

Environmental Product Declaration

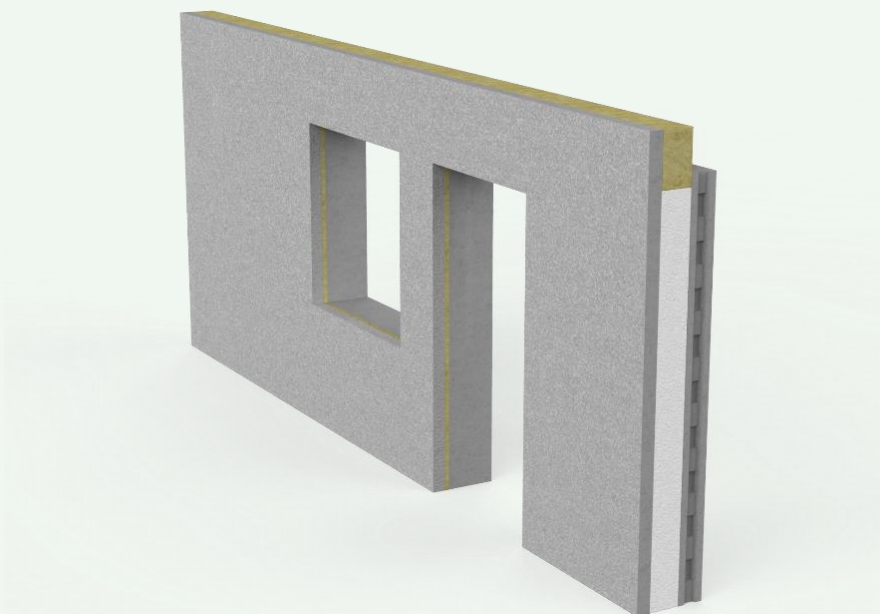


In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Solid precast concrete insulated wall (Sandwich)

from

Gripen Betongelement AB



Programme:

Programme operator:

EPD registration number:

Publication date:

Valid until:

The International EPD® System, www.environdec.com

EPD International AB

S-P-02098

2023-07-12

2028-07-12

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
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR): PCR 2019:14, v.1.2.5 Construction Products and Construction Services, c-PCR-003, version 2023-01-02. UN CPC code 37550 - Articles of concrete, cement and plaster

PCR review was conducted by: The Technical Committee of the International EPD® System. Chair of the PCR review is Claudia A. Peña. The review panel may be contacted via info@environdec.com

Life Cycle Assessment (LCA)

LCA accountability: Emmy Isbring, WSP Sverige AB

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☒ EPD verification by individual verifier



Third-party verifier: Martin Erlandsson, IVL Svenska Miljöinstitutet

Approved by: The 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 registered in different EPD programmes, or not compliant with EN 15804, 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 and ISO 14025.



Company information

Owner of the EPD: Gripen Betongelement AB

Contact: Anders Olofsson, phone +46 (0)703 848 716, anders.olofsson@gripenbetong.se. Gripen Betongelement AB, Stekelgatan 4 A, 212 23 Malmö, Sweden.

Description of the organisation: Gripen Betongelement offers a wide range of precast concrete products used in various buildings on the Swedish market.

Product-related or management system-related certifications: All products are CE-certified by CERTBUD. It guarantees that all products fulfil all their technical requirements and that all products are manufactured according to current building norms. See <https://gripenbetong.se/om-oss.aspx> for more information

Name and location of production site(s): Precast concrete products are manufactured at Gripen Betongelement production sites in Kartoszyno in Poland.

About the Company

Gripen Betongelement AB manufactures prefabricated concrete frames.

The two production facilities are located on the same site in Kartoszyno in Poland and have been producing high quality concrete frames since 1995. Gripen Betongelement build on the trust of some of Sweden's largest builders and have delivered elements to hundreds of buildings over the years.

Gripen Betongelement have solutions for all types of buildings, such as apartment buildings, townhouses, industrial halls, offices etc. Gripen Betongelement has an integrated organization and a well-worked working model. This means that they can work efficiently - with fast deliveries, high product quality and economically sustainable solutions.



Product information

Product name: Solid precast concrete insulated wall (sandwich).

Product description: Gripen Betongelement exterior sandwich walls have an inner load-bearing layer of concrete, intermediate thermal insulation and an outer layer of concrete as facade. The wall comes with embedded conduits for installations and can be delivered with different surface finishing from the factory.

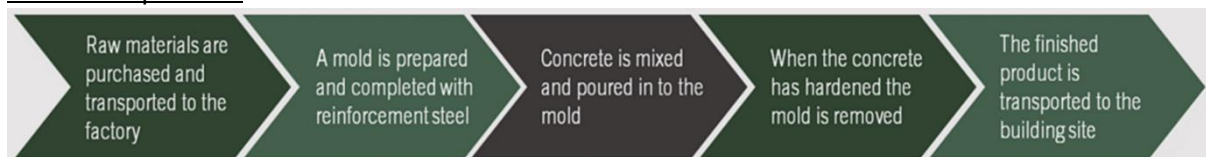
The smooth moulded sides are easy to paint and wallpaper, has a very low U-value and can be obtained with different types of insulation, such as white styrofoam, gray styrofoam, PIR or Kooltherm.

Technical data: Products are manufactured according to technical data in customer design specification. Products are CE-certified by CERTBUD, and BBC by Nordcert which guarantees that they fulfil all their technical requirements and are manufactured according to current building norms. See <https://gripenbetong.se/om-oss.aspx> for more information.

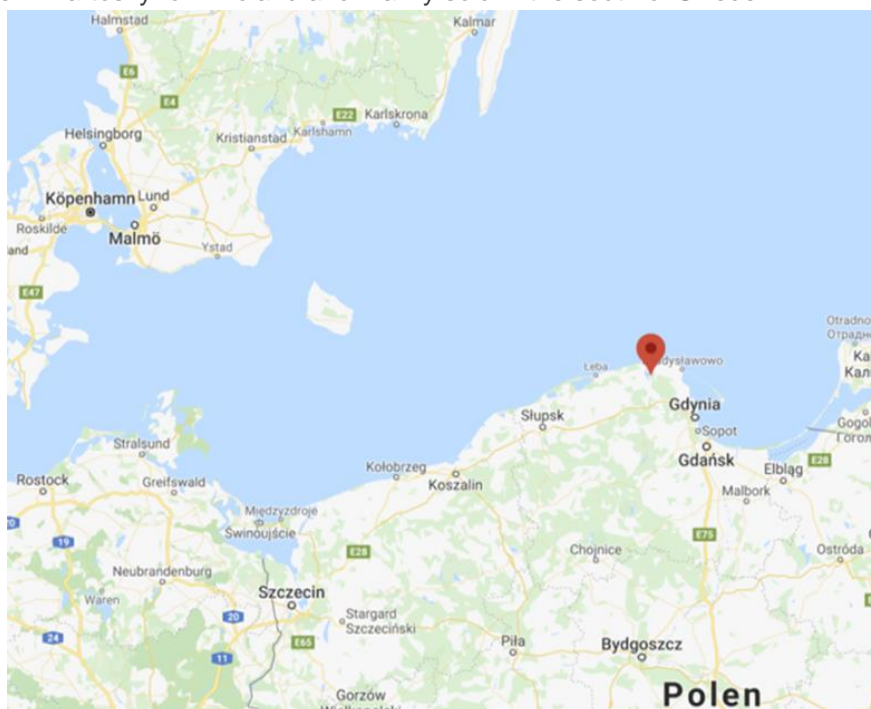
Additional information for the product can be found at the Gripen Betongelement website: <https://gripenbetong.se/>.

UN CPC code: 37550 - Articles of concrete, cement and plaster

Production process:



Geographical scope: Precast concrete products are manufactured at Gripen Betongelement production site in Kartoszyño in Poland and mainly sold in the south of Sweden.



LCA information

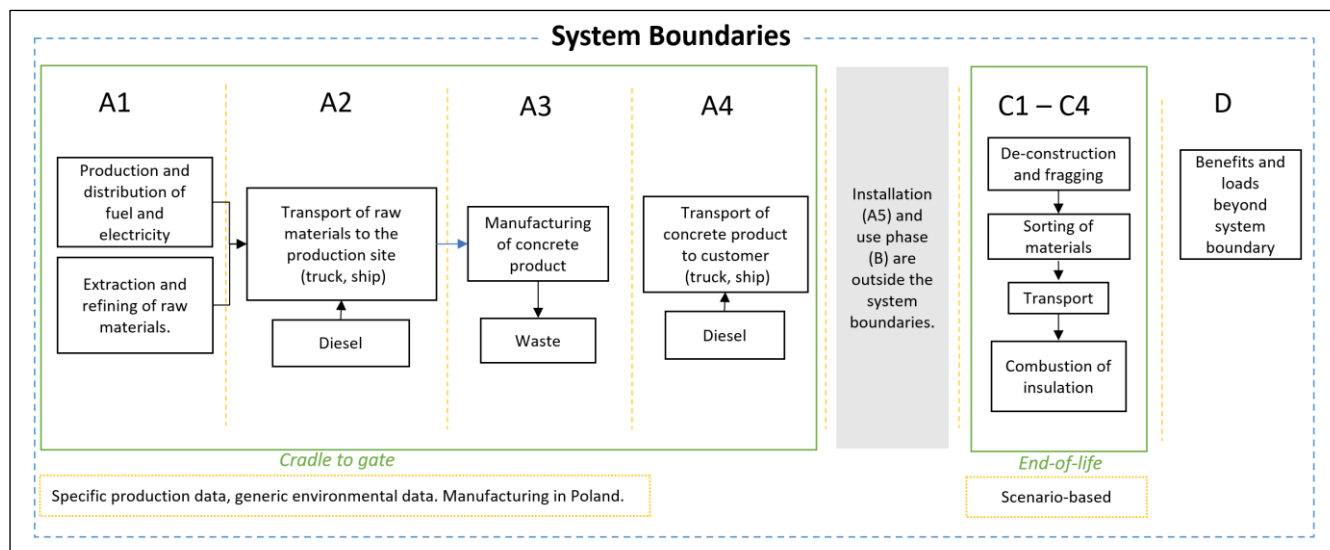
Declared unit: 1 metric tonne of solid precast concrete insulated wall (sandwich).

Reference service life: Normally 50-100 years¹ and depending on customer requirements.

Time representativeness: Data is representative for production year 2022. For materials, energy and transports, generic industry data from Ecoinvent has been used. Assessment time for background data is 2013-20.

Database(s) and LCA software used: Ecoinvent 3.8. and SimaPro 9.3.0.3

Description of system boundaries: Cradle to gate with module A4, modules C1–C4 and module D (A1–A3 + A4 + C + D).



A1: Extraction and processing of raw materials and generation of electricity from primary energy resources

A2: Specific transport distance from suppliers of different materials to Gripen Betongelement production site.

A3: Manufacturing of the product at Gripen Betongelement production site.

A4: Average transport distance (308 km lorry and 234 km ferry transport) from Gripen Betongelement production site to customer.

C1: The products are demolished, and the constituents are separated from each other.

C2: Transportation for concrete, steel and insulation to waste processing and reuse or recycling.

C3: No waste processing is assumed to occur.

C4: No disposal of any of the product's elements is assumed to occur.

D: Reuse of the crushed concrete as construction material and the material recycling of steel.

¹ <https://www.svenskbetong.se/bygga-med-betong/bygga-med-prefab/miljo-och-hallbarhet/livslangd-for-byggnader>

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	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	EU	PL	PL	EU	-	-	-	-	-	-	-	-	SE	SE	SE	SE	SE
Specific data used	80 %					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	+/- 10% compared to the given average					-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Reinforcement steel	28	100 %	0
Cement	127	0 %	0
Aggregate	762	0 %	0
Water	74	0 %	0
Insulation	9	0 %	0
TOTAL	1000	2,8 %	0

No packaging material is used for this product.

Gripen Betongelement declares that their products do not contain substances from the candidate list of SVHC for Authorization in levels above 0.1% by weight.

Estimates and assumptions: Heat, electricity use as well as waste in the production are calculated as a weight average per produced tonne of all products using yearly production data representative for 2022. No assumptions are made and no co-products are made.

Electricity used in the manufacturing of the concrete element is generated by hydro power and bought from the electricity supplier and demonstrated by a Guarantee of Origin (GoO).

There is variation in the mix of materials (cement, reinforcement, gravel etc.) in the concrete products. Material percentages in the table below are averages.

However, the variation in material composition for different mixes and the related environmental impact is within +/- 10% compared to the given average in this EPD.

Cut off criteria: All major materials, production energy use and waste are included. Materials less than 1% of the weight in the concrete product are not considered.

Data quality: The data quality can be described as fair for waste estimations and good for other data. The primary data collection has been done thoroughly; all relevant flows are considered.

All electricity used at Gripens production site has been calculated with hydro power produced in Poland. the dataset "Electricity, high voltage {PL}| electricity production, hydro, run-of-river | Cut-off, S" been used which represents the renewable energy they purchase.

Assumptions in module C:

- The transport distance to the waste treatment for steel and insulation site is 50 km. The transport distance for the concrete is assumed to be 20 km.
- The consumption of diesel for demolition in C1 is assumed to be 10 kWh/tonne.
- The consumption of diesel for crushing concrete/ballast in C1 is assumed to be 2 kWh/tonne.
- The consumption of diesel for shredding steel in C1 is assumed to be 7,4 kWh/tonne.
- The consumption of diesel for reprocessing insulation in C1 is assumed to be 0,8 kWh/tonne.
- The energy use of crushing concrete in C3 is assumed to be 2 kWh/tonne.
- Insulation is assumed to be incinerated in module C3.
- 80 % of the concrete is assumed to be crushed and reused as filling material instead of using virgin material. The remaining amount of concrete is assumed to be landfilled.

The steel is made from scrap hence no benefits beyond system boundaries is calculated.

Transport to the building site (A4)	Vehicle type	Distance	Capacity utilisation (including empty returns) (%)	Bulk density of transported products	Volume capacity utilisation factor (factor: =1 or <1 or >1 for compressed or nested packaged products)
Ferry		234 km		1560 kg/m ³	<i>Not applicable</i>
Truck	EURO 6	308 km	45 %	1560 kg/m ³	<i>Not applicable</i>

End-of-life (C1-C4)	Unit (per declared unit)	Weigh
Collection processes specified by type	kg collected separately	1000
	kg collected with mixed construction waste	0
Recovery system specified by type	kg for re-use	812
	kg for recycling	0
	kg for energy recovery	9
Disposal specified by type	kg product or material for final deposition	179
Assumptions for scenario development e.g. transportation	km	20 ²
		50 ³

² The average transport distance for concrete is assumed to be 20 km.

³ The average transport distance for steel and insulation to waste processing is assumed to be 50 km.

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	1,39E+02	5,25E+01	3,96E-01	1,99E-01	-3,69E-04	0,00E+00	-2,80E-01
GWP-biogenic	kg CO ₂ eq.	-5,69E-01	6,45E-02	1,40E-04	2,02E-04	-1,50E-05	0,00E+00	-1,78E-03
GWP-luluc	kg CO ₂ eq.	3,95E-02	4,53E-02	3,95E-05	7,47E-05	4,06E-07	0,00E+00	-1,08E-04
GWP-total	kg CO ₂ eq.	1,38E+02	5,26E+01	3,96E-01	1,99E-01	-3,84E-04	0,00E+00	-2,82E-01
ODP	kg CFC 11 eq.	6,93E-06	1,15E-05	8,46E-08	4,96E-08	7,21E-12	0,00E+00	-5,05E-08
AP	mol H ⁺ eq.	4,46E-01	2,52E-01	4,11E-03	6,34E-04	-5,94E-06	0,00E+00	-6,71E-03
EP-freshwater	kg P eq.	9,86E-03	4,03E-03	1,23E-05	1,29E-05	8,56E-08	0,00E+00	-2,21E-05
EP-marine	kg N eq.	6,60E-02	8,44E-02	1,82E-03	1,42E-04	-8,23E-07	0,00E+00	-2,35E-03
EP-terrestrial	mol N eq.	1,27E+00	9,22E-01	2,00E-02	1,55E-03	-9,13E-06	0,00E+00	-3,32E-02
POCP	kg NMVOC eq.	2,90E-01	2,68E-01	5,49E-03	6,11E-04	-4,32E-06	0,00E+00	-6,99E-03
ADP-minerals&metals*	kg Sb eq.	2,02E-04	1,61E-04	2,04E-07	4,76E-07	9,36E-11	0,00E+00	-1,46E-06
ADP-fossil*	MJ	1,22E+03	7,63E+02	5,43E+00	3,24E+00	-4,03E-02	0,00E+00	-3,68E+00
WDP*	m ³	7,49E+01	2,53E+00	8,49E-03	1,11E-02	-1,15E-03	0,00E+00	-3,83E-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 of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG ⁴	kg CO ₂ eq.	1,39E+02	5,25E+01	3,96E-01	1,99E-01	-3,69E-04	0,00E+00	-2,80E-01

Resource use indicators

Results per functional or declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	1,71E+02	1,31E+01	3,05E-02	4,12E-02	1,75E-04	0,00E+00	-5,25E-01
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,71E+02	1,31E+01	3,05E-02	4,12E-02	1,75E-04	0,00E+00	-5,25E-01
PENRE	MJ	1,12E+03	8,10E+02	5,76E+00	3,44E+00	-4,34E-02	0,00E+00	-3,90E+00
PENRM	MJ	2,79E+02	0,00E+00	0,00E+00	0,00E+00	-2,79E+02	0,00E+00	0,00E+00
PENRT	MJ	1,40E+03	8,10E+02	5,76E+00	3,44E+00	-2,79E+02	0,00E+00	-3,90E+00
SM	kg	7,64E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	1,69E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	2,63E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	6,88E+01	2,54E+00	8,81E-03	1,12E-02	-1,10E-03	0,00E+00	-3,43E-02
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							

⁴ 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 functional or declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	4,78E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	3,67E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,79E+02	0,00E+00
Radioactive waste disposed	kg	1,82E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flow indicators

Results per functional or declared unit								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	5,38E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	6,69E+00	0,00E+00	0,00E+00	0,00E+00	8,13E+02	0,00E+00	0,00E+00
Materials for energy recovery	kg	2,22E-01	0,00E+00	0,00E+00	0,00E+00	9,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	9,44E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	1,62E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Differences versus previous versions

The results from the previous report are calculated according to the *climate change impact* category in EN 15804:2012 and the values used for the comparison are calculated with the impact category called *climate change – fossil* in EN 15804:2012+A2:2019. The impact category was chosen as a reference since the product does not include any biogenic carbon. The impact categories are not the same, but they are assumed to be similar enough to give an approximation of the reductions related to the change in the recipes.

The high reduction is mostly due to new datasets (EPDs) from the suppliers of cement and reinforcement steel, optimization of the recipes, and hydro power as energy source.

Product	Previous EPD values for A1-A3	Current EPD values for A1-A3	Reduction from previous- to current EPD-values (%)
	<i>Climate change impact</i> kg CO2 eq.	<i>Climate change – fossil</i> kg CO2 eq.	
Concrete insulated wall (Sandwich)	2.06E+02	1,39E+02	33 %

References

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

PCR 2019:14. Construction products (EN 15804:A2). V1.2.5
c-PCR-003 Concrete and concrete elements

EN 15804:2012+A2:2019 Sustainability of construction works - Environmental Product Declarations -
Core rules for the product category of construction products

Core production data for materials, transport, energy and waste has been delivered by Andrea Sator,
Gripen Betongelement AB, +46 (0)730 679537, andrea.sator@gripenbetong.se
Ecoinvent 3.8 database, <http://www.ecoinvent.org/>

LCA software SimaPro Analyst 9.3.0.3

LCA Report Gripen Betongelement 2023

