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	Calendar year 2021
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DECLARED UNIT

Declared unit	1 m ²
Mass per declared unit	44,85 kg
Reference service life	>70 years

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	13,09
Biogenic carbon content in packaging, kg C	0,36

SYSTEM BOUNDARY

The system boundaries are described in the system diagram. The environmental Product Declaration (EPD) shows the environmental performance of the product through its life cycle stages from cradle to gate to end of life. The life cycle stages are product stage (A1-A3), construction

process stage (A4-A5), end-of-life stage (C1-C4) and Benefits and loads beyond the system boundary (D).

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage			
	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	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D	
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X	X	X	
Geography	SE	SE	SE	SE	SE	ND	ND	ND	ND	ND	ND	ND	SE	SE	SE	SE	SE	SE	SE	
Specific data used	87%					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation products	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation sites	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The analyzed system is the life cycle of 1 m2 turnkey prefabricated ceiling element.
Modules Declared = X. Modules not declared = ND.

ALLOCATION, ESTIMATES AND AVERAGES

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 -standard.

Mass allocation was utilised for manufacturing waste since detailed data was not available from the supplier. Mass allocations of Laminated Veneer Lumber was used for transportation volumes in module A2 because of multiple suppliers.

Distances for manufacturing waste (A3), Construction waste (A5) and end-of-life (C2) waste transportation are average distances based on literature since detailed information was not available.

Installation resources (A5) are estimated based on literature since detailed specific data was unavailable. Estimates was further made for

disassembling in module C1. All estimates and averages have an overall quality impact on the study.

ASSUMPTIONS AND VARIABILITY

Site-specific data from the reference year acted as the primary source of collection. If inputs or outputs were unknown or unavailable, industry-based and/or similar product EPD datasets were utilized for full compliance with EN 15804 +A1 and +A2.

Modelling of data was primarily based on product specific EPDs. Where manufacturer specific data are missing generic data from Ecoinvent was used. This is mostly due to lack of supplier specific data for EN15804+A2 datasets. When generic data was used a systematic assessment was carried out.

The utilization rate of the vehicle capacity is assumed to be 70% where this capacity utilization includes returns. Large truck medium-sized truck (EURO 6, 16–32 tons) has been adopted within all transport modules in the analysis. The waste fractions are assumed to go directly to the nearest facility for final disposal, which is assumed to 15 km as a representative distance in Sweden according to Saxton (2013).

Variation between +A1 impact results and +A2 is 2,8% which is below the 10% limit according to the programme operator.

Since specific data was unavailable, it is generally assumed that material yield for module D is 100% for recycled steel. No energy recovery has been applied due to landfill in module D as it is assumed to be negligible.

ENVIRONMENTAL IMPACT DATA

Note: additional environmental impact data may be presented in annexes.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO ₂ eq	1,34E+01	4,11E+00	7,58E+00	2,51E+01	7,56E-02	4,41E+00	ND	ND	ND	ND	ND	ND	ND	1,91E+00	1,10E-01	4,33E+01	6,51E-01	1,02E+01
GWP – fossil	kg CO ₂ eq	4,29E+01	4,11E+00	3,19E+00	5,02E+01	7,55E-02	3,09E+00	ND	ND	ND	ND	ND	ND	ND	1,88E+00	1,10E-01	2,61E-01	6,46E-01	-2,81E+01
GWP – biogenic	kg CO ₂ eq	-2,96E+01	1,87E-03	4,38E+00	-2,52E+01	4,06E-05	1,32E+00	ND	ND	ND	ND	ND	ND	ND	9,82E-03	5,91E-05	4,31E+01	4,31E-03	3,84E+01
GWP – LULUC	kg CO ₂ eq	4,10E-02	1,60E-03	3,38E-03	4,60E-02	2,73E-05	2,42E-03	ND	ND	ND	ND	ND	ND	ND	1,58E-02	3,97E-05	5,19E-04	7,66E-05	-5,06E-02
Ozone depletion potential	kg CFC ₁₁ eq	2,14E-06	9,23E-07	1,53E-07	3,21E-06	1,72E-08	3,05E-07	ND	ND	ND	ND	ND	ND	ND	4,73E-07	2,50E-08	3,09E-08	5,05E-08	-1,63E-06
Acidification potential	mol H ⁺ eq	6,13E-01	2,53E-02	1,39E-02	6,52E-01	2,17E-04	1,42E-02	ND	ND	ND	ND	ND	ND	ND	1,83E-02	3,15E-04	1,54E-03	1,52E-03	-2,04E-01
EP-freshwater ³⁾	kg Peq	1,69E-03	3,30E-05	1,20E-04	1,85E-03	6,42E-07	8,78E-06	ND	ND	ND	ND	ND	ND	ND	2,40E-05	9,35E-07	2,40E-05	7,49E-06	-1,42E-03
EP-marine	kg Neq	5,77E-02	5,77E-03	2,81E-03	6,63E-02	4,31E-05	6,24E-03	ND	ND	ND	ND	ND	ND	ND	7,86E-03	6,27E-05	2,69E-04	6,02E-04	-2,51E-02
EP-terrestrial	mol Neq	2,10E+00	6,42E-02	3,33E-02	2,20E+00	4,80E-04	6,85E-02	ND	ND	ND	ND	ND	ND	ND	8,67E-02	6,99E-04	3,17E-03	4,02E-03	-2,96E-01
POCP (“smog”)	kg NMVOCeq	2,01E-01	1,95E-02	1,21E-02	2,32E-01	1,84E-04	1,88E-02	ND	ND	ND	ND	ND	ND	ND	2,37E-02	2,68E-04	8,56E-04	1,37E-03	-9,94E-02
ADP-minerals & metals	kg Sbeq	5,28E-02	1,04E-04	2,22E-04	5,32E-02	2,08E-06	2,94E-06	ND	ND	ND	ND	ND	ND	ND	6,40E-06	3,03E-06	1,38E-06	1,73E-06	-3,46E-04
ADP-fossil resources	MJ	9,71E+02	6,11E+01	6,53E+01	1,10E+03	1,14E+00	2,26E+01	ND	ND	ND	ND	ND	ND	ND	5,08E+01	1,66E+00	5,38E+00	3,22E+00	-3,43E+02
Water use ²⁾	m ³ eq depr.	1,34E+01	1,92E-01	1,62E+00	1,52E+01	3,73E-03	9,17E-02	ND	ND	ND	ND	ND	ND	ND	4,03E-01	5,44E-03	8,65E-02	1,39E-01	-6,83E+00

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) EN 15804+A2 disclaimer: the results for Abiotic depletion, Water use and optional indicators except Particulate matter, and Ionizing radiation human health, these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicators mentioned (Frischknecht et al., 2000). 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO₄eq.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	4,40E-06	2,47E-07	1,69E-07	4,82E-06	4,81E-09	3,68E-07	ND	ND	ND	ND	ND	ND	ND	4,66E-07	7,00E-09	9,13E-09	2,08E-08	-2,05E-06
Ionizing radiation ³⁾	kBq U235eq	1,14E+00	2,67E-01	9,94E-01	1,51E+00	5,00E-03	2,21E-01	ND	ND	ND	ND	ND	ND	ND	1,07E+00	7,26E-03	4,27E-02	1,20E-02	-3,06E+00
Ecotoxicity (freshwater)	CTUe	1,24E+03	4,65E+01	4,70E+01	1,33E+03	8,86E-01	1,27E+01	ND	ND	ND	ND	ND	ND	ND	2,37E+01	1,29E+00	3,29E+00	6,89E+00	-9,17E+02
Human toxicity, cancer	CTUh	1,77E-07	1,47E-09	1,85E-09	1,80E-07	2,55E-11	4,77E-10	ND	ND	ND	ND	ND	ND	ND	7,04E-10	3,71E-11	1,24E-10	1,81E-10	-4,48E-08
Human tox. non-cancer	CTUh	1,35E-06	4,97E-08	3,96E-08	1,44E-06	9,68E-10	1,26E-08	ND	ND	ND	ND	ND	ND	ND	1,69E-08	1,41E-09	3,04E-09	6,27E-09	7,13E-07
SQP	-	8,39E+01	4,70E+01	6,45E+00	1,37E+02	9,67E-01	6,21E-01	ND	ND	ND	ND	ND	ND	ND	1,00E+00	1,41E+00	1,47E+00	5,43E+00	-3,38E+01

SQP = Land use related impacts/soil quality. EN 15804+A2 disclaimer for Ionizing radiation, human health: 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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renewable PER ¹ as energy	MJ	5,92E+02	8,28E-01	3,33E+01	6,26E+02	1,63E-02	2,10E+00	ND	ND	ND	ND	ND	ND	ND	1,36E+01	2,38E-02	7,75E-01	7,23E-02	-1,02E+02
Renewable PER as material	MJ	6,02E+02	0,00E+00	2,13E+01	6,24E+02	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00+0E0
Total use of renewable PER	MJ	1,19E+03	8,28E-01	5,46E+01	1,25E+03	1,63E-02	2,10E+00	ND	ND	ND	ND	ND	ND	ND	1,36E+01	2,38E-02	7,75E-01	7,23E-02	-1,02E+02
Non-renewable PER as energy	MJ	5,49E+02	6,12E+01	5,19E+01	6,6E+02	1,14E+00	2,26E+01	ND	ND	ND	ND	ND	ND	ND	5,08E+01	1,66E00	5,38E+00	3,22E+00	-3,43E+02
Non-renewable PER as material	MJ	6,85E+01	0,00E+00	1,34E+01	8,19E+01	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable PER	MJ	6,18E+02	6,12E+01	6,53E+01	7,44E+02	1,14E+00	2,26E+01	ND	ND	ND	ND	ND	ND	ND	5,08E+01	1,66E+00	5,38E+00	3,22E+00	-3,43E+02
Secondary materials	kg	1,24E+00	0,00E+00	7,05E-03	1,25E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,90E+00

USE OF NATURAL RESOURCES - CONTINUED

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renewable secondary fuels	MJ	9,72E-01	0,00E+00	0,00E+00	9,72E-01	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels	MJ	9,61E-04	0,00E+00	0,00E+00	9,61E-04	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m3	1,87E-01	1,01E-02	3,82E-02	2,36E-01	1,97E-04	3,13E-03	ND	ND	ND	ND	ND	ND	ND	9,32E-03	2,87E-04	2,15E-03	3,31E-03	-1,14E-01

1) PER = Primary Energy Renewable

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	9,53E-01	6,32E-02	2,24E-01	1,24E+00	1,17E-03	3,47E-02	ND	ND	ND	ND	ND	ND	ND	4,55E-02	1,71E-03	0,00E+00	3,93E-02	-4,34E+00
Non-hazardous waste	kg	2,02E+01	4,00E+00	7,86E+00	3,20E+01	8,09E-02	8,93E-01	ND	ND	ND	ND	ND	ND	ND	8,72E-01	1,18E-01	0,00E+00	1,48E+01	-3,18E+01
Radioactive waste	kg	6,17E-03	4,20E-04	1,67E-04	6,76E-03	7,82E-06	1,86E-04	ND	ND	ND	ND	ND	ND	ND	5,54E-04	1,14E-05	0,00E+00	1,78E-05	-1,62E-03

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	1,37E-03	0,00E+00	0,00E+00	1,37E-03	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	1,70E-03	0,00E+00	6,10E-01	6,12E-01	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	4,27E+00	1,19E+01	0,00E+00
Materials for energy recovery	kg	3,92E-04	0,00E+00	2,04E+00	2,04E+00	0,00E+00	2,31E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	1,88E+01	0,00E+00	0,00E+00
Exported energy	MJ	2,17E-01	0,00E+00	0,00E+00	2,17E-01	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq	4,29E+01	4,11E+00	3,19E+00	5,02E+01	7,55E-02	3,09E+00	ND	ND	ND	ND	ND	ND	ND	1,88E+00	1,10E-01	2,61E-01	6,46E-01	-2,81E+01

8) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013) This indicator is almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

ENERGY DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	LCA inventory for wind energy (OneClickLCA 2016)
Electricity kg CO ₂ eq / kWh	0,0172
District heating data source and quality	Locally specific (Västerås) according to Energiföretagen and Ecoinvent 3.3 (2019)
District heating CO ₂ eq / kWh	0,0667

BIBLIOGRAPHY

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EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services

Int'l EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021)

Prefabricated Ceiling Element LCA Background report 20.08.2022

R., Frischknecht, A., Braunschweig, P., Hofstetter, and P., Suter, 2000, Human health damages due to ionising radiation in life cycle impact assessment, *Environmental Impact Assessment Review*, Vol 20(2), pp. 159-189



ABOUT THE MANUFACTURER

Svenska Takelement AB is a family-owned company that specialises in prefabricated ceiling elements. The product has been developed for years and tested in various conditions to ensure first-class durability and quality. Advantages with prefabricated ceiling elements are reduced building time and cost. Simultaneously, a prefabricated roof enables weather proofing of any construction quicker than many alternatives which protects the construction and may prolong its lifetime. Svenska Takelement AB is situated in Västerås, Sweden.

EPD AUTHOR AND CONTRIBUTORS

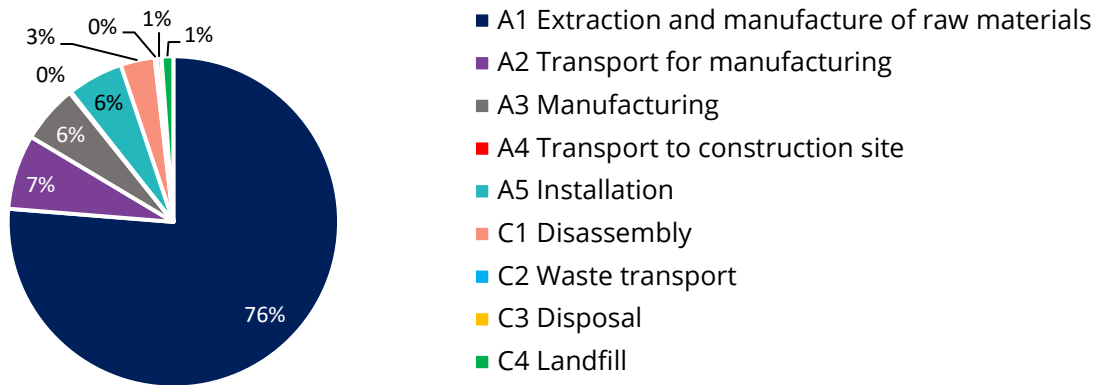
Manufacturer	Svenska Takelement AB
EPD author	Georg Eriksson, Gidås Sustainability Agency
EPD verifier	Gloria FJ Kartikasari, PT Life Cycle Indonesia
EPD program operator	The International EPD System
Background data EPD-034	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for wood products

ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

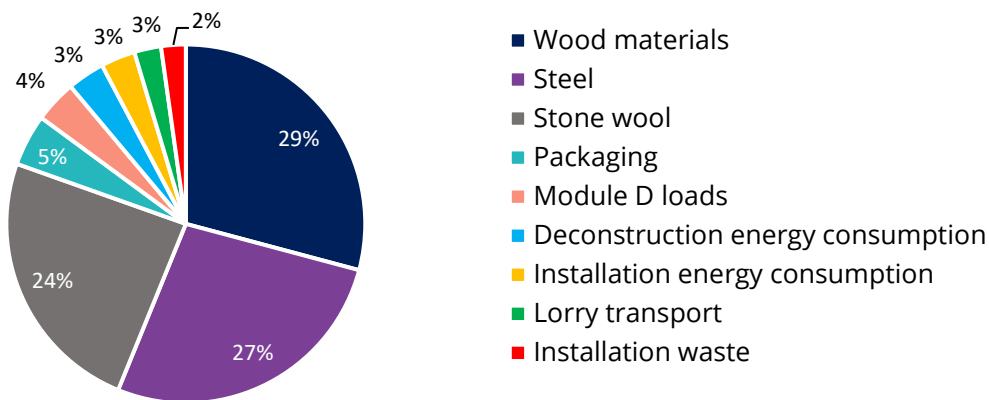
Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ eq	4,10E+01	4,07E+00	3,83E+00	4,89E+01	7,48E-02	3,08E+00	ND	ND	ND	ND	ND	ND	ND	1,88E+00	1,09E-01	2,56E-01	5,32E-01	-2,72E+01
Ozone depletion Pot.	kg CFC ₁₁ eq	1,44E-06	7,34E-07	1,69E-07	2,35E-06	1,37E-08	2,56E-07	ND	ND	ND	ND	ND	ND	ND	4,72E-07	1,99E-08	3,17E-08	5,07E-08	-1,61E-06
Acidification	kg SO ₂ eq	1,96E-01	1,92E-02	1,68E-02	2,32E-01	1,52E-04	2,26E-03	ND	ND	ND	ND	ND	ND	ND	3,27E-03	2,22E-04	1,19E-03	1,46E-02	-1,78E-01
Eutrophication	kg PO ₄ ³ eq	4,05E-02	2,85E-03	5,60E-03	4,90E-02	3,15E-05	5,76E-04	ND	ND	ND	ND	ND	ND	ND	9,36E-04	4,58E-05	7,68E-04	1,49E-02	-4,63E-02
POCP ("smog")	kg C ₂ H ₄ eq	1,51E-02	7,44E-04	1,08E-03	1,69E-02	9,11E-06	2,10E-04	ND	ND	ND	ND	ND	ND	ND	2,88E-04	1,33E-05	5,24E-05	1,86E-04	-1,10E-02
ADP-elements	kg Sbeq	1,11E-03	1,04E-04	2,22E-04	1,43E-03	2,08E-06	2,94E-06	ND	ND	ND	ND	ND	ND	ND	6,40E-06	3,03E-06	1,38E-06	1,73E-06	-3,46E-04
ADP-fossil	MJ	5,52E+02	6,11E+01	6,53E+01	6,79E+02	1,14E+00	2,26E+01	ND	ND	ND	ND	ND	ND	ND	5,08E+01	1,66E+00	5,38E+00	3,22E+00	-3,43E02

ANNEX 2: LIFE-CYCLE ASSESSMENT RESULT VISUALIZATIONS

Global warming potential - Life cycle stages



Global warming potential fossil kg CO₂eq - Classifications



CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

