Environmental Product Declaration

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

Asphalt mixtures

from

KMG OÜ

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

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

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products and construction services, version 1.3.4. PCR 2019:14-c-PCR-028 c-PCR-028 Bituminous mixtures (c-PCR to PCR 2019:14) (May 2024) UN CPC 1533 - Bitumen and asphalt, natural; asphaltites and asphaltic rock.
PCR review was conducted by: *IVL Swedish Environmental Research Institute Secretariat of the International EPD® System*
Life Cycle Assessment (LCA)
LCA accountability: *MSc, Maksim Punger, BM Certification Estonia OÜ*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: <*prof. Ing. Vladimír Kočí, PhD, MBA / LCA Studio / Vlad.Koci@vscht.cz*> 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 registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: KMG OÜ

Contact: Karli Kannenberg

Description of the organisation:
KMG OÜ is a company with long experience in asphalt production and installation. We have asphalt plants all over Estonia. We also carry out general road construction work and own sand and gravel quarries.

Product-related or management system-related certifications:
ISO 9001- and 14001-certificates - https://kmg.ee/katenditood/iso-sertifikaat/ .
Products manufactured in accordance with standards EN 13108-1:2016; EN 13108-2:2016; EN 13108-3:2016; EN 13108-5:2016; EN 13108-6:2016; EN 13108-7:2016.

Name and location of production site(s): Betooni 28, 13816, Tallinn, Estonia

Product information

Product name: Asphalt mixtures.

Product identification:
GREEN SURF - AC 16 surf 70/100 [133L].

Product description:
Used on roads and other traffic areas including car parks, pedestrian walkways, airports, squares

UN CPC code: 1533 - Bitumen and asphalt, natural; asphaltites and asphaltic rock

Geographical scope: The manufacturing facility, as well as the main suppliers are located in Estonia; The products are exported to the European / Estonian market.

LCA information

Functional unit / declared unit: 1 tonne of asphalt mixture

Reference service life: Average service life 10 years.

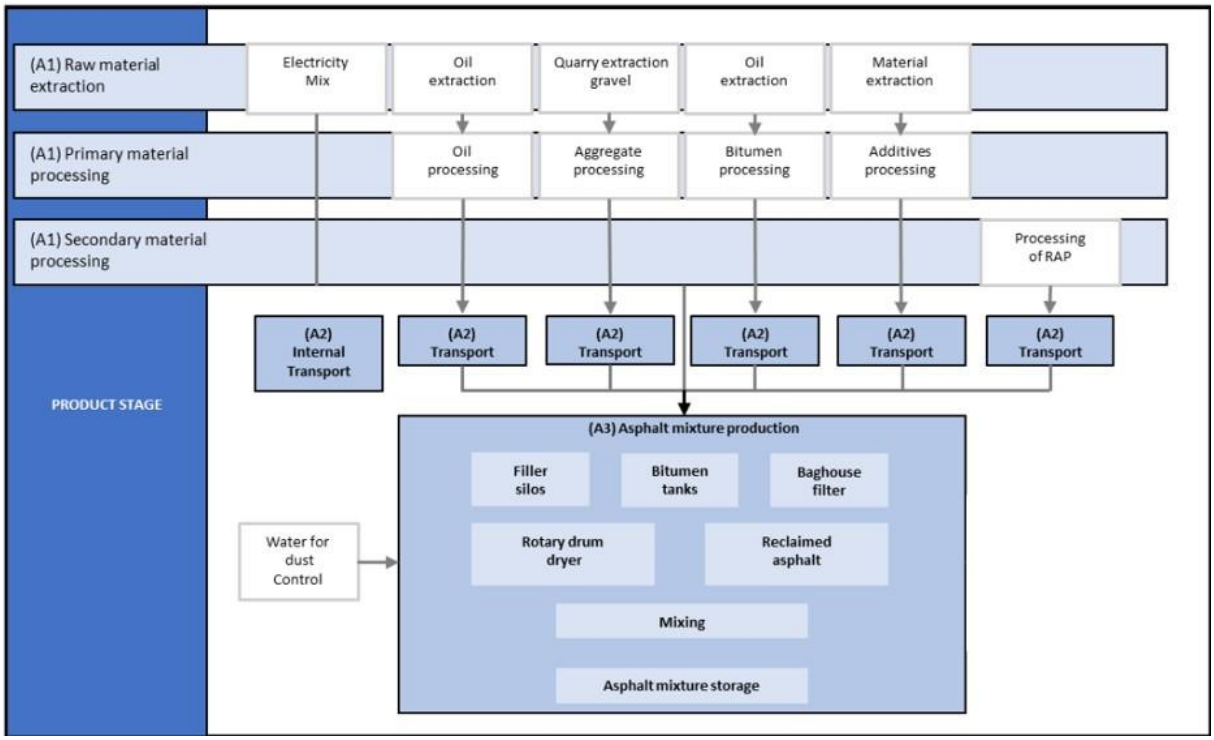
Time representativeness: 2023.

Database(s) and LCA software used: Calculation software - One Click LCA, Ecoinvent 3.10.

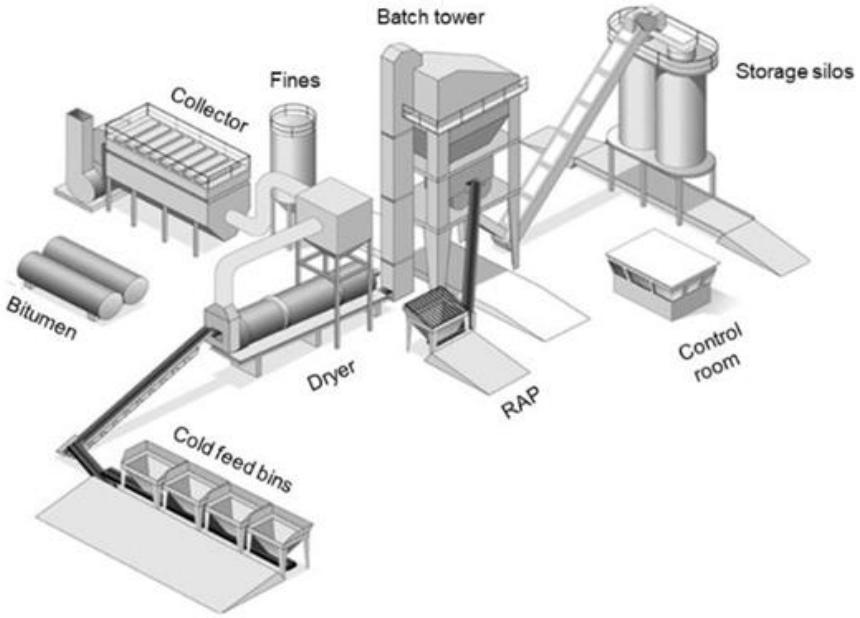
Environmental Impact Assessment Method: EN15804 reference package EF 3.1.

Description of system boundaries: Cradle to gate, C1–C4, D (A1–A3 + C1-C4 + D).

System diagram:



More information: The results have been calculated per 1 tonne of product.
All relevant inputs and outputs from each unit process that have available data are considered in the calculation. No single unit process is disregarded if it accounts for more than 1% of the total mass or energy flows. Additionally, the total neglected input and output flows for each module do not surpass 5% of the energy usage or mass.



Schematic illustration of an asphalt plant

Target group: The aim of the study is to provide information and data for an EPD for both business-to-consumer and business-to-business communication.

Cut-off criteria:
The <1% due difficulties to attributing and minor environmental impacts.

Allocation: Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.
In this study, as per EN 15804, allocation is conducted in the following order:
1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.

Allocation (electricity, gas) was done basis on volume of production (m^2). Allocation values are calculated based on the ratio of the product produced to the total amount of production and is used to separate the sources needed to manufacture products.
The allocations in the Ecoinvent 3.10 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804'.

Electricity: Energy sources of the electricity used in manufacturing processes of module A3 are modelled using the electricity, "Estonia, residual mix 2023" - 0.68kg CO2 eq./kWh (100%).
The GHG emission factor was estimated using the GWP-GHG indicator.

Explanation of assumptions regarding modules C and D:

EOL scenarios have been based on scenarios that 100% of asphalt goes to recycling.

C1: In the demolition phase the asphalt is removed by cold milling. It was calculated that the energy consumption of a demolition process for asphalt is on average 0.32 liters of diesel per tonne of asphalt.
It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed that it has the same weight as the decreased product.

C2: Transport to waste treatment site after dismantling using EURO 6 lorry average (100 km assumed).

C3, C4, D: 100% of asphalt goes to recycling - sent to waste treatment and recycled.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	**X**	**X**	**X**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**X**	**X**	**X**	**X**	**X**
Geography	Europe, Estonia			-	-	-	-	-	-	-	-	-	Europe, Estonia				Europe, Estonia
Specific data used	84 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Granite aggregates	832,7	0	0
Sand	75,7	0	0
Limestone filler	38,8	0	0
Bitumen	46,0	0	0
Lignin	6,6	0	0,7 % / 3,96 kg
Additives	0,2	0	0,02% / 0,21 kg

Asphalt delivered without any packaging.

Products do not contain any REACH SVHC substances in amounts greater than 0,1% (1000 ppm).

Results of the environmental performance indicators

Characterization factors of EN15804 are based on EF 3.1.

Mandatory impact category indicators according to EN 15804:2012+A2:2019

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	3,33E+01	3,33E-01	1,04E+01	4,43E+01	0,00E+00	-2,54E+00
GWP-fossil	kg CO_2 eq.	4,84E+01	3,33E-01	1,04E+01	2,92E+01	0,00E+00	-2,53E+00
GWP-biogenic	kg CO_2 eq.	-1,51E+01	7,71E-05	1,75E-03	1,51E+01	0,00E+00	-4,79E-03
GWP-luluc	kg CO_2 eq.	3,49E-02	7,62E-05	3,68E-03	4,98E-02	0,00E+00	-7,14E-03
ODP	kg CFC 11 eq.	2,88E-06	2,73E-08	2,16E-07	4,88E-07	0,00E+00	-4,91E-07
AP	mol H^+ eq.	3,92E-01	1,34E-03	2,45E-02	1,38E-01	0,00E+00	-2,76E-02
EP-freshwater	kg P eq.	1,20E-03	2,28E-06	8,36E-05	2,59E-04	0,00E+00	-1,00E-04
EP-marine	kg N eq.	2,68E-01	2,00E-04	6,28E-03	5,45E-02	0,00E+00	-1,09E-02
EP-terrestrial	mol N eq.	9,78E-01	2,15E-03	6,94E-02	5,50E-01	0,00E+00	-1,15E-01
POCP	kg NMVOC eq.	3,51E-01	2,91E-03	4,25E-02	1,91E-01	0,00E+00	-2,71E-02
ADP-minerals&metals*	kg Sb eq.	8,66E-05	2,23E-07	2,96E-05	6,44E-05	0,00E+00	-4,26E-05
ADP-fossil*	MJ	2,71E+03	1,79E+01	1,56E+02	4,21E+02	0,00E+00	-6,55E+01
WDP*	m^3	6,30E+01	2,68E-02	7,81E-01	2,37E+00	0,00E+00	-2,69E+01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	4,84E+01	3,33E-01	1,04E+01	2,92E+01	0,00E+00	-2,53E+00

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Resource use indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3,93E+02	8,18E-02	2,47E+00	6,28E+00	0,00E+00	-5,67E+00
PERM	MJ	5,48E+01	0,00E+00	0,00E+00	-5,48E+01	0,00E+00	0,00E+00
PERT	MJ	4,47E+02	8,18E-02	2,47E+00	-4,85E+01	0,00E+00	-5,67E+00
PENRE	MJ	7,27E+02	4,21E+00	1,56E+02	-1,67E+03	0,00E+00	-6,45E+01
PENRM	MJ	1,94E+03	1,37E+01	0,00E+00	-1,94E+03	0,00E+00	0,00E+00
PENRT	MJ	2,67E+03	1,79E+01	1,56E+02	-3,61E+03	0,00E+00	-6,45E+01
SM	kg	1,00E-01	1,68E-03	6,72E-02	1,68E-01	0,00E+00	1,26E-03
RSF	MJ	2,15E-03	1,05E-05	8,48E-04	2,66E-03	0,00E+00	-2,40E-05
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	4,32E-01	6,30E-04	2,26E-02	-3,68E+00	0,00E+00	-2,46E-01
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

Waste indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	3,57E-01	5,91E-03	2,26E-01	8,25E-01	0,00E+00	-4,13E-02
Non-hazardous waste disposed	kg	8,31E+00	1,24E-01	4,53E+00	5,00E+03	0,00E+00	-6,02E-01
Radioactive waste disposed	kg	2,34E-02	1,97E-06	4,67E-05	1,00E-04	0,00E+00	-7,62E-05

Output flow indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	2,50E-01	0,00E+00	0,00E+00	1,00E+03	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	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	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Disclaimer: The environmental performance results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks

References

Life-Cycle Assessment Background Report in accordance with EN 15804+A2 & ISO 14025 / ISO 21930.

General Programme Instructions of the international EPD® system. Version 4.0. ww.environdec.com.

ISO 14020:2023 Environmental statements and programmes for products. Principles and general requirements.

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

EN 15804+A2 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

UN CPC 1533 - Bitumen and asphalt, natural; asphaltites and asphaltic rock

PCR 2019:14 Construction products and construction services, version 1.3.4.

PCR 2019:14-c-PCR-028 c-PCR-028 Bituminous mixtures (c-PCR to PCR 2019:14) (May 2024)

Data references:

One Click LCA

Ecoinvent 3.10 database

EPD “LIGNOVA™ Crude” by Fibenol. EPD registration number: S-P-09726.

EPD “Aggregates from Marieholm quarry” by Bröderna Björklunds Grus AB. EPD registration number: S-P-09015.

EPD “CDML bitumen additive” by Chemoran. EPD registration number: EPDIE-22-77.

Footprint information for bitumen is taken from the Eurobitume report - “THE EUROBITUME LIFE-CYCLE INVENTORY FOR BITUMEN VERSION 3.1”.

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