

Environmental Product Declaration



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

Concrete roofing tiles and fittings

from

BMI Sverige AB



Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-07747
Publication date:	2022-12-15
Valid until:	2027-12-14



EPD Profile

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<p>CEN standard EN 15804 serves as the Core Product Category Rules (PCR)</p>
<p>Product category rules (PCR): The International EPD System PCR for Construction 2019:14, version 1.2.3. UN CPC Code: 3755</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: Approved by: The international EPD System</p>
<p>Procedure for follow-up of data during EPD validity involves third party verifier:</p> <p><input type="checkbox"/> Yes <input checked="" 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 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 organization

BMI Sverige AB manufactures, sells, and delivers Concrete roofing tiles and fittings to professional customers and retailers on the Swedish market. BMI Sverige AB offers an entire roof system with smart solutions, we are your personal and flexible supplier of concrete roofing tiles and fittings. Our headquarters and production site are located in Jönåker in Södermanland county.

For more information regarding the products or the organization, see EPD owner's website:

www.bmisverige.se

Name and location of production sites

The Concrete roofing tiles and fittings covered in this EPD are produced in Jönåker in Sweden, located in Södermanland county.

EPD Product information

Product name: Concrete roofing tiles and fittings.

Product identification:

This EPD covers concrete roofing tiles and fittings. All products covered are identified with product names in Appendix A.

Product description:

The Concrete roofing tiles and fittings are made of cement, gravel, paint, pigment, hotmelt and cast oil.



Figure 1 Illustration of BMI's Concrete roofing tiles and fittings

This EPD is valid for all products listed in Appendix A. Specifications for each product can be found at www.bmisverige.se

UN CFC code: 3755

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.

LCA Information

Declared unit: 1 tonne of average Concrete roofing tiles and fittings.

Reference service life: 50 years

Time representativeness: The data and information collected and modelled for refers to the production year of 2020. The general datasets from the used databases are all representative and valid for the year of 2020.

Database(s) and LCA software used: The LCA software SimaPro 9.3.0.3 was used in the assessment, with data from specific raw material EPDs and the databases Ecoinvent 3.8 and Environmental footprint (EF) database 2.0.

Description of system boundaries: Cradle-to-gate with options, i.e. life cycle stages A1- A4, C1-C4 and D.

Excluded lifecycle stages: Life cycle stages A5 and B1-B7 are not declared.

Allocation methodology: The cut-off method has been applied within the product system. For allocations between product systems, the Polluter-pays allocation method has been used.

Cut-off: All raw materials according to the product formula, including their respective energy demands during extraction and production have been considered, as well as the main packaging materials used to prepare the final product for distribution. Some packaging materials and production solvents that constitute less than 1% of the product weight have been excluded. This cut-off rule does not apply for hazardous material and substances.

More information:

The EPD obtained for cement and pigments from the supplier is produced in accordance with the PCR 2012. Hence it lacks information regarding the additional impact categories considered by the PCR 2019. These data gaps were filled with generic data from Ecoinvent 3.8.

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

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

For more information about the underlying LCA study, contact the LCA practitioner Sayali Bhalekar (Sayali.Bhalekar@dge.se).

System diagram

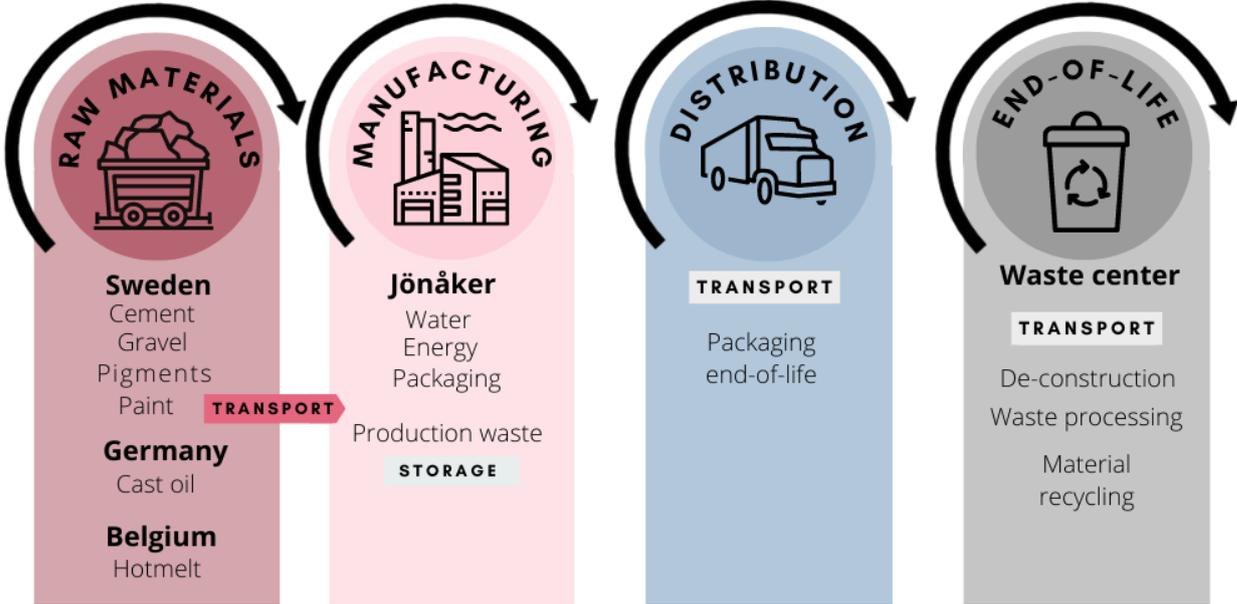


Figure 2 An illustration of the process within the system boundary.

Table 1 An overview of the life cycle phases declared for in this LCA. The nomenclature A1-C4 refers to life cycle phase categorization used by the standard EN 15804.

	Product stage			Construction process stage	Use stage								End of life stage				Benefits and loads beyond the system boundary	
	Raw materials	Transport	Manufacturing	Transport	Construction-Installation	Use stage	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Reuse, recovery recycle 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	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X	
Geography	EU 27			-	-	-	-	-	-	-	-	-	SE					
Specific data used	>60%			N/A														
Variation - products	0%				N/A													
Variation - sites	0%				N/A													

*SE Sweden *N/R Not Relevant *N/A Not Applicable MND Module Not Declared

Description of life cycle stages A1-A4 and C1-C4: Raw material extraction and production, transport from supplier, manufacturing on site, distribution, and end of life.

Table 2 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 waste generated for these processes. The energy generation needed for these processes (extraction, refining and transport of energy from primary energy sources).
A2 Transport	The external transportation of raw materials from the suppliers to the manufacturing site. The modelling includes transportation on road and/or water, with processes for each raw material. This stage also includes transportation for packaging material and fuels used in the manufacturing process (A3).
A3 Manufacturing	The manufacturing of Concrete roofing tiles and fittings takes place at the production site in Jönåker. All materials are weighed in by a computer driven process. Gravel, cement, water and pigments are mixed to form concrete. The mix is extruded to tiles and placed on pallets. The tiles are coated with first of two layers of water based acrylic paint coating. After the first layer they are matured in a tempered chamber for 18 hours. They are then removed from the pallets and coated with a second layer of paint. Strips of hotmelt are applied on the underside of the tiles to prevent abrasion on the painted side. After the second layer of paint, they are left to dry in the carousel for 20 min. The finished Concrete roofing tiles and fittings are bundled with plastic stripes in 4-pack, 10 packs in a row and 2 times 3 rows on a wooden JPA-pall, which are finally covered with plastic foil. The JPA-pall is reused 60% of the times. Electricity, fuel, waste generation, and packaging materials are all included in this stage.
A4 Distribution	When the Concrete roofing tiles and fittings are produced and packaged, they are either stored at the storage near the manufacturing site in Jönåker or distributed directly to the end users. This life cycle phase also includes the impacts from end of life of packaging waste.
C1-C4 End of life	The service life for the Concrete roofing tiles and fittings is 50 years. After its lifetime, the effete product is assumed to be deconstructed and transported to a waste management centre. The majority of the raw material in the products are made of cement, gravel, pigments and paint; hence they are assumed to be 100% material recycled.
D Reuse, recovery recycle potential	For Concrete roofing tiles and fittings, 100% of the product is assumed to be recycled, hence benefits are gained from the future use of demolished concrete to crushed gravel as a primary material in another system. Considering the incineration of packaging material there is gain in form of recovered energy for both the packaging materials wood and plastic.

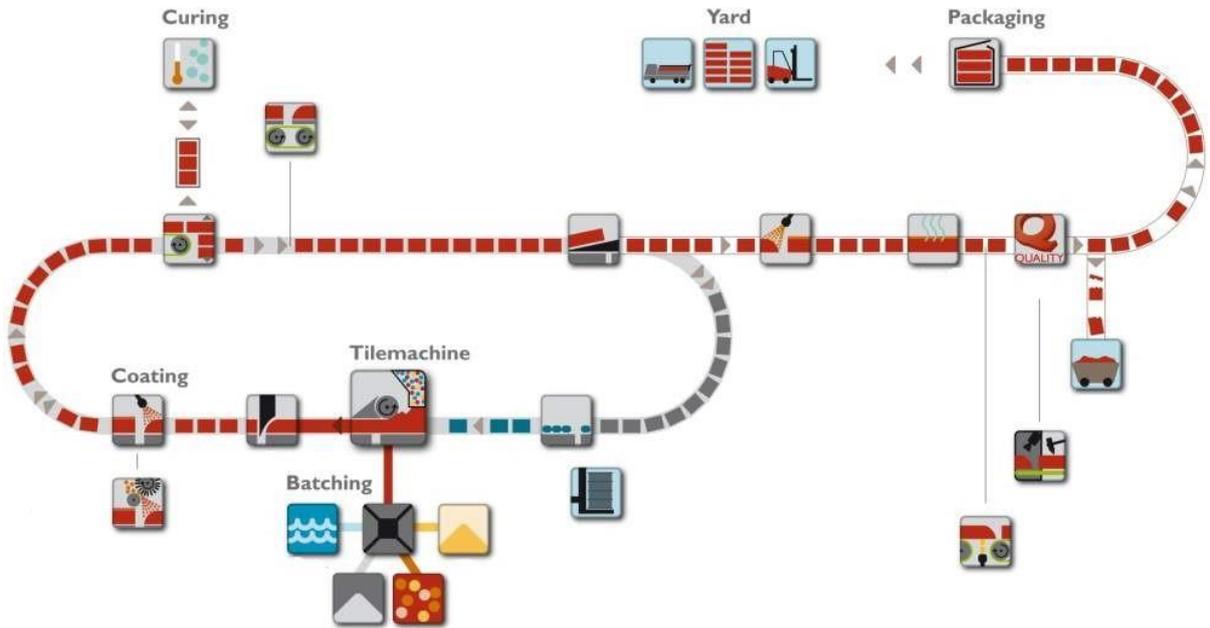


Figure 3 Representation of the manufacturing process of BMI's Concrete roofing tiles and fittings in Jönåker.

Content declaration per declared unit

1 tonne of Concrete roofing tiles and fittings

Table 3 Content declaration for the declared unit. None of the substances are regarded as SVHCs (Substances of very high concern) as defined in the REACH legislation.

Raw materials	Weight, kg/DU	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Cement	203,9	-	-
Natural gravel 1	256,9	-	-
Natural gravel 2	477,3	-	-
Water	3,05	-	-
Pigments	10,2	-	-
Paint	47,6	-	-
Cast oil	0,73	-	-
Hotmelt	0,13	-	-

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Plastic band	0,42	0,042%	-
Plastic film	0,26	0,026%	-
Plastic sheet	0,01	0,001%	-
JPA pallet	21,6	2,16%	0,29

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

For construction product EPDs compliant with EN15804, the content declaration shall list 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: i.e. >0.1 % of the weight of the product. **No such substances are used in the production of the products covered in this EPD.**

Environmental performance

Potential environmental impacts according to EN 15804 results per DU

Table 4 Results for mandatory environmental impact categories for the life cycle phases of BMI's Concrete roofing tiles and fittings.

1 tonne of Concrete roofing tiles and fittings.		A1 Raw material extraction and production	A2 Transport from supplier	A3 Manufacturing	A4 Distribution	C1-C4 End of life	D Beyond system boundary
Impact category	Unit						
Acidification	Mol H ⁺ eq.	4,07E-01	1,59E-02	2,49E-02	2,73E-02	5,10E-02	-3,01E-02
Eutrophication (Aquatic freshwater)	kg P eq.	2,30E-02	2,60E-04	1,13E-03	5,42E-04	3,39E-04	-7,84E-04
Eutrophication (Aquatic marine)	Kg N eq.	1,24E-01	4,51E-03	6,98E-03	6,94E-03	2,04E-02	-8,62E-03
Eutrophication (Terrestrial)	mol N eq.	1,38E+00	4,93E-02	7,38E-02	7,43E-02	2,23E-01	-1,16E-01
Global warming (GWP – Fossil)	kg CO ₂ eq.	1,61E+02	4,05E+00	8,10E+00	9,60E+00	7,29E+00	-3,42E+00
Global warming (GWP – Biogenic)	kg CO ₂ eq.	4,68E+00	9,67E-03	5,65E+00	1,24E+01	1,23E-02	-1,93E-01
Global warming (GWP – Land use and Land use change)	kg CO ₂ eq.	4,72E-02	1,50E-03	5,06E-02	2,91E-03	1,71E-03	-2,76E-03
Total Global warming (GWP – Total)	kg CO ₂ eq.	1,66E+02	4,06E+00	1,38E+00	2,20E+01	7,30E+00	-3,61E+00
Ozone layer depletion	kg CFC-11 eq.	4,31E-06	7,89E-07	5,37E-07	1,55E-06	1,28E-06	-3,70E-07
Abiotic depletion, minerals and metals	kg Sb eq.	3,73E-04	9,56E-06	2,95E-05	1,88E-05	1,37E-05	-7,24E-05
Abiotic depletion, fossil fuels	MJ	8,16E+02	6,38E+01	9,55E+01	1,26E+02	1,03E+02	-3,88E+01
Photochemical oxidation	kg NMVOC eq	3,85E-01	1,66E-02	2,43E-02	2,78E-02	6,36E-02	-2,72E-02
Water deprivation potential (WDP)	m ³	1,53E+01	2,18E-01	3,38E+00	4,38E-01	2,27E-01	-9,94E-01

Potential environmental impact – additional mandatory and voluntary indicators

Table 5 Results for additional mandatory and voluntary environmental impact indicators for the life cycle phases of BMI's Concrete roofing tiles and fittings.

1 tonne of Concrete roofing tiles and fittings.		A1 Raw material extraction and production	A2 Transport from supplier	A3 Manufacturing	A4 Distribution	C1-C4 End of life	D Beyond system boundary
Impact category	Unit						
GWP – GHG	kg CO ₂ eq.	1,61E+02	4,05E+00	8,15E+00	9,61E+00	7,29E+00	-3,42E+00
Human toxicity Cancer	CTUh	4,13E-08	1,39E-09	9,50E-09	3,08E-09	2,50E-09	-6,96E-09
Human toxicity Non-Cancer	CTUh	1,55E-06	5,43E-08	7,11E-08	1,22E-07	6,29E-08	-7,59E-08
Ecotoxicity, freshwater	CTUe	1,41E+03	5,08E+01	1,02E+02	1,04E+02	7,11E+01	-7,53E+01

Use of resources

1 tonne of Concrete roofing tiles and fittings

Table 6 Result for resource use for all the life cycle phases of BMI's Concrete roofing tiles and fittings.

1 tonne of Concrete roofing tiles and fittings.			A1 Raw material extraction and production	A2 Transport from supplier	A3 Manufacturing	A4 Distribution	C1- C4 End of life	D Beyond system boundary
Parameter	Unit							
Primary energy resources - Renewable	Use as energy carrier	MJ, net calorific value	9,44E+01	8,27E-01	6,51E+01	1,64E+00	1,02E+00	-1,66E+01
	Used as raw materials	MJ, net calorific value	0	0	1,81E+02	0	0	0
	TOTAL	MJ, net calorific value	9,44E+01	8,27E-01	2,47E+02	1,64E+00	1,02E+00	-1,66E+01
Primary energy resources - Non-renewable	Use as energy carrier	MJ, net calorific value	8,81E+02	6,50E+01	1,94E+02	1,28E+02	1,05E+02	-5,21E+01
	Used as raw materials	MJ, net calorific value	0	0	2,42E+01	0	0	0
	TOTAL	MJ, net calorific value	8,81E+02	6,50E+01	2,18E+02	1,28E+02	1,05E+02	-5,21E+01
Secondary material	kg		1,56E+01	0	0	0	0	9,50E+02
Renewable secondary fuels	MJ, net calorific value		9,20E+01	0	0	0	0	7,95E+01
Non-renewable secondary fuels	MJ, net calorific value		4,04E+02	0	0	0	0	6,35E+00
Net use fresh water	m ³		1,28E+00	1,34E-02	4,68E-02	3,06E-02	1,33E-02	-9,94E-01

Waste production and output flows

1 tonne of Concrete roofing tiles and fittings

Waste production

Table 7 Results for waste production for all the life cycle phases of BMI's Concrete roofing tiles and fittings.

1 tonne of Concrete roofing tiles and fittings		A1 Raw material extraction and production	A2 Transport from supplier	A3 Manufacturing	A4 Distribution	C1-C4 End of life	D Beyond system boundary
Impact category	Unit						
Hazardous waste disposed	kg	1,06E-02	0	2,82E-02	1,44E-05	0	0
Non-hazardous waste disposed	kg	7,79E+00	0	1,46E-01	0	0	-2,12E-06
Radioactive waste disposed	kg	8,51E-04	0	0	0	0	0

Output flows

Table 8 Outflows from all the life cycle phases of BMI's Concrete roofing tiles and fittings.

1 tonne of Concrete roofing tiles and fittings		A1 Raw material extraction and production	A2 Transport from supplier	A3 Manufacturing	A4 Distribution	C1-C4 End of life	D Beyond system boundary
Impact category	Unit						
Materials for reuse	kg	0	0	0	0	0	0
Materials for recycling	kg	4,88E-02	1,82E-06	1,62E+01	0	1,00E+03	-2,50E-03
Materials for energy recovery	kg	3,32E-01	1,82E-06	1,57E+00	2,69E-06	8,53E-05	-2,50E-03
Energy recovery	MJ	1,19E+00	0	0	0	0	-1,01E+02

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Appendix A

Products	Specification
Jönåker Polar	Matt, tegelröd Matt, svart Matt, grå
Jönåker Protector 2.0	Blank, tegelröd Blank, röd Blank mörkgrå Blank, svart
Jönåker Elegant	Tegelröd Svart Mellangrå Ljusgrå

