



Environmental Product Declaration - EPD

PRECAST CONCRETE FOUNDATION PILES

IN ACCORDANCE WITH ISO 14025 AND EN 15804 FOR PEAB GRUNDLÄGGNING AB.

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-01729
Publication date:	2019-12-18
Valid until:	2024-12-17
Revision date:	2021-10-14

Programme related information and verification

Program:	<p>The International EPD® System</p> <p>EPD International AB Box 210 60 SE-100 31 Stockholm Sweden</p> <p>www.environdec.com info@environdec.com</p>
-----------------	---

<p>Product category rules (PCR): <i>PCR 2012:01 Construction products and construction services (EN 15804:A1). Version 2.3, 2018-11-15</i> <i>PCR 2012:01-SUB-PCR-G. Concrete and concrete elements (EN 16757:2017). Version 2018-11-22.</i></p>
<p>PCR review was conducted by: <i>The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com</i></p>
<p>Independent third-party verification of the declaration and data, according to ISO 14025:2006:</p> <p><input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification</p>
<p>Third party verifier: Carl-Otto Nevén, Nevén Miljökonsult</p> <p>Approved by: The International EPD® System</p>
<p>Procedure for follow-up of data during EPD validity involves third party verifier:</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

Company information

This EPD is intended for external communication towards Peab's customers.

OWNER OF THE EPD

Peab Grundläggning AB

E-mail: diego.penalosa@peab.se

Adress: Flintyvegatan 2, SE-213 76 Malmö (Sweden)

DESCRIPTION OF THE ORGANISATION

Peab Grundläggning AB, a subsidiary company to Peab AB, is one of Sweden's leading companies on foundation work. We perform foundation work for all types of construction projects, from larger demanding infrastructure projects to smaller contracts. Our technical department designs constructions and solutions in the projects. At our factories in Tollarp, Sjövik and Västerås we have our own manufacturing of foundation piles, among other products. The factories produce foundation piles in different dimensions, where the most frequent dimensions are 235x235 mm and 275x275 mm. The carrying capacity of the foundation piles depends on the concrete quality and the amount of reinforcement. The company has around 200 employees and is active across all of Sweden.

PRODUCT RELATED OR MANAGEMENT SYSTEM RELATED CERTIFICATIONS

Peab Grundläggning AB is certified under ISO 14001:2015.

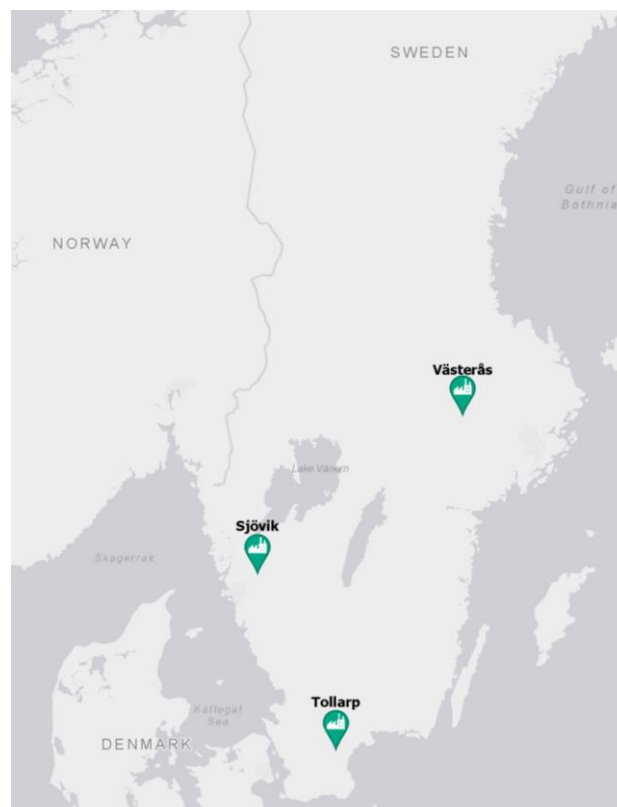
NAME AND LOCATIONS OF PRODUCTION SITES

Peab Grundläggning AB

Location of production site Sjövik: Hampes väg 31, SE-443 45 Sjövik (Sweden)

Location of production site Tollarp: Marietorpssvägen 19, SE-298 33 Tollarp (Sweden)

Location of production site Västerås: Tallmätargatan 2, SE-721 34 Västerås (Sweden)



Environmental Product Declaration

PRODUCT NAMES

PP-25
SP-1
SP-2
SP-3

PRODUCT IDENTIFICATION

The products comply with the technical standards SS-EN 206-1, SS-EN 12794, SS-EN 13369:2018 edition 4, SS 137003, SS 137005:2018 edition 2, SS 137010, SS-EN 13670-1, SS-EN 1990, SS-EN 1992, SS-EN 1993, SS-EN 1997, CB5.

UN CPC CODE

37550 - Articles of concrete, cement and plaster

PRODUCT DESCRIPTION

Foundation piles are used when the ground bearing capacity is insufficient for the planned construction.

The products are designed for a service life of 100 years and are classified as L100 according to the standard SS-EN 12794 *Precast concrete products/foundation piles*.

Product dimensions are 235x235 mm for SP-1 and 275x275 mm for PP-25, SP-2 and SP-3. Information regarding material content can be found in Table 2.

GEOGRAPHICAL SCOPE

Nordic countries

PICTURE OF THE PRODUCT



LCA information

DECLARED UNIT

1 meter precast concrete foundation pile

TIME REPRESENTATIVENESS

The production data covers the production during 2018. The database data are from 2014-2018.

DATABASE(S) AND LCA SOFTWARE USED

The LCA software GaBi 9 was used for modelling and the Thinkstep database from 2019 was the primary source of data sets.

DESCRIPTION OF SYSTEM BOUNDARIES

This study is done according to *cradle-to-gate with options* and includes the life cycle stages *raw material supply* (A1), *transport to manufacturing* (A2), *manufacturing* (A3) and *transport to the building site* (A4).

EXCLUDED LIFE CYCLE STAGES

The life cycle stages excluded from this study are *installation* (A5), the *use stage* (B1-B7), the *end-of-life stage* (C1-C4) and *benefits and loads beyond the system boundary* (D).

ADDITIONAL INFORMATION

This EPD is in accordance with ISO 14025 and EN 15804. It is a third party externally verified document that reports environmental data of products based on Life Cycle Assessment (LCA) and other relevant information.

Scenarios

One scenario has been modelled and is assumed to be the most probable scenario for each product. The calculations are based on product specific material compositions and site-specific data for the manufacturing process.

For transportation of the products to the customers (A4), the following scenario was applied for all products:

- *Distance to construction site:*
Sjövik: 45 km
Tollarp: 100 km
Västerås: 100 km
- *Vehicle type:* Diesel truck trailer, Euroclass 5*, 34-40 t gross weight
- *Vehicle load capacity:* 27 t
- *Capacity utilization:* 100%

* Several transports to customers are in fact Euroclass 6, but the calculations are based on Euroclass 5 for all routes as a conservative approach.

Allocation

The factories produce by-products such as filling material, concrete beams and border elements. For all sites, a conservative approach is applied and the environmental burden is allocated to the main products, since those are the purpose of the production, and none to the by-products.

In order to allocate the environmental burden between the different products, physical allocation is applied. The flows concerning A3 (ancillary materials, packaging, energy, process water and waste) are allocated based on yearly site production volumes and product weights.

Cut-off criteria

Close to 100% of all material and energy flows have been included in the model calculations. The study applies a cut-off criterion of maximum 1%, which complies with the maximum cut-off criteria established by the PCR and EN 15804 standard.

Data quality

Concerning the relevance of the data in the study, all data for module A3 has been collected directly from the production sites and is representative for the production during the year 2018. Data used from the different sites is based on the production shares for 2018. The global warming potential (GWP) for A1-A3 does not vary more than 10% between the different sites.

For modules A1, A2 and A4, some of the data are modelled using supplier specific EPDs (cement and plasticizer). In cases where no supplier specific data was available, suitable generic data has been used.

Revision changes

For the latest revision of this EPD (October 2021), minor language changes were made and the contact information for the EPD owner was updated.

Additional information

For more information about the production, please visit www.peabgrundlaggning.se.

SYSTEM DIAGRAM

The life cycle stages included in the analysis are illustrated according to EN15804 in Table 1 below. If a module is included, it is indicated with "X" and if it is not included "MND" (Module Not Declared) is noted.

Table 1. Life cycle stages included in the LCA study.

Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
Raw material	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction, demolition	Transport	Waste processing	Disposal	Reuse, recycling or energy recovery potentials
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Figure 1 below illustrates the life cycle stages and processes included in this study. This includes the following:

- A1 Raw materials (steel reinforcement, concrete and concrete components, rock shoes/ pile joints, spirals, spacers)
- A2 Transportation of raw material to the factories by truck and boat
- A3 Manufacturing (manufacturing of reinforcement cages, wet concrete casting in steel molds, vibration of concrete, demoulding, storage and internal handling). In Tollarp and Sjövik the concrete is produced on site, while in Västerås ready-mix concrete is used.
- A4 Transport of products to customers by truck

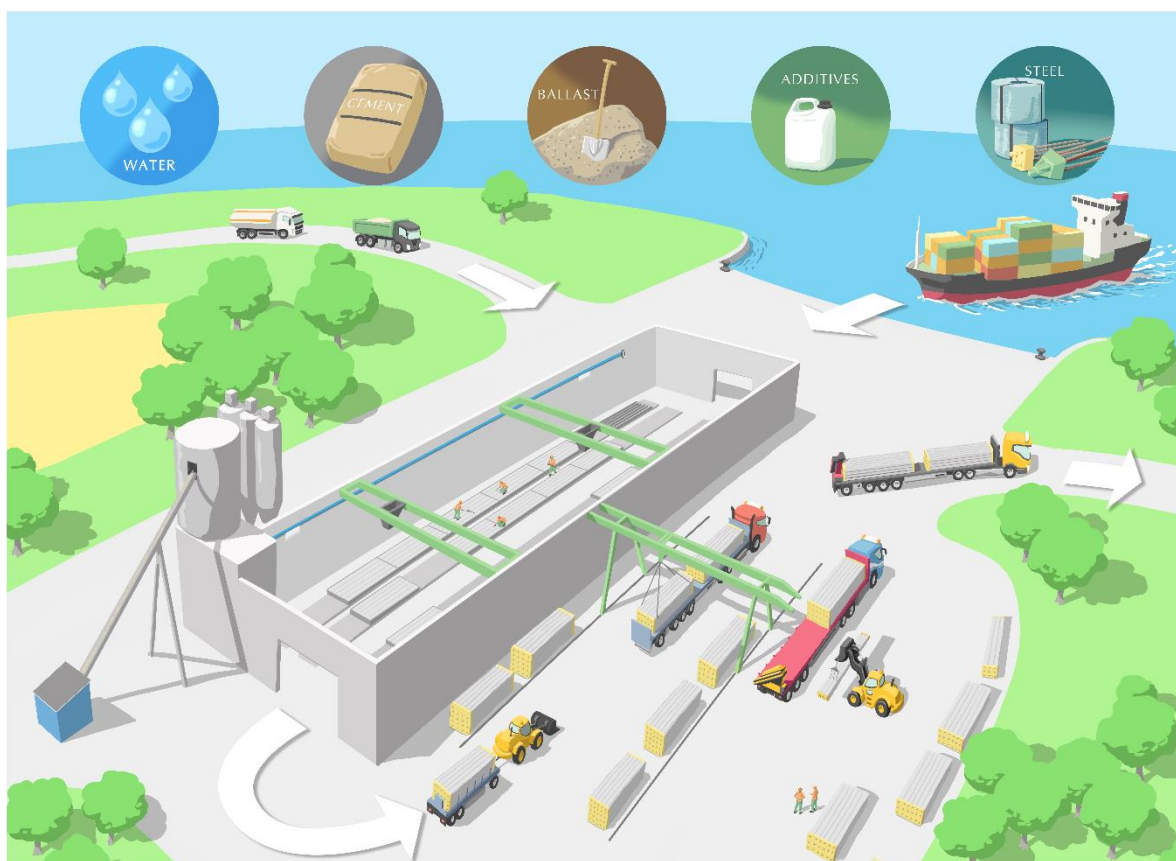


Figure 1. Illustration of the life cycle stages included in the LCA study.

Content declaration

Products

The material content in the studied products is presented in Table 2 below.

Table 2. Information about material content for the products included in the assessment.

PRODUCT NAME	WEIGHT (kg/m)	MATERIAL CONTENT (% in weight)				
		Concrete	Reinforcement (steel)	Rock shoes/ pilejoints (steel)	Spiral (steel)	Spacers (plastic)
PP-25	209	88,5	9,1	1,9	0,5	0,02
SP-1	144	93,9	4,4	1,1	0,6	0,02
SP-2	185	94,6	3,8	1,0	0,6	0,02
SP-3	188	91,8	6,7	1,0	0,5	0,02

For construction product EPDs compliant with EN 15804, the content declaration shall list, as a minimum, substances contained in the products that are listed in the "Candidate List of Substances of Very High Concern for Authorization" when their content exceeds the limits for registration with the European Chemicals Agency. No substances occur on the REACH candidate list of SVHC (Candidate List of Substances of Very High Concern) in the products of this EPD.

Packaging

DISTRIBUTION PACKAGING

The main raw materials do not require packaging for distribution.

CONSUMER PACKAGING

The final products do not require packaging.

Recycled material

PROVENIENCE OF RECYCLED MATERIALS (PRE-CONSUMER OR POST-CONSUMER) IN THE PRODUCT

Recycled materials are used in the production of some of the raw materials used in the studied products, for example steel reinforcement. The specific content in each product could not be defined due to lack of supplier specific information.

Environmental performance

The environmental performance of the products are presented in Table 3, Table 4 and Table 5.

Potential environmental impact

Table 3. Potential environmental impact (1 m precast concrete foundation pile)

PARAMETER	UNIT	PP-25		SP-1		SP-2		SP-3	
		A1-A3	A4	A1-A3	A4	A1-A3	A4	A1-A3	A4
Global warming potential (GWP)	kg CO ₂ eq.	64	0,77	34	0,54	42	0,74	47	0,65
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	2,0E-07	1,3E-16	1,2E-07	8,9E-17	1,4E-07	1,2E-16	1,2E-07	1,1E-16
Acidification potential (AP)	kg SO ₂ eq.	0,17	1,6E-03	7,5E-02	1,1E-03	9,2E-02	1,6E-03	0,12	1,4E-03
Eutrophication potential (EP)	kg PO ₄ ³⁻ eq.	2,7E-02	3,9E-04	1,4E-02	2,7E-04	1,6E-02	3,7E-04	1,9E-02	3,3E-04
Formation potential of tropospheric ozone (POCP)	kg C ₂ H ₄ eq.	1,5E-02	-5,1E-04	6,9E-03	-3,5E-04	8,2E-03	-4,9E-04	1,0E-02	-4,3E-04
Abiotic depletion potential – Elements	kg Sb eq.	-2,1E-04	5,5E-08	-6,9E-05	3,8E-08	-7,7E-05	5,3E-08	-1,4E-04	4,6E-08
Abiotic depletion potential – Fossil resources	MJ, net calorific value	5,5E+02	10	2,6E+02	7,3	3,1E+02	10	3,8E+02	8,8

"E" is written as a substitute for the number of zeros. For example, 3,5 E-02 means 0,035.

Use of resources

Table 4. Use of resources (1 m precast concrete foundation pile)

PARAMETER		UNIT	PP-25		SP-1		SP-2		SP-3	
			A1-A3	A4	A1-A3	A4	A1-A3	A4	A1-A3	A4
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	92	0,61	41	0,42	48	0,59	69	0,51
	Used as raw materials	MJ, net calorific value	0	0	0	0	0	0	0	0
	TOTAL	MJ, net calorific value	92	0,61	41	0,42	48	0,59	69	0,51
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	5,9E+02	10	2,8E+02	7,3	3,3E+02	10	4,1E+02	8,9
	Used as raw materials	MJ, net calorific value	0	0	0	0	0	0	0	0
	TOTAL	MJ, net calorific value	5,9E+02	10	2,8E+02	7,3	3,3E+02	10	4,1E+02	8,9
Secondary material		kg	23	0	8,1	0	9,0	0	16	0
Renewable secondary fuels		MJ, net calorific value	19	0	12	0	13	0	12	0
Non-renewable secondary fuels		MJ, net calorific value	28	0	17	0	19	0	17	0
Net use of fresh water		m ³	1,5	1,0E-03	0,53	7,1E-04	0,60	9,9E-04	1,0	8,7E-04

"E" is written as a substitute for the number of zeros. For example, 3,5 E-02 means 0,035.

Waste production

Table 5. Waste production (1 m precast concrete foundation pile)

PARAMETER	UNIT	PP-25		SP-1		SP-2		SP-3	
		A1-A3	A4	A1-A3	A4	A1-A3	A4	A1-A3	A4
Hazardous waste disposed	kg	4,5E-05	5,8E-07	1,8E-05	4,1E-07	2,1E-05	5,7E-07	2,9E-05	5,0E-07
Non-hazardous waste disposed	kg	9,4	8,5E-04	4,6	5,9E-04	5,9	8,2E-04	8,0	7,2E-04
Radioactive waste disposed	kg	3,6E-03	1,4E-05	2,9E-03	9,9E-06	4,0E-03	1,4E-05	4,2E-03	1,2E-05

"E" is written as a substitute for the number of zeros. For example, 3,5 E-02 means 0,035.

References

Cementa (2016) EPD for Portland Cement CEM I 52.5 R (rs) from Cementa AB, HeidelbergCement Group. Valid to 2021-11-09.

CEN European Committee for Standardisation (2013). EN 15804:2012+A1:2013, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

EFCA (2015) EPD for Concrete admixtures – Plasticisers and Superplasticisers from European Federation of Concrete Admixtures Associations Ltd. (EFCA). Valid to 2020-09-13.

ISO (2006a). ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO (2006b). ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework.

ISO (2006c). ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines.

IVL (2019) LCA methodology report for precast concrete foundation piles from Peab Grundläggning. As basis for the publication of an EPD under EPD International. October 2019.

The International EPD System (2018a) PCR 2012:01 Construction products and construction services. Version 2.3, date 2018-11-15.

The International EPD System (2018b) PCR 2012:01-SUB-PCR-G. Concrete and concrete elements (EN 16757:2017). Date 2018-11-22.

The International EPD System (2019) General programme instructions for the International EPD System. Version 3.01, date 2019-09-18.

EPD OWNER	 Peab Grundläggning Peab Grundläggning AB Flintyvegatan 2, SE-213 76 Malmö (Sweden) www.peabgrundlaggning.se , diego.penalosa@peab.se
LCA AUTHOR	 Swedish Environmental Research Institute IVL Swedish Environmental Research Institute, Box 210 60, SE-100 31 Stockholm, www.ivl.se .
PROGRAMME OPERATOR	 THE INTERNATIONAL EPD® SYSTEM EPD International AB info@environdec.com



About Peab Grundläggning AB

Peab Grundläggning AB, a subsidiary company to Peab AB, is one of Sweden's leading companies on foundation work. We perform foundation work for all types of construction projects, from larger demanding infrastructure projects to smaller contracts. Our technical department designs constructions and solutions in the projects. At our factories in Tollarp, Sjövik and Västerås we have our own manufacturing of foundation piles, among other products. The factories produce foundation piles in different dimensions, where the most frequent dimensions are 235x235 mm and 275x275 mm. The carrying capacity of the foundation piles depends on the concrete quality and the amount of reinforcement. The company has around 200 employees and is active across all of Sweden.