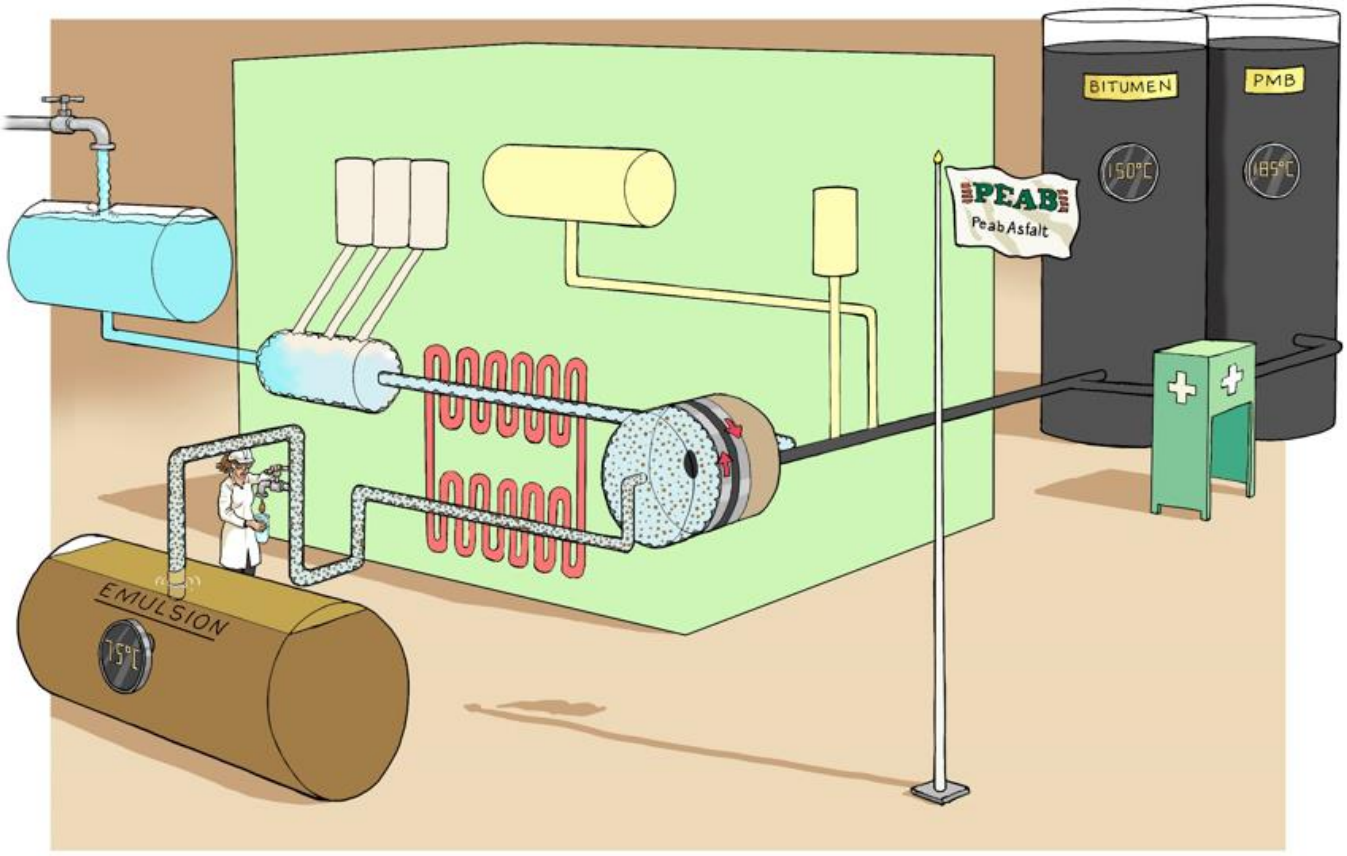

Environmental product declaration – EPD

Environmental product declaration according ISO 14025 and EN 15 804:2012+A2:2019

Bitumen emulsion, BE

Programme: The International EPD® System, www.environdec.com

Programme operator: EDP International AB

EPD registration number: S-P-04439

Publication date: 2021-12-06

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Peab Asfalt

Programme information

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

Product category rules (PCR): PCR 2019:14 Construction products version 1.1, UN CPC code: 153
PCR review was conducted by: Claudia A. Peña. The Technical Committee of the International EPD System, info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☒ External ☐ Internal covering ☐ EPD process certification ☒ EPD verification
Third party verifier: Pär Lindman, Individual verifier approved by Environdec. *In case of recognised individual verifiers:* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ 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.

Company information

Owner of the EPD

Peab Asfalt AB, Box 1282, 262 24 Ängelholm, Sweden, tel. 0431-89 000

Description of Peab Asfalt AB

Peab Asfalt AB, a subsidiary of Peab AB, is one of Sweden's leading asphalt companies and the only one with a nationwide coverage, specializing in the production and deployment of hot, semi-hot, cold-mixed asphalt and sealcoating. The company has approximately 700 employees, operating all over in Sweden and has a subsidiary in Norway, Finland and Denmark.

Peab Asfalt's ambition is to take responsibility throughout the entire value chain for the environmental impact. The endeavour within the company is to reduce its climate impact, to ensure a highly material effective operation and work actively to phase out environmental and health hazardous materials.

Peab Asfalt AB is striving to reduce the waste of old asphalt in coating work by reusing as much as possible in the manufacture of new asphalt. Reuse of asphalt directly in place, contributes to reduced transportations to landfills, as well as the need for bitumen and rock materials.

Peab Asfalt AB is quality certified according to ISO 9001 and environmentally certified according to ISO 14001. All asphalt sites provide asphalt that is CE marked, in accordance with the requirements of SS-EN ISO 13108-1-8 and SS-EN ISO 13108-20-21.

More information at peabasfalt.se.

Production site

All products included in this declaration is produced on Peab production site in Västerås, Sweden.

Product information

Product description

The product bitumen emulsion (BE) is used for road application. Emulsion is used together with gravel to produce and maintain road surfaces. The products presented in this declaration differs from each other in the production, in amount of each ingredient. This makes the emulsion obtain different characteristics like, viscosity, breaking speed etc. It includes the bitumen types PaveCoat C 50 B 2, C69 B 2, C 60 B 2, C 67 B 2 and PaveGrip C 69 BP 2. The former designation of the bitumen types can be seen in the table below.

Table 1: An overview of the new and old designation for bitumen emulsion.

New designation	Former designation
C 50 B 2	BE 50R
C 69 B 2	BE 69R
C 60 B 2	BE 60R
C 67 B 2	-
C 69 BP 2	BE 69R SBS

The bitumen emulsions declared in this EPD fulfil the standard EN 13808 and the technical requirements from the Swedish Transport Administration according to TDOK 2013:0529. BE is CE-marked with number 0402.

BE has the density 1 Mg/m^3 and a lifespan that is longer than 20 years. Road applications with BE are reused in the same way as other coatings and contain non-hazardous subjects.

More information can be found in the safety data sheet (SDS) for each product.

Product identification

Bitumen emulsion includes bitumen phase and heated water phase that are mixed and grounded together. The water phase contains water, emulsifier, calcium chloride and hydrochloric acid. The bitumen phase contains warm bitumen, and sometime self-made polymer bitumen (PMB), naphtha, and adhesives. The emulsion is pumped to a storage tank for unloading. All production takes place to order, which means that the storage time is short for finished product.

The geographical coverage for all products in this declaration is Europe

UN CPC code: 15330

LCA information

Declared unit
The declared unit is 1 tonne (1000 kg) of bitumen emulsion at production plant gate.

Time representativeness
Collected data for this declaration is based on information from the year 2019.

Used databases and LCA software
The LCA software GaBi 9 Professional was used as well as databases provided by Thinkstep AG/Sphera (2019).

System boundaries
The LCA covers the cradle-to gate stages, i.e. extraction and transports of raw materials (upstream modules A1-A2) and manufacturing to passage of plant gate (core module A3). Transportation to construction site (module A4) has been excluded since an average transport length will be misleading because the transportation length can variate a lot. The end-of-life modules (C-D) are excluded, since the products need to be physically integrated with other raw materials (gravel and ballast) during installation (A5) to be applied to roads.

Table 2: Life cycle stages declared in this study. An "X" means that the stage is included and MND (Module Not Declared) means it is not. Since all product variants are presented separately and only one site is included, the variation not reported

Life cycle stage	Included in this study (X)	Geography	Specific data used (% of GWP GHG)
A1) Raw material supply	X	Global	50% PMB 10%CE
A2) Transport	X	Global	100%
A3) Manufacturing	X	Sweden	100%
A4) Transport	MND	N.A.	N.A.
A5) Construction installation	MND	N.A.	N.A.
B1) Use	MND	N.A.	N.A.
B2) Maintenance	MND	N.A.	N.A.
B3) Repair	MND	N.A.	N.A.
B4) Replacement	MND	N.A.	N.A.
B5) Refurbishment	MND	N.A.	N.A.
B6) Operational energy use	MND	N.A.	N.A.
B7) Operational water use	MND	N.A.	N.A.
C1) Deconstruction, demolition	MND	N.A.	N.A.
C2) Transport	MND	N.A.	N.A.
C3) Waste processing	MND	N.A.	N.A.
C4) Disposal	MND	N.A.	N.A.
D) Reuse, recovery, recycling potential	MND	N.A.	N.A.

The upstream data concerning bitumen production contain several allocations made by the data providers. These include allocation in the following steps: crude oil extraction, refinery and storage of bitumen. At the crude oil extraction step, burdens were allocated by oil-equivalents (energy allocation). At refinery, allocation had been avoided by using an approach following up energy flows within the distillation column, using physical relationships, as proposed in ISO 14040 and ISO 14044. Allocation for the storage stage of the life cycle was based upon a mass balance.

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.

System diagram

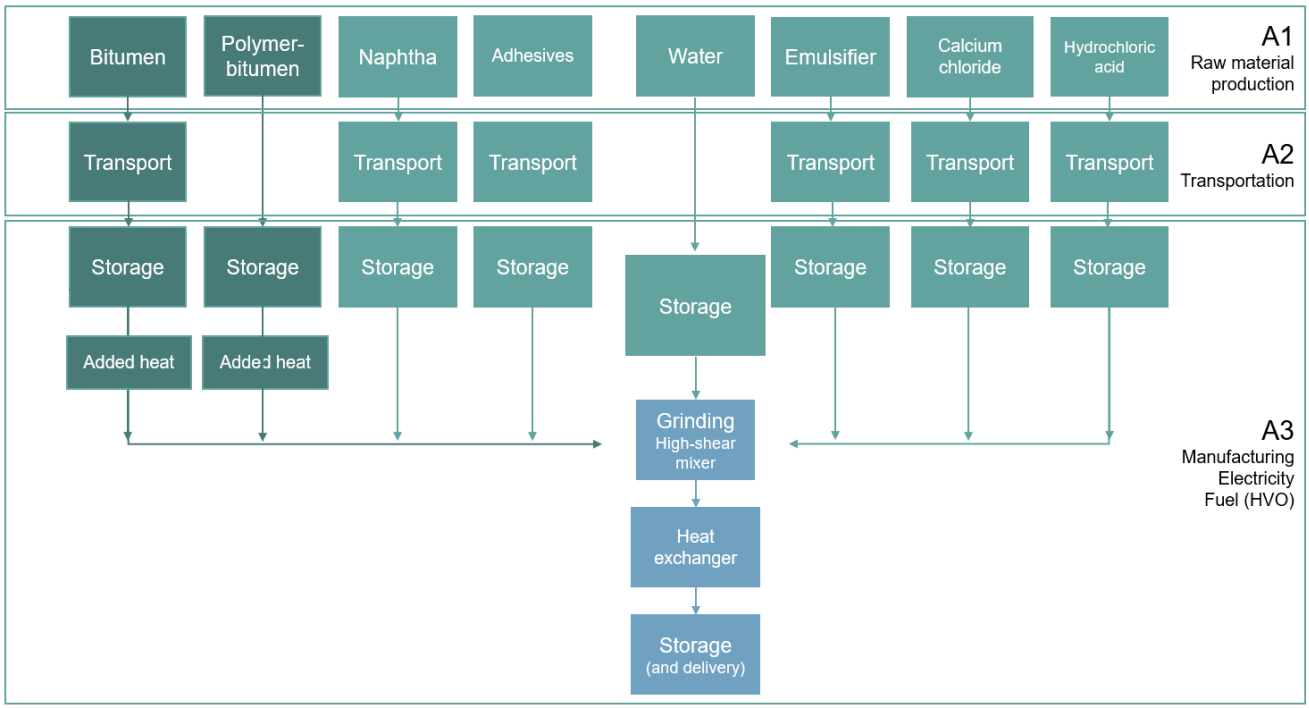

Figure 1: An overview of the studied product system for production of cationic emulsion (PB).

Content declaration

Bitumen emulsion

Table 3: Information of the composition of declared bitumen types.

	PaveCoat				PaveGrip
Materials	**C 50 B 2**	**C 69 B 2**	**C 60 B 2**	**C 67 B 2**	**C 69 BP 2**
Bitumen	>62%	>62%	>62%	>62%	>62%
Water	<35%	<35%	<35%	<35%	<35%
Additives	0,1-1%	0,1-1%	0,1-1%	0,1-1%	0,1-1%
Naphtha	0,3-2%	0,3-2%	0,3-2%	0,3-2%	0,3-2%

The values for each environmental parameter are presenting the five PaveCoat products C 50 B 2, C 69 B 2, C 60 B 2, C 69 BP2 and C 67 B 2 in the tables below (table 3 – table 6).

Environmental performance

Potential environmental impact

Table 4: Results of the LCA, modules A1-A3 – Potential environmental impact for 1 tonne (1000 kg) of specific bitumen types, PaveCoat C 50 B 2, C69 B 2, C 60 B 2, C 67 B 2 and PaveGrip C 69 BP 2.

			PaveCoat				PaveGrip
PARAMETER		**ENHET**	**C 50 B 2**	**C 69 B 2**	**C 60 B 2**	**C 67 B 2**	**C 69 BP 2**
Indicator for climate impact, GWP – GHG		kg CO_2 eq.	1,11E+02	1,40E+02	1,32E+02	1,33E+02	1,87E+02
Global warming potential (GWP)	Fossil	kg CO_2 eq.	1,09E+02	1,36E+02	1,28E+02	1,28E+02	1,85E+02
	Biogenic	kg CO_2 eq.	-3,19E+00	-1,80E+00	-1,25E+00	-2,17E+00	1,01E+01
	Land use and transformation	kg CO_2 eq.	1,34E-01	1,70E-01	1,61E-01	1,65E-01	1,65E-01
	TOTAL	kg CO_2 eq.	1,06E+02	1,34E+02	1,26E+02	1,26E+02	1,95E+02
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC 11 eq.	6,12E-06	8,04E-06	7,53E-06	7,96E-06	7,73E-06
Acidification potential (AP)		mole H^+ eq.	1,10E+00	1,41E+00	1,32E+00	1,37E+00	1,48E+00
Eutrophication potential (EP)		kg PO_4^{3-} eq.	9,51E-03	1,01E-02	1,01E-02	1,02E-02	1,47E-02
Eutrophication aquatic freshwater		kg P eq.	3,10E-03	3,28E-03	3,30E-04	3,33E-03	4,78E-03
Eutrophication aquatic marine		kg N eq.	1,07E+00	1,14E-01	1,15E-01	1,12E-01	1,54E-01
Eutrophication terrestrial		mole N eq.	2,07E+00	2,58E+00	2,45E+00	2,52E+00	2,89E+00
Photochemical ozone formation		kg NMVOC eq.	7,57E-01	9,94E-01	9,29E-01	9,63E-01	1,06E+00
Depletion of abiotic resources – minerals and metals		kg Sb eq.	3,32E-04	3,32E-04	3,39E-04	3,38E-04	3,37E-04
Depletion of abiotic resources – fossil fuels		MJ, net calorific value	2,39E+04	3,20E+04	2,97E+04	3,10E+04	3,23E+04
Water scarcity		m^3 eq.	5,53E+01	4,85E+01	5,13E+01	5,04E+01	5,76E+01
Particulate matter emissions		Disease incidences	6,27E-06	8,01E-06	7,56E-06	7,80E-06	8,58E-06
Ionizing radiation, human health		kBq U235 eq.	1,02E+00	9,74E-01	9,93E-01	9,07E-01	8,43E+00
Eco-toxicity (freshwater)		CTUe	1,21E+03	1,21E+03	1,22E+03	8,74E+02	2,00E+03
Human toxicity, cancer effects		CTUh	3,92E-06	3,94E-06	3,94E-06	3,93E-06	6,53E-06
Human toxicity, non-cancer effects		CTUh	2,95E-06	3,63E-06	2,81E-06	3,86E-06	4,05E-06
Land use related impacts/soil quality		Pt	-9,16E+02	-9,35E+02	-9,59E+02	-9,66E+02	-9,11E+02

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

Use of resources

Table 5: Results of the LCA, modules A1-A3 – Use of resources for 1 tonne (1000 kg) of specific bitumen types, PaveCoat C 50 B 2, C69 B 2, C 60 B 2, C 67 B 2 and PaveGrip C 69 BP 2.

			PaveCoat				PaveGrip
PARAMETER		**UNIT**	**C 50 B 2**	**C 69 B 2**	**C 60 B 2**	**C 67 B 2**	**C 69 BP 2**
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	3,38E+02	3,52E+02	3,56E+02	3,57E+02	4,12E+02
	Used as raw materials	MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	TOTAL	MJ, net calorific value	2,05E+02	2,12E+02	2,13E+02	2,13E+02	2,71E+02
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	4,86E+04	6,56E+04	6,09E+04	6,42E+04	6,45E+04
	Used as raw materials	MJ, net calorific value	1,80E+04	2,45E+04	2,27E+04	2,41E+04	2,34E+04
	TOTAL	MJ, net calorific value	4,29E+04	5,79E+04	5,37E+04	5,66E+04	5,71E+04
Secondary material		kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-renewable secondary fuels		MJ, net calorific value	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water		m^3	6,51E-01	4,70E-01	5,20E-01	4,87E-01	8,06E-01

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

Waste production and output flows

Waste production

Table 6: Results of the LCA, modules A1-A3 – Waste production for 1 tonne (1000 kg) of specific bitumen types, PaveCoat C 50 B 2, C69 B 2, C 60 B 2, C 67 B 2 and PaveGrip C 69 BP 2.

		PaveCoat				PaveGrip
PARAMETER	**UNIT**	**C 50 B 2**	**C 69 B 2**	**C 60 B 2**	**C 67 B 2**	**C 69 BP 2**
Hazardous waste disposed	kg	3,32E-06	4,14E-06	3,93E-06	3,82E-06	3,59E-06
Non-hazardous waste disposed	kg	8,49E+00	9,27E+00	9,05E+00	9,17E+00	1,12E+01
Radioactive waste disposed	kg	2,65E-02	3,41E-01	3,20E-02	3,31E-02	6,66E-02

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

Output flows

Table 7: Results of the LCA, modules A1-A3 – Output flows for 1 tonne (1000 kg) of specific bitumen types, PaveCoat C 50 B 2, C69 B 2, C 60 B 2, C 67 B 2 and PaveGrip C 69 BP 2.

		PaveCoat				PaveGrip
PARAMETER	**UNIT**	**C 50 B 2**	**C 69 B 2**	**C 60 B 2**	**C 67 B 2**	**C 69 BP 2**
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	4,22E+00	4,22E+00	4,22E+00	4,22E+00	4,22E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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

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