Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 for:

Water- and Sewage system concrete pipes without reinforcement: KANMAX PG®

from

S:t Eriks AB

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-02093
Publication date:	2020-09-15
Valid until:	2025-08-18

EPD Profile

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	Third party Verifier Pär Lindman, Miljögiraff AB Approved by: The International EPD® System

Product category rules (PCR): The International EPD System PCR for Construction Products and Construction Services 2012:01, version 2.32 and PCR 2012:01-SUB-PCR-G	
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification	

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

Description of the organisation

S:t Eriks develops, manufactures, sell and delivers concrete ground-, roof- and infra systems to professional customers and retailers on the Nordic market. They are certified according to ISO 9001:2015, ISO 14001:2015, BASTA, BBC, Vilma and transQ.

Read more at: https://steriks.se/om-st-eriks/miljo-och-kvalitet/.

Name and location of production sites

The Water- and Sewage System Concrete Pipes covered in this EPD are called KANMAX PG® and are produced at two different sites in Sweden, located in Hjällbo (Bollplansgatan 1, 424 33 Angered) and Kil (Bryggaregatan 6, 665 32 Kil).

EPD Product information

Product name: GERMAX PG®, Water- and sewage system concrete pipes, without reinforcement.

Product identification:

This EPD covers the Water- and sewage system concrete pipes, without reinforcement, included in the product category KANMAX PG®, covering the products identified in Table 1.

Figure 1. Picture of a KANMAX PG® concrete pipe.

Table 1. The KANMAX PG® Water- and sewage system concrete pipes covered in this EPD, modelled as one average metric ton.

Dimension (mm)	Strength class	Product code
150x1000	240	800-151024
225x1700	240	800-201724
300x2000	110	800-302011
400x2200	135	800-402213
500x2200	135	800-502213
600x2200	90	800-602290
800x2200	90	800-802290
1000x2200	90	800-102290
225x1000	710	823-9210
300x1000	480	823-9310
400x1000	240	823-9410

Product description:

1 metric ton of average KANMAX PG®, water- and sewage system concrete pipes, without reinforcement, produced by S:t Eriks. The concrete pipes are used to seal waste- and surface water pipes. The product specifications of the concrete pipes are presented in Table 1.

Average compilation:

Since the assessed product category is produced on two different sites, an average was compiled. This was done based on production volumes of the product category at the two sites, where the production volumes of the assessed product category were compared resulting in each site contributing with a corresponding ratio to the average.

UN CPC code: 37550

LCA information

Declared unit: 1 metric ton of average KANMAX PG®, product category for water- and sewage system concrete pipes without reinforcement.

Reference service life: Not specified

Time representativeness: The data and information collected and modelled for refers to the production year of 2017. The general datasets from used databases are all representative and valid for the year of 2017.

Geographical scope: Sweden
The geographical coverage of this LCA is scenario adapted, i.e. set to Sweden for the manufacturing and to region specifics, when possible, for the raw material extraction and production. This means that the data used for raw material extraction and production is adapted to the geographical region it is extracted from and produced in. The geographical coverage for transports is set to Europe.

Database(s) and LCA software used: The LCA software SimaPro 9.1.0 was used in the assessment, with data from one specific raw material EPD and the databases Ecoinvent 3.5 and U.S. LCI.

Description of system boundaries: Cradle-to-gate, i.e. life cycle stages A1-A3

Excluded lifecycle stages: Since this in a cradle-to-gate EPD, life cycle stages A4, B1-B7, C1-C4 and D are neither considered nor declared.

More information:
In accordance with the PCR, more than 95% of total inflows of mass and energy has been included in the Life Cycle Inventory.
The differences between the environmental impact indicators deviate from the average results (i.e. results for the DU) with less than ±10% for all impact categories except one, which deviate with more than ±10%. Ranges are presented in Table 5.

For more information about the EPD owner, visit www.steriks.se.

For more information about the EPD producer, visit www.dge.se.

For more information about the underlying LCA study, contact the LCA practitioner Helena Lindh (helena.lindh@dge.se).

Concrete in use goes through a carbonation process. Carbonation of concrete is a chemical reaction, a natural process by which CO_2 in the ambient air penetrates the concrete and reacts with hydration products in the concrete. Not only the $Ca(OH)_2$ component of the hardened cement paste is able to carbonate, but also other calcium rich hydrated oxides in the concrete have been shown to gradually transform into carbonate by first decompose to $Ca(OH)_2$ when pH is getting lower due to carbonation. For concrete carbonation this means that part of the carbon dioxide emitted during cement production is rebound to the concrete during use and end of life stages of a structure. The carbonation process for the products assessed is not considered, since the life cycle stages for usage and end of life is not included.

System diagram

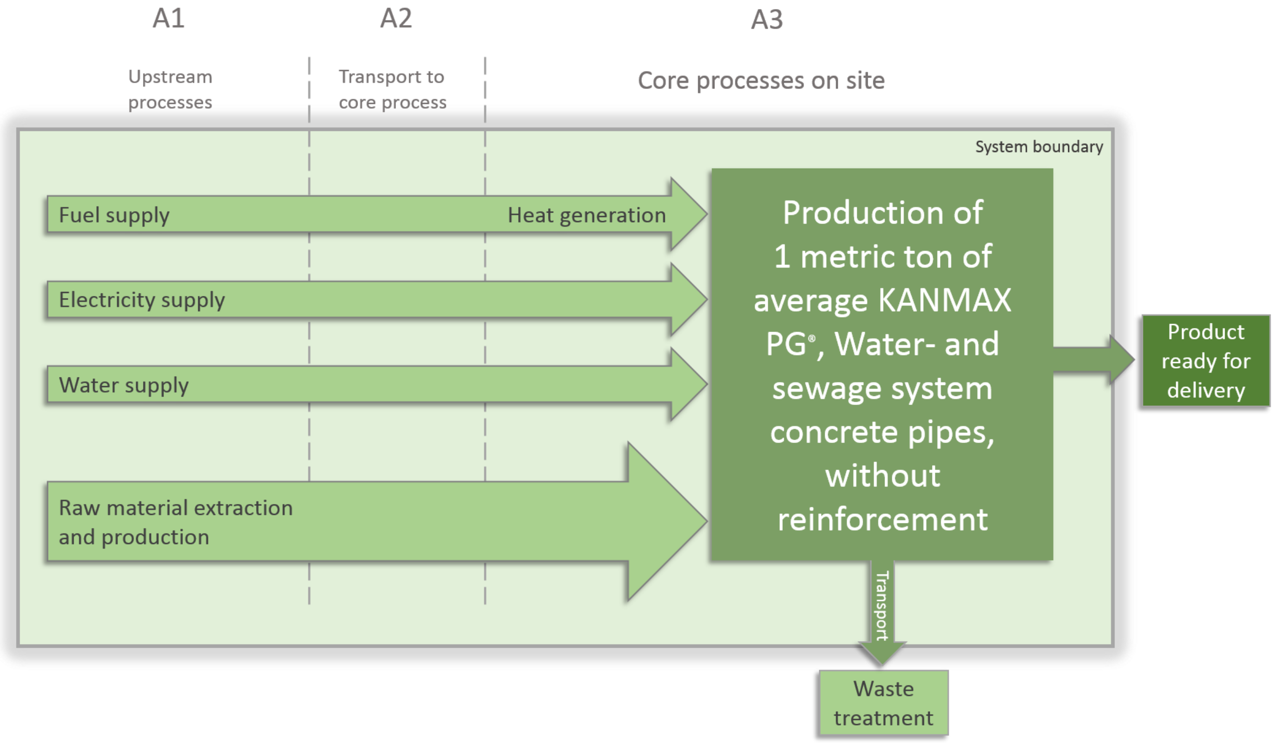

Figure 2. Flow diagram of the assessed life cycle stages for KANMAX PG®, beginning with raw material extraction and production, followed by transport from supplier to site and finally manufacturing at the core sites.

Table 2. Table declaring the life cycle stages included in the LCA.
X= included in the LCA, MND= Module Not Declared

Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
Raw materials	Transport	Manufacturing	Transport	Construction-Installation	Usage stage	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Reuse-recovery-recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Description of life cycle stages A1-A3: Raw material extraction and production, transport from suppliers and manufacturing on site

Table 3. The life cycle stages included in this EPD and a description of each stage.

Stage	Description
A1 Raw materials	Extraction and processing of all raw materials occurring upstream from the manufacturing process, including the energy generation needed for these processes (extraction, refining and transport of energy from primary energy sources) as well as the energy needed for the manufacturing process (A3).
A2 Transport	The external transportation of raw materials to each of the three manufacturing sites. The modelling includes transportation on road and/or water, with processes for each raw material.
A3 Manufacturing	The manufacturing of the concrete pipes takes place at S:t Eriks' two sites in Hjällbo and Kil. All raw materials are weighted in by a computer driven process. Gravels and cement are mixed, followed by dosing of water and addition of plasticizer. The concrete mix is poured in to a cast oil-coated cast, equipped with a vibrating core. After the completed production cycle, the cast is removed, and the pipe is hardened for 24 hours. Electricity, fuel and water consumption and waste generation is included in this stage.

Content declaration per declared unit

1 metric ton of the average KANMAX PG®

Table 4. Content declaration of the declared unit. None of the substances are regarded as SVHCs (Substances of Very High Concern) as defined in the REACH legislation.

Raw materials	Mass ratio
Cement	<17%
Gravel, crushed	<40%
Gravel, natural round	<40%
Plasticizer	<0,05%
Cast oil	<0,01%
Rubber joint	<0,2%
*Water**	*<10%*

**The water weight included in the products are the calculated amounts left after hardening, to sum up to the total weight.*

Environmental performance

1 metric ton average of KANMAX PG®

Environmental impacts

Table 5. The results from the LCA showing the environmental impacts from 1 DU during the life cycle stages assessed.

IMPACT CATEGORY	UNIT	A1	A2	A3	TOTAL A1-A3	*Deviation range from average*
Acidification potential (AP)	kg SO_2 eq.	0,30	0,03	0,02	**0,35**	-1% to +2%
Eutrophication potential (EP)	kg PO_4^{3-} eq.	0,05	0,004	0,007	**0,065**	-3% to +4%
Global warming potential (GWP100a)	kg CO_2 eq.	106	3,13	6,61	**116**	-0,6% to +0,4%
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	0,021	0,001	0,001	**0,023**	-2% to +3%
Abiotic depletion potential, elements	kg Sb eq.	2,71E-04	4,31E-06	7,10E-06	**2,82E-04**	-1% to +2%
Abiotic depletion potential, fossil resources	MJ, net calorific value	477	47,4	75,0	**599**	-1% to +1%
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.	1,05E-06	5,72E-07	2,12E-06	**3,74E-06**	-19% to +12%

1 average metric ton of KANMAX PG®

Use of resources

Table 6. The results from the LCA showing the resource consumption from 1 DU during the life cycle stages assessed.

PARAMETER		UNIT	A1	A2	A3	TOTAL A1-A3
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	57	1	101	158
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	MJ, net calorific value	57	1	101	**158**
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	510	49	243	802
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	MJ, net calorific value	510	49	243	**802**
Secondary material		kg	0	0	0	**0**
Renewable secondary fuels		MJ, net calorific value	162	0	0	**162**
Non-renewable secondary fuels		MJ, net calorific value	175	0	0	**175**
Net use of fresh water		m^3	1,13	0,01	0,17	**1,31**

Waste production and output flows

1 average metric ton of KANMAX PG®

Waste production

Table 7. The results from the LCA showing the waste production from 1 DU during its different life cycle stages.

IMPACT CATEGORY	UNIT	A1	A2	A3	TOTAL
Hazardous waste disposed	kg	0,002	0,001	0,064	0,067
Non-hazardous waste disposed	kg	0,549	7,97E-05	0,157	0,706
Radioactive waste disposed	kg	0,003	0	3,05E-05	0,003

Output flows

Table 8. The results from the LCA showing the output flows from 1 DU during its different life cycle stages.

IMPACT CATEGORY	UNIT	A1	A2	A3	TOTAL
Components for reuse	kg	0	0	0	0
Material for recycling	kg	4,26E-03	0	0,145	0,15
Materials for energy recovery	kg	1,65E-03	0	0,69	0,69
Energy recovery	MJ	0	0	0	0

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