

Environmental Product Declaration

 **EPD**®
THE INTERNATIONAL EPD® SYSTEM



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

BS FALSEN and BS FALSEN Z (EN:Rebate) (DK:Pladefals)

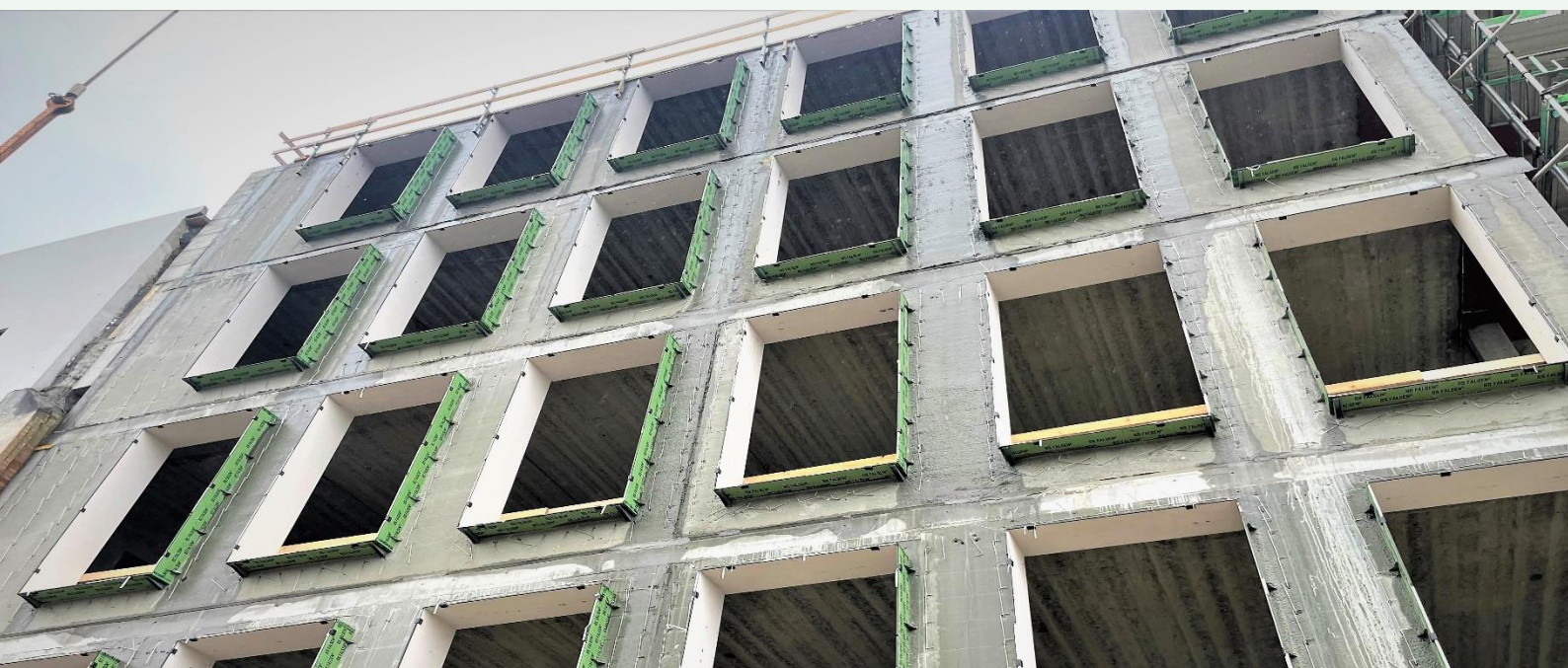
from

BS FALSEN



Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-11470
Publication date:	2023-12-29
Valid until:	2028-12-28

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

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804+A2 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <i>Construction products 2019:14 Version 1.2.5,2022-11-20;</i>
PCR review was conducted by: <i>Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se</i>
Life Cycle Assessment (LCA)
LCA accountability: <i>Augustas Sudaras, Green Survey ApS www.greensurvey.dk</i>
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by individual verifier Third-party verifier: <i>Sigita Židonienė, PhD., Vesta Consulting, Sigita@vestaconsulting.lt</i> Approved by: The International EPD® System
OR
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804+A2, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same 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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804+A2 and ISO 14025.

Company information

Owner of the EPD: BS FALSEN ApS

Contact: Lars Mølgård

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Description of the organisation: The company is located near Odder in Jutland and has existed since 1999. The idea behind rebate production arose when the existing rebate elements at the time had difficulty meeting the stricter requirements in terms of both the working environment and insulation. The companies are owned by Bent Sørensen and his sons Lars Mølgård and Jens Peter Fogt. Bent Sørensen has many years of experience in construction. He started in the industry in 1975 and has continuously followed developments in construction, energy optimisation and innovation.

Name and location of production site(s): Malskærvej 3, Odder, 8300, Denmark.

Product information

Product name: BS FALSEN Z

Environmental Product Declaration (EPD): This EPD covers both BS FALSEN and BS FALSEN Z, with 'BS FALSEN Z' serving as the representative product. This choice is based on a conservative worst-case scenario for GWP-GHG emissions, ensuring compliance with applicable construction product PCRs. The GWP-GHG results for both products in lifecycle stages A1-A3 are within a 10% variance, affirming the suitability of 'BS FALSEN Z' as the representative.

Product description: BS FALSEN Z is a newly developed rebate (Danish name: **Pladefals**) solution for installation in rear wall elements. The plate rebate can replace the traditional concrete casting, traditional plate rebate. The panel rebate comes with insulation strips, BS support angles, spacer blocks for window and door installation, and a vapour barrier attached.

UN CPC code: 3756 – Other articles of cement, concrete, or artificial stone

Geographical scope: Europe

LCA information

Declared unit: 1m² with average density of 13.78 kg/m².

Reference service life: >50 years

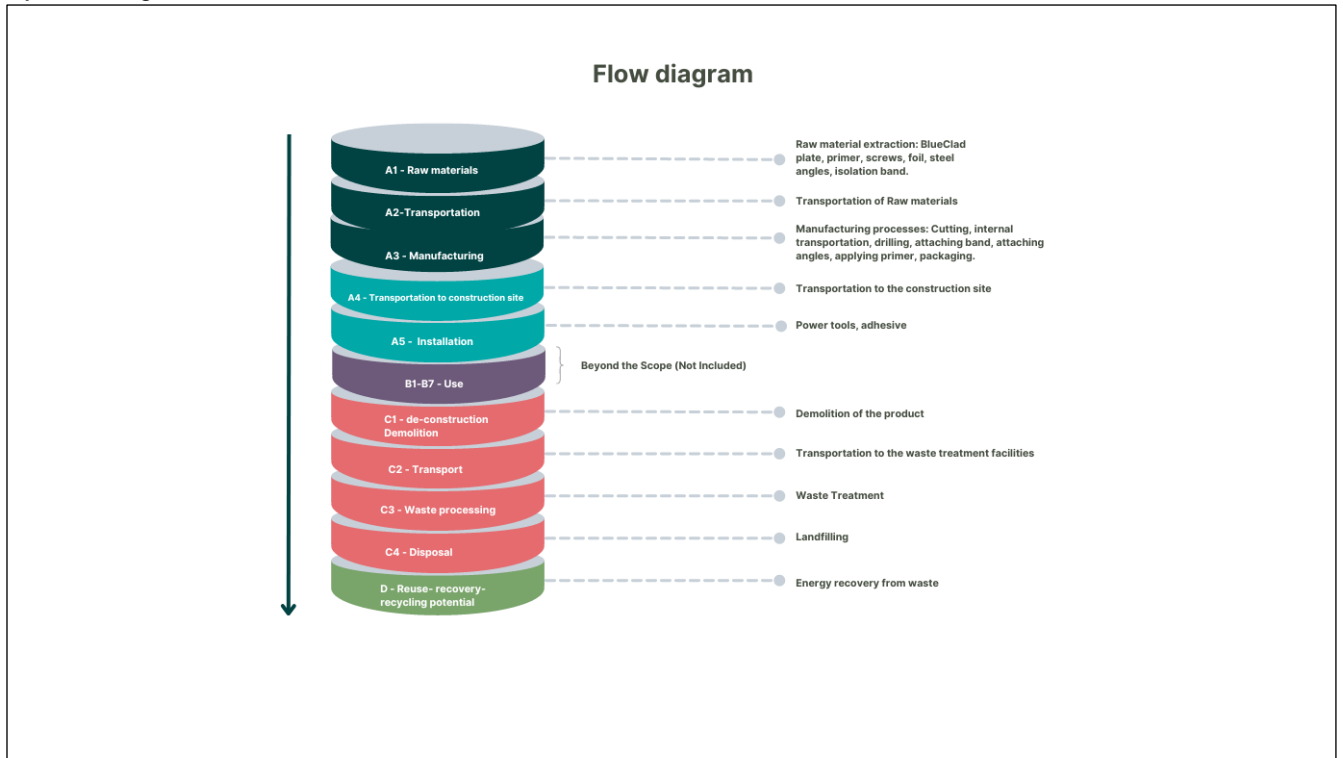
Time representativeness: 2022

Database(s) and LCA software used: SimaPro 9.5.0.2 and Ecoinvent 3.9.1

Description of system boundaries:

Cradle to gate with options (A1–A3 and A4 and A5). A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing) A4 (Transportation), A5 (Construction Installation) as well as C1 (Deconstruction), C2 (transport at end-of-life), C3 (Waste processing) and C4 (Disposal) in addition, module D – benefits and loads beyond the system boundary is included.

System diagram:



Data quality: The foreground data collected internally is based on yearly production amounts and extrapolations of measurements on specific machines and plants. Overall, the data quality can be described as good. The primary data collection has been done thoroughly.

Cut-off criteria: Life cycle inventory data for a minimum of 99% of total material and energy inputs flows have been included in the life cycle analysis.

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

	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-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	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	EU	EU	DK	EU	DK	-	-	-	-	-	-	-	DK	GLO	DK	DK	DK
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0			-	-	-	-	-	-	-	-	-	-	-	-	-	-
System boundary (X = included in LCA; MND = module not declared)																	

Product stage:

A1: This module considers the extraction and processing of raw materials and energy consumption.

A2: The raw materials are transported to the manufacturing plant. In this case the model includes road and sea transportation for the raw materials.

A3: This module encompasses the manufacturing process of BS FALSEN Z, including product fabrication and packaging. It accounts for energy use and waste generation at the production facility.

Key steps include:

- **Cutting Plates to Width and Pre-stocking:**
 - The plates are first cut to the required width.
 - Pre-stocking of the cut plates is done to prepare for further assembly stages.
- **Sawing Operations:**
 - Sawing equipment is used for precise cutting as per the design specifications.
- **Material Handling:**
 - Automatic roller tables facilitate the smooth movement of materials through the production line.
 - Scissor tables adjust the height of the materials for ergonomic handling.
 - Vacuum lifters are employed to transport plates securely and efficiently.
- **Dust Management:**

- Extraction machines are integral to the process, removing dust generated during cutting and sawing, ensuring a clean production environment and adherence to health and safety standards.
- **Cutting Plates to Length:**
 - Plates are cut to the desired length after width sizing.
- **Drilling Operations:**
 - Drilling holes as required for installment into the building.
- **Foil Application:**
 - A foil machine with an automatic roller table applies the foil to the plates, a step that is unique to the BS FALSEN Z product line.

A4: Transportation to the construction site was estimate that on average is 150km.

A5: Instalation of the BS FALSEN Z

- Preparation of Adhesive: The specific glue designed for binding to concrete is prepared by combining it with water at a precise ratio of 0.24 liters of water per kilogram of glue. The total amount used for the installation is 2.5 kg of glue. This mixture ensures optimal adhesion between the plates and the concrete surface.
- Drilling into Concrete: Prior to attaching the plates, holes must be drilled into the concrete wall. This is done using a portable 18V electric drill. The precision and depth of the holes are crucial for the stability of the plates.
- Attachment of Plates: The plates are then secured to the concrete wall using screws. On average, you will need about six screws per square meter of the plate to ensure a firm and safe installation.
- Screwing: The screws are inserted into the pre-drilled holes using the same portable 18V electric drill, switched to a screwing mode or with an appropriate attachment. This process requires care to avoid stripping the screws or damaging the plates.

End of Life stage:

C1: Demolition of the building

C2: Transport of the discarded product to the processing site. It is estimated that there is no mass loss during the use of the product, therefore, the end-of-life product is assumed that it has the same weight as the declared product. All the end-of-life products are being sent to the incineration according to the Danish waste management infrastructure on average is assumed to be 90 km distance and the transportation method is lorry which is the most common.

C3: No input.

C4: It is assumed that 100% of the product is collected at the construction site and sent to landfill.

D: Reuse, recovery and/or recycling potential. No inputs

Content information

Product components	Weight, kg	Percentage of the product composition - %	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Blueclad board	12,9	93.61 %	0	0
Screws	0,00892	0.06 %	0	0
Pro foil	0,184	1.34%	0	0
Primer	0,0243	0.18 %	0	0
Montage Ekstra 292	0,05	0.35 %	0	0
Steel Angels	0,582	4.22 %	0	0
Illbruck TP600 band	0,035	0.24 %	0	0
TOTAL	13,78	100%	0	0
Packaging materials	Weight, kg	Percentage of the product composition - %	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
PVC Film	0.0138	100%	0.1%	0

No dangerous substances from the candidate list of SVHC for Authorisation are present in concentrations greater than 0.1% by weight in the product

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804+A2

Results per Declared Unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1,28E+01	3,82E-01	1,07E+00	3,57E+00	1,47E-01	0,00E+00	9,90E-02	0,00E+00
GWP-biogenic	kg CO ₂ eq.	-1,43E+00	3,50E-04	3,43E-02	8,20E-04	1,17E-04	0,00E+00	1,59E+00	0,00E+00
GWP-luluc	kg CO ₂ eq.	6,13E-03	1,89E-04	1,50E-03	4,02E-04	7,17E-05	0,00E+00	5,98E-05	0,00E+00
GWP-total	kg CO ₂ eq.	1,14E+01	3,82E-01	1,11E+00	3,57E+00	1,47E-01	0,00E+00	1,69E+00	0,00E+00
ODP	kg CFC ₁₁ eq.	1,22E-07	8,32E-09	9,42E-08	5,68E-08	3,34E-09	0,00E+00	2,87E-09	0,00E+00
AP	mol H ⁺ eq.	2,81E-02	8,35E-04	4,68E-03	3,31E-02	3,64E-04	0,00E+00	7,46E-04	0,00E+00
EP-freshwater	kg P eq.	6,56E-04	2,71E-05	1,29E-04	1,10E-04	1,08E-05	0,00E+00	8,24E-06	0,00E+00
EP-marine	kg N eq.	8,16E-03	2,11E-04	1,61E-03	1,53E-02	9,91E-05	0,00E+00	2,86E-04	0,00E+00
EP-terrestrial	mol N eq.	8,63E-02	2,14E-03	1,26E-02	1,67E-01	1,02E-03	0,00E+00	3,07E-03	0,00E+00
POCP	kg NMVOC eq.	4,15E-02	1,30E-03	3,53E-03	4,94E-02	5,94E-04	0,00E+00	1,07E-03	0,00E+00
ADP-minerals&metals*	kg Sb eq.	6,96E-05	1,25E-06	4,26E-06	1,25E-06	4,11E-07	0,00E+00	1,37E-07	0,00E+00
ADP-fossil*	MJ	1,64E+02	5,42E+00	8,65E+00	4,68E+01	2,23E+00	0,00E+00	2,47E+00	0,00E+00
WDP*	m ³	2,18E+00	2,24E-02	1,24E-01	1,01E-01	1,06E-02	0,00E+00	1,09E-01	0,00E+00
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 of these results are high or as there is limited experience with the indicator.

Disclaimer: 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.

Additional mandatory and voluntary impact category indicators

Results per Declared Unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	1,28E+01	3,82E-01	1,07E+00	3,57E+00	1,47E-01	0,00E+00	9,90E-02	0,00E+00

*This method is based on the final government distribution version of the IPCC report 'AR6 Climate Change 2021. This version of the method excludes CO₂ uptake and biogenic CO₂ emissions.

Resource use indicators

Results per Declared Unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,91E+00	2,10E-02	1,60E-01	5,39E-02	7,39E-03	0,00E+00	6,16E-03	0,00E+00
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	1,91E+00	2,10E-02	1,60E-01	5,39E-02	7,39E-03	0,00E+00	6,16E-03	0,00E+00
PENRE	MJ	2,59E+01	5,77E+00	5,48E+00	4,97E+01	2,37E+00	0,00E+00	6,15E+00	0,00E+00
PENRM	MJ	1,33E+02	0,00E+00	3,53E+00	0,00E+00	0,00E+00	0,00E+00	1,29E+02	0,00E+00
PENRT	MJ	1,59E+02	5,77E+00	9,00E+00	4,97E+01	2,37E+00	0,00E+00	1,36E+02	0,00E+00
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	1,93E+00	7,81E-04	1,14E-01	3,67E-03	3,61E-04	0,00E+00	2,62E-03	0,00E+00

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.

Acronyms	<p>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</p>
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Waste indicators

Results per Declared Unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,86E-03	1,36E-04	3,87E-04	4,08E-04	6,21E-05	0,00E+00	3,03E-05	0,00E+00
Non-hazardous waste disposed	kg	5,75E+00	2,69E-01	4,29E-02	1,62E+01	1,95E-01	0,00E+00	1,63E+01	0,00E+00
Radioactive waste disposed	kg	4,26E-05	1,78E-06	2,77E-06	5,13E-06	6,79E-07	0,00E+00	3,64E-07	0,00E+00

Output flow indicators

Results per Declared Unit									
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	0,00E+00	0,00E+00	5,75E-02	0,00E+00	0,00E+00	0,00E+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	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Information on biogenic carbon content

BIOGENIC CARBON CONTENT PER DECLARED UNIT		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0
Biogenic carbon content in accompanying packaging	[kg C]	0
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

Additional environmental information

Manufacturing energy scenario documentation

Energy Source	Method	Kg CO ₂ eq/kWh
Danish Electricity Country mix	IPCC 2021	0.0587

References

General Programme Instructions of the International EPD® System. Version 4.0.

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

PCR 2019:14 Construction products (version 1.2.5)

BS FALSEN Z for construction from BS FALSEN ApS LCA background report. 2023 December

