

## ENVIRONMENTAL PRODUCT DECLARATION



In accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration

Skonto Prefab SIA

Publisher

The Norwegian EPD Foundation

Declaration number

NEPD00285E

Issue date

01.12.2014

Valid to

01.12.2019

## Columns

Product



Skonto Prefab SIA

Owner of the declaration



**General information**
**Product**

Columns

**Owner of the declaration**

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**Manufacturer**

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 LV-2119 Latvia

**Declaration number:**

NEPD00285E

**Place of production:**

Acone, Salaspils area, Latvia

**This declaration is based on Product Category Rules:**

CEN Standard EN 15804:2012+A1:2013 serves as core PCR.

NPCR 020 (03 2012): Precast Concrete Products.

**Management system:**

ISO 14001 and ISO 9001

**Declared unit (A1-A3):**

1 tonne of manufactured product.

**Org. No:**

LV40003610650

**Declared unit with option:**

-

**Issue date**

01.12.2014

**Functional unit (A1-C4):**

1 tonne with a specified reference service life (RSL) of 60 years.

**Valid to**

01.12.2019

**The EPD has been worked out by:**

Christofer Skaar, PhD



**Comparability:**

EPD of construction products may not be comparable if they do not comply with EN 15804 and are seen in a building context.

**Verification:**

Independent verification of data, other environmental information and EPD has been carried out in accordance with ISO14025, 8.1.3 and 8.1.4

 externally  internally 

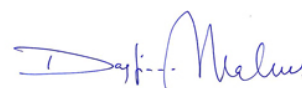

Helene Sedal, PhD

(Independent verifier approved by EPD-Norway)

**Year of study:**

2014

Approved



Dagfinn Malnes

Managing Director of EPD-Norway

**Declared unit (A1-A3):**

1 tonne of manufactured product.

Key environmental indicators	Unit	Cradle to gate A1 - A3	Transport *****
Global warming	kg CO <sub>2</sub> -eqv	1,87E+02	49,1
Energy use	MJ	2,06E+03	7,67E+02
Dangerous substances	*	-	-

\* The product contains no substances from the REACH Candidate list or the Norwegian priority list

\*\*\*\*\* Estimate of transport from production site to central warehouse in Oslo, Norway. Calculation of this distance is required by the PCR. Note that the product is normally transported directly to construction site (as described in A4).

## Product

### Product description:

Various sizes, shapes and lengths. Minimum cross-section size is 200 to 200 mm. From one up to several brackets. Precast columns are assembled at foundation with screw type fastening (column shoes) or by installing them in socket type foundations.

### Product specification

The composition of the product is described in the table below:

Materials	kg	%
Aggregate	405	40,5
Sand	340	34,0
Cement	139	13,9
Water	70	7,0
Steel	45	4,5
Additives	< 1	< 0,1 %

### Technical data:

The product is certified in accordance with the EN13225:2004/AC:2006 standard. Properties (min/max):  
Compressive strength: C25/30 - C50/60.  
Length: 2000 - 11500 mm.  
Cross-section: 200x200 - 900x900.

### Market:

Norway

### Reference service life:

Expected reference service life (RSL) is 60 years.

## LCA: Calculation rules

### Functional unit (A1-C4):

1 tonne with a specified reference service life (RSL) of 60 years.

### System boundary:

Cradle to grave. Included modules production and construction are A1-A5, included modules for end of life are C1, C2 and C4. In the use stage B1-B5 has no activity, and B6-B7 are not relevant. The waste processing stage (C3) has no activity, as waste processing takes place in C1. Module D is not declared. Production process at Skonto includes mould preparation, casting of concrete product, curing and finalising. The product is then loaded on trucks for transportation to building site.

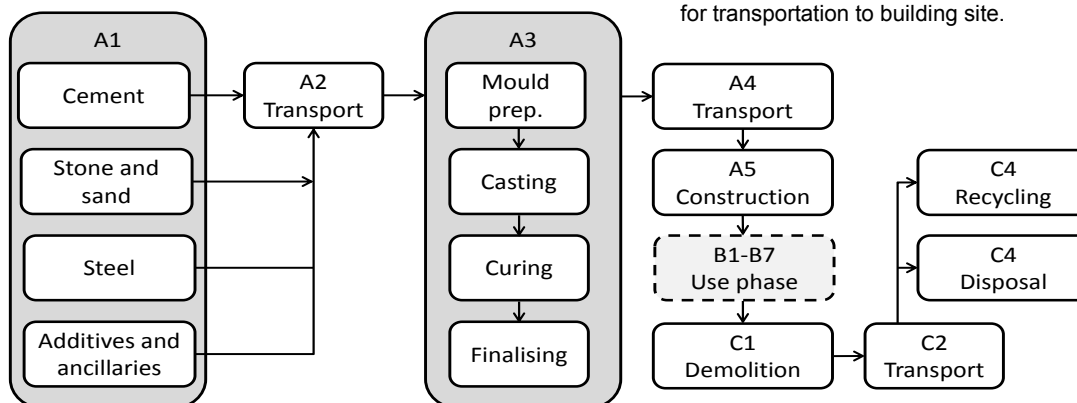


Figure 1: Flow chart of production system

### Data quality:

Data for Skonto Prefab production facilities is for 2013. Transport data is for 2014, but valid for 2013. Material and energy use per declared unit has been calculated using expert judgment and validated against annual consumption. Generic data is from the ecoinvent 2.2 database (2003-2007).

### Allocation:

The allocation is made in accordance with the provisions of EN 15804. Energy, water and produced waste is allocated on expert judgment to each product group produced by Skonto Prefab to reflect differences between products. The basis for allocation has been information in Building Product Declarations (BPDs) for Skonto Prefab products.

### Cut-off criteria:

All important raw materials and energy use are included. In the production process, raw materials and energy of low amounts are not included (<1%). These cut-off rules do not apply to dangerous substances.

## LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

The scenario for transportation from production place to user is defined as transport from Salaspils (Latvia) to Stavanger (Norway). This is a typical transportation distance for Skonto Prefab products.

### Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/tkm)
Truck	75	Lorry, >32t, EURO4	975	0,019 l/tkm	18,62
Boat	65	Ferry	469	0,003 l/tkm	1,31

### Installation in the building (A5)

	Unit	Value
Auxiliary	kg	-
Water consumption	m <sup>3</sup>	-
Electricity consumption	kWh	-
Other energy carriers	MJ	42
Material loss	kg	-
Output materials from waste treatment	kg	-
Dust in the air	kg	0,012

#### Description, A5:

Scenario is modelled as installation of a typical concrete product in a building. Only fossil fuel use during installation is included. Breakage and other inputs are negligible.

### End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	0
Collected as mixed construction waste	kg	0
Reuse	kg	0
Recycling	kg	0
Energy recovery	kg	0
To landfill	kg	1000

#### Description, C1, C3 and C4:

End of Life scenario is based on materials being separated on site. 99 % of steel and 90 % of concrete is recycled. The remaining fractions are sent to landfill (module C4). Energy for material separation is included in C1, therefore there is no activity in C3.

### Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck		Lorry, 16-32t	15	0,0356 l/tkm	0,53

#### Description, C2:

Transport to reuse of concrete as aggregate and material recycling of steel.

### Use stage (B1-B7)

There is no significant interaction with the environment in modules B1, B2, B3, B4 and B5, as there is no need for maintenance, repair or refurbishment in the use stage. B6 and B7 are specified as not relevant (MNR) in NPCR020, and are therefore not included. This must not be regarded as an indicator result of zero for B6 and B7.

**LCA: Results**

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	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	X	X	X	X	X	X	X	MNR	MNR	X	X	X	X	MND

**Environmental impact**

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4
GWP	kg CO <sub>2</sub> -eqv	1,87E+2	8,76E+1	3,66E+0	0	0	0	0	0	9,16E+0	2,48E+0	0	1,49E+0
ODP	kg CFC11-eqv	9,46E-6	1,45E-5	4,56E-7	0	0	0	0	0	1,14E-6	3,92E-7	0	3,15E-7
POCP	kg C <sub>2</sub> H <sub>4</sub> -eqv	3,30E-2	1,54E-2	7,21E-4	0	0	0	0	0	1,80E-3	3,02E-4	0	3,07E-4
AP	kg SO <sub>2</sub> -eqv	4,49E-1	4,41E-1	2,81E-2	0	0	0	0	0	7,03E-2	9,50E-3	0	9,67E-3
EP	kg PO <sub>4</sub> <sup>3-</sup> -eqv	1,85E-1	1,05E-1	6,56E-3	0	0	0	0	0	1,64E-2	2,53E-3	0	2,34E-3
ADPM	kg Sb-eqv	5,26E-4	3,09E-4	5,80E-7	0	0	0	0	0	1,45E-6	6,84E-6	0	1,47E-6
ADPE	MJ	1,69E+3	1,39E+3	5,06E+1	0	0	0	0	0	1,27E+2	3,66E+1	0	2,86E+1

**GWP** Global warming potential; **ODP** Depletion potential of the stratospheric ozone layer; **POCP** Formation potential of tropospheric photochemical oxidants; **AP** Acidification potential of land and water; **EP** Eutrophication potential; **ADPM** Abiotic depletion potential for non fossil resources; **ADPE** Abiotic depletion potential for fossil resources

**Resource use**

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4
RPEE	MJ	9,37E+1	2,24E+1	2,11E-1	0	0	0	0	0	5,26E-1	5,29E-1	0	2,25E-1
RPEM	MJ	4,32E+0	0,00E+0	0,00E+0	0	0	0	0	0	0,00E+0	0,00E+0	0	0,00E+0
TPE	MJ	9,80E+1	2,24E+1	2,11E-1	0	0	0	0	0	5,26E-1	5,29E-1	0	2,25E-1
NRPE	MJ	1,97E+3	1,49E+3	5,17E+1	0	0	0	0	0	1,29E+2	3,90E+1	0	2,97E+1
NRPM	MJ	0,00E+0	0,00E+0	0,00E+0	0	0	0	0	0	0,00E+0	0,00E+0	0	0,00E+0
TRPE	MJ	1,97E+3	1,49E+3	5,17E+1	0	0	0	0	0	1,29E+2	3,90E+1	0	2,97E+1
SM	kg	4,90E+1	0,00E+0	0,00E+0	0	0	0	0	0	0,00E+0	0,00E+0	0	0,00E+0
RSF	MJ	0,00E+0	0,00E+0	0,00E+0	0	0	0	0	0	0,00E+0	0,00E+0	0	0,00E+0
NRSF	MJ	0,00E+0	0,00E+0	0,00E+0	0	0	0	0	0	0,00E+0	0,00E+0	0	0,00E+0
W	m <sup>3</sup>	3,95E+0	8,43E-1	1,42E-2	0	0	0	0	0	3,55E-2	1,82E-2	0	2,36E-2

**RPEE** Renewable primary energy resources used as energy carrier; **RPEM** Renewable primary energy resources used as raw materials; **TPE** Total use of renewable primary energy resources; **NRPE** Non renewable primary energy resources used as energy carrier; **NRPM** Non renewable primary energy resources used as materials; **TRPE** Total use of non renewable primary energy resources; **SM** Use of secondary materials; **RSF** Use of renewable secondary fuels; **NRSF** Use of non renewable secondary fuels; **W** Use of net fresh water

**End of life - Waste**

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4
HW	kg	4,08E-3	1,81E-3	2,66E-5	0	0	0	0	0	6,65E-5	3,86E-5	0	1,48E-5
NHW	kg	3,48E+1	1,40E+1	3,41E-2	0	0	0	0	0	8,53E-2	2,42E-1	0	9,55E+1
RW	kg	3,87E-3	1,35E-3	1,53E-5	0	0	0	0	0	3,82E-5	3,25E-5	0	1,42E-5

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

**End of life - Output flow**

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4
CR	kg												
MR	kg										9,04E+2		
MER	kg												
EEE	MJ												
ETE	MJ												

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: 9,0 E-3 =  $9,0 \cdot 10^{-3} = 0,009$

**Additional Norwegian requirements**
**Electricity**

Latvian electricity mix is used for production site. The main electricity sources are hydropower (39 %), natural gas (35 %) and electricity imported from Russia (18 %). Data are based on ENTSO-E for 2013.

Greenhouse gas emissions per MJ: 0.127 kg CO<sub>2</sub>-eqv/MJ

Greenhouse gas emissions per kWh: 0.459 kg CO<sub>2</sub>-eqv/kWh

**Dangerous substances**

None of the following substances have been added to the product: Substances on the REACH Candidate list (of 16.6.2014) of substances of very high concern or substances on the Norwegian Priority list (of 11.11.2013) or substances that lead to the product being classified as hazardous waste. The chemical content of the product complies with regulatory levels as given in the Norwegian Product Regulations. As the product contains no dangerous substances on the REACH Candidate list or the Norwegian priority list, it is assumed that there are no toxic effects occurring in the use stage.

**Transport**

Transport from production site to central warehouse in Norway is defined as transport to Oslo. The product is not normally transported to a central warehouse, but directly to construction site (see description of module A4).

**Indoor environment**




The product has not been tested for emissions to indoor environment. The product contains no dangerous substances on the REACH Candidate list or the Norwegian priority list, and a water-based release agent is used. Based on this it is assumed that the product has a negligible impact on the indoor environment and therefore meets the requirements for low emissions (M1) according to EN15251:2007 Appendix E.

**Carbon footprint**

Carbon footprint has not been worked out for the product.

## Bibliography

ISO 14025:2006	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
Skaar, C. (2014)	LCA report for Skonto Prefab SIA. MiSA EPD Report No. 1-2014.
NPCR020 (2012)	<i>Precast concrete products . EPD-Norway.</i>

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