Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 for:

Precast concrete foundation

Pålplintar AB



Programme:	The International EPD [®] System, <u>www.environdec.com</u>
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Programme information

	The International EPD [®] System
Programme:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
	www.environdec.com info@environdec.com

Product category rules (PCR):

PCR 2012:01 Construction products and construction services (EN 15804:A1). Version 2.3, 2018-11-15 PCR 2012:01-SUB-PCR-G. Concrete and concrete elements (EN 16757:2017). Version 2018-11-22.

PCR review was conducted by: The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com

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

 \Box EPD process certification \boxtimes EPD verification

Third party verifier: *Pär Lindman, Miljögiraff AB*

Procedure for follow-up of data during EPD validity involves third party verifier:

 \boxtimes Yes \Box No

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





Company information

The EPD is intended for external communication to Pålplintar AB: customers.

Owner of the EPD:

- Company: Pålplintar AB
- E-mail: jimmy.h@palplintar.se
- Address: Borrvägen 4

Description of the organisation

Pålplintar has been in the industry since the beginning of the 1980s. Since 2000 Pålplintar is part of the Norwegian concern AF Gruppen ASA. Pålplintar is a leading company on foundation work with a wide range from smaller projects to larger demanding infrastructure projects. The projects can be about massive concrete piles a hundred meters down into the earth under a newly built business center.

Smaller projects could be a wall of sheet pile wall that reinforces an old quay, or steel piles that support an ordinary family villa. The company's experience within the industry allows them to be a leading part when it comes to design constructions and solutions within projects. Pålplintar can help create solutions that are more cost-efficient and better for the environment, e.g. by minimizing transmissions through the structure. Pålplintars factory is located in Nykvarn were they have their own manufacturing of foundations piles.

Name and location of production site

 Påplintar AB Location site: Nykvarn 155 93 Nykvarn, Borrvägen 4



Figure 1: location of Pålplintars facility





Product information

Product name:

- SP1
- SP2
- SP3
- 350

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 ideal for industrial applications. All products are manufactured indoors. This ensures a high and even quality throughout the production year.

Raw materials are purchased and transported to the factory. The environmental impact from the production of concrete is mainly due to the usage of the raw material.

The products are designed to have a lifetime of 100 years and are classified as L100 according to the standard SS-EN 12794, Precast concrete products/foundation piles.

The dimensions of the products are 235×235 mm for SP-1 and 275×275 mm for, SP-2 and SP-3 and 350×350 for 350.

Information regarding material content can be found in Table 2.

Geographical scope: Sweden



Figure 2: Picture of product, SP3



LCA information

Declared unit: 1-meter precast concrete foundation pile

Time representativeness:

The data given in this document covers the production during 2020. The database data are from 2011 - 2020

Database(s) and LCA software used:

The LCA software GaBi 9 was used for modelling and the Thinkstep database from 2019 -2020 was the primary source of data sets.

Description of system boundaries:

Cradle-to-gate:

The conducted study is done accordingly to the cradle-to-gate system. The life cycle includes four stages.

- M1: raw material supply
- M2: transport to manufacturing
- M3: manufacturing
- M4: transport to the building site

Excluded lifecycle stages:

In the conducted study several stages during the life cycle of the products are excluded. The excluded stages are listed below.

- M5: installation
- U1 U7: the use stage
- E1 E4: end-of-life stage
- R: benefits and loads beyond the system boundary

More information:

The conducted study, environmental product declaration (EPD), has been performed by Trapezia AB. This EPD is in accordance with ISO 14025 and EN 15804. It is a third party externally verified document, which means that it has been controlled by a non-biased controller. This document reports the environmental data of Pålplintars products based on Life cycle assessment (LCA) and other information provided to this study.

Scenarios

For each product, one scenario has been modelled and is assumed to be the most probable scenario for each product. Calculations are based on productspecific materials compositions and site-specific data for the manufacturing site.

Transport for the raw material is specified below:

- Crushed rock: 6,5 km
- Cement: 110 km
- Plasticisers: 221 km
- Steel: 550 km*

*The distance for steel is an average due to different productions sites in the Baltics.

Transport of the product to the costumers is based on an average distance.

• Distance to the construction site: 100 km

The vehicle type is based on an average diesel truck (Euro class 5, 28 - 34 tones gross weight). The load capacity is 22 tone with 100 % capacity utilization. The vehicle type for transport of steel is a diesel truck (Euro class 5) with a load capacity of 24 tone with 100 % capacity utilization.

Allocation

During the production of concrete foundations piles, the factory produces several by-products. These are concrete beams and boarder elements. Even though Pålplintar produces these products none of the environmental burden is allocated on the byproducts, thus all environmental burden is focused on the main products.

To differentiate the environmental burden between the products that Pålplintar produces, a physical allocation is applied. This is conducted within the step (M3), ancillary materials, packaging, energy, process water, and waste. Allocation is based on yearly site production volumes and product weight.

Data quality

All data for module M3 has been collected directly from Pålplintars productions plant during the year 2019.

For the other modules M1, M2 and M4 data have been collected for the providers and from Thinkstep.

Assumptions

- 1. Assumption for transport distance for steel included in Pålplintar's products. It is assumed that transport by cargo ship is 380 km. This corresponds to transport by boat from the Baltics to a port in Sweden for further transport by truck to Pålplintar's factory.
- 2. It is assumed that the average distance to the average customer is 100 km. Transport distance between Pålplintar's factory and customer.
- 3. In calculations, plasticizers found in the database have been used. The plasticizer used in this study is made in Germany and corresponds to the product used by Påplintar AB. The assumption is that the quality of this product is comparable to that used by Påplintar AB and that the environmental impact is the same.





Cut-off criteria

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

For more information about the production, please visit http://www.palplintar.se/



System diagram

Table 1: Life cycle stages included in the study according to EN 15804. Stages included: X, stages that are not included in this study: "MND" (module not included) is noted.

Pro	duct st	age	Constr proces	ruction s stage			1	Use stage	e			End of life				Resource recovery stage
Raw material	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction	Transport	Waste processing	Disposal	Reuse or recycling
MI	M2	M3	M4	M5	Ū.	U2	N3	U4	US	U6	n,	EI	E2	E3	E4	RI
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND



In Figure 3 bellow a schematic picture shows the flow of processes and ingoing materials that is included in this study.



Figure 3: Illustration of the lifecycle stages covered by the LCA study.



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Content declaration

Product

The concrete products produced by Pålplintar AB consist of approximately 72% crushed material, 7.8% water, 20% cement and 0.2% spacers. The material content of each product is given below in Table 2 (excluding water).

		Material content (% in weight)								
Product name	Weight (kg/m)	Concrete	Reinforcement (steel)	Rock shoes/pilejoints (steel)	Spiral (steel)	Spacers (plastic)				
SP 1	144	93,9	4,4	1,1	0,6	0,02				
SP 2	185	94,6	3,8	1	0,6	0,02				
SP 3	188	91,8	6,7	1	0,5	0,02				
350	340	92,68	5,8	1	0,5	0,02				

Table 2: Material content for the products included in the assessment.

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 Authorisation" when their content exceeds the limits for registration with the European Chemicals Agency. There are no SVHC substances according to REACH in the product or in the waste.

Packaging

<u>Distribution packaging:</u> The main raw materials do not require packaging for distribution.

<u>Consumer packaging:</u> The final products do not require packaging.

Recycled material

<u>The provenience of recycled materials (pre-consumer or post-consumer) in the product:</u> Recycled materials are not used in the production of the raw materials used in the studied products.



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

Potential environmental impact

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

DADAMETED	UNIT	SP 1		SP	2	SF	3	350	
FARAMETER	UNII	A1-A3	A4	A1-A3	A4	A1-A3	A4	A1-A3	A4
Global warming potential (GWP)	kg CO ₂ eq.	26,56	0,924	33,8	1,19	36,5	1,21	63,55	2,18
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	7,7E-012	2,29E-016	9,88E-012	2,94E-016	1,01E-011	2,99E-016	1,82E-011	5,41E-016
Acidification potential (AP)	kg SO ₂ eq.	0,0488	0,00218	0,0618	0,0028	0,07	0,00284	0,119	0,00514
Eutrophication potential (EP)	kg PO ₄ ³⁻ eq.	0,00698	0,000522	0,00876	0,000671	0,0096	0,000682	0,0162	0,00123
Formation potential of tropospheric ozone (POCP)	kg C ₂ H ₄ eq.	0,00466	-0,000714	0,0058	-0,000917	0,00696	-0,000932	0,0118	-0,00169
Abiotic depletion potential – Elements	kg Sb eq.	3,45E-006	7,48E-008	3,95E-006	9,61E-008	4,57E-006	9,77E-007	6,62E-006	1,77E-007
Abiotic depletion potential – Fossil resources	MJ, net calorific value	155	12,5	197	16	231	16,3	390	29,4



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Use of resources

Renewable and non-renewable products are used in the manufacture of Pålplintar AB's products. Table 4 shows the use of energy and materials. The term "secondary" refers to resources from previous use or waste which are not included in the production of these products.

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

PARAMETERA		LINIT	SP 1		SP 2		SP 3		350	
		UNII	A1-A3	A4	A1-A3	A4	A1-A3	A4	A1-A3	A4
	Use as energy carrier	MJ, net calorific value	149	0,745	159	0,957	170	0,972	211	1,76
Primary energy resources – Renewable	Used as raw materials	MJ, net calorific value	0	0	0	0	0	0	0	0
	TOTAL	MJ, net calorific value	149	0,745	159	0,957	170	0,972	211	1,76
Primary energy resources – Non- renewable	Use as energy carrier	MJ, net calorific value	304	12,5	359	16,1	407	16,4	619	29,6
	Used as raw materials	MJ, net calorific value	0	0	0	0	0	0	0	0
	TOTAL	MJ, net calorific value	304	12,5	359	16,1	407	16,4	619	29,6
Secondary material		kg	0	0	0	0	0	0	0	0
Renewable secondary fuels		MJ, net calorific value	0	0	0	0	0	0	0	0
Non-renewable secondary fuels		MJ, net calorific value	0	0	0	0	0	0	0	0
Net use of fresh wa	ter	m ³	0,284	0,00125	0,307	0,00161	0,328	0,00164	0,417	0,00296



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Waste production and output flows

 Tabell 5: Waste production (1 m precast concrete foundation pile)

DADAMETED	UNIT	SP 1		SF	2	SF	• 3	350		
FARAVIETER			A4	A1 – A3	A4	A1 – A3	A4	A1 – A3	A4	
Hazardous waste disposed	kg	7,88E-005	6,96E-007	0,000101	8,94E-007	0,000103	9,09E-007	0,000186	1,64E-006	
Non-hazardous waste disposed	kg	0,341	0,00106	0,396	0,00136	0,428	0,00138	0,638	0,00249	
Radioactive waste disposed	kg	0	0	0	0	0	0	0	0	



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EPD Owner:	PÅLPLINTAR
	Pålplintar AB, jimmy.h@palplintar.se Borrvägen 4, 155 93 Nykvarn (Sweden)
LCA author:	trapezia 🍼
	we make a difference
	Trapezia AB, info@trapezia.se
	Blekholmstorget 30F, 111 64 Stockholm (Sweden) www.trapezia.se
Programme operator:	
	EPD ®
	EPD International AB
	info@environdec.com



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