Environmental Product Declaration

according to ISO 14025 and EN 15804

This declaration is for:
Flexigum

Provided by:
Bitum Ltd.

program operator
Stichting MRPI®
publisher
Stichting MRPI®
www.mrpi.nl

MRPI® registration
1.1.00282.2022
date of first issue
03-05-2022
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03-05-2022
expiry date
03-05-2027

COMPANY INFORMATION

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00972-4-8416217
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https://www.bitum.com

PRODUCT

Flexigum

DECLARED UNIT/FUNCTIONAL UNIT

1 tonne applied Flexigum

DESCRIPTION OF PRODUCT

Flexigum is a two-component elastomeric sealing material

VISUAL PRODUCT

MRPI® REGISTRATION

1.1.00282.2022

DATE OF ISSUE

03-05-2022

EXPIRY DATE

03-05-2027

MORE INFORMATION

https://www.bitum.com/2682/flexigum

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by **Pieter Stadhouders, EcoReview NL B.V..**
The LCA study has been done by **Branco Schipper, SGS Search.**
The certificate is based on an LCA-dossier according to ISO14025 and EN15804+A2/Bepalingsmethode. It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPDs of construction products may not be comparable if they do not comply with EN15804+A2/Bepalingsmethode. Declaration of SVHC that are listed on the 'Candidate List of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

PROGRAM OPERATOR

Stichting MRPI®
Kingsfordweg 151
1043GR
Amsterdam

ir. J-P den Hollander, Managing director MRPI®

DEMONSTRATION OF VERIFICATION
CEN standard EN15804 serves as the core PCR[a]
Independent verification of the declaration and data, according to EN ISO 14025:2010: internal: external: X
Third party verifier: Pieter Stadhouders, EcoReview NL B.V.
[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

Flexigum is a two-component elastomeric sealing material to be applied by spraying. It is based on a bitumen emulsion with high concentration polymeric latex, which gives the Flexigum elasticity and resistance to a wide range of temperatures. The emulsion is applied to the wall in combination with a reagent. Flexigum is used for sealing basement walls, tunnels, basement floors and large concrete decks. The density of Flexigum is 1,02 gram/cm³. Flexigum has no expiration date. The reference service life is as long as the reference service life of the construction it is applied to. In very rare cases where repairs to the water sealing layer is needed, new material can be applied. Thereby extending the lifespan.

COMPONENT (> 1%)	[kg / %]
Composition classified	----

(*) > 1% of total mass

SCOPE AND TYPE

This specific EPD is representative for Flexigum produced by Bitum Ltd, a major manufacture of sealants and waterproofing technologies specifically for the construction and infrastructure fields, in Haifa, Israel. The key application markets include Germany, Denmark, Norway and Sweden. The type of this EPD is Cradle-to-Gate with options. The following modules have been included. The product stage (A1-A3): extraction of raw materials and energy (A1), transport to the production location (A2), and the production phase (A3). The construction stage (Module A4-A5), the End-of-Life (Module C) and reuse and recycling stage (module D) are also included. Flexigum cannot be removed separately from the structure, therefore end-of-life is reached at the same time as the construction does. The software SimaPro 9.2.0.2 was used to perform the calculations for the LCA. The data used in the model is sourced from the Ecoinvent 3.6 database and the ESU database for data on the environmental impact of crude oil. The results are calculated with the exclusion of long-term emissions.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	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	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

X = Modules Assessed

ND = Not Declared

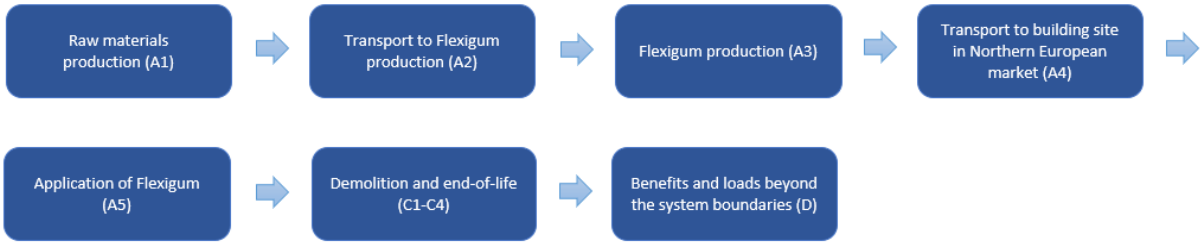

Figure: LCA process diagram according to EN 15804 (7.2.1)

REPRESENTATIVENESS

This EPD is representative for Flexigum produced by Bitum Ltd. in Haifa, Israel for use in the Europe market and mainly in Northern European market. A4 and A5 from the main scenario are calculated according to the situation in Denmark.

ENVIRONMENTAL IMPACT per functional unit or declared unit (indicators A1)

	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
ADPE	kg Sb eq.	1.19 E-1	1.34 E-3	8.16 E-5	0.00	3.40 E-4	0.00	1.15 E-4	0.00
ADPF	MJ	3.41 E+4	1.34 E+3	7.83 E+1	0.00	1.99 E+2	0.00	2.55 E+2	0.00
GWP	kg CO2 eq.	8.88 E+2	9.82 E+1	6.60 E+0	0.00	1.31 E+1	0.00	1.28 E+2	0.00
ODP	kg CFC11 eq.	1.69 E-4	1.66 E-5	4.19 E-7	0.00	2.42 E-6	0.00	2.65 E-6	0.00
POCP	kg ethene eq.	1.45 E+0	1.02 E-1	2.64 E-3	0.00	7.83 E-3	0.00	3.14 E-2	0.00
AP	kg SO2 eq.	3.95 E+0	1.75 E+0	1.75 E-2	0.00	5.62 E-2	0.00	1.33 E-1	0.00
EP	kg (PO4)3- eq.	5.02 E-1	2.00 E-1	3.13 E-3	0.00	1.12 E-2	0.00	5.98 E-2	0.00

Toxicity indicators for Dutch market

HTP	kg DCB eq.	3.09 E+2	5.01 E+1	4.70 E+0	0.00	5.58 E+0	0.00	6.26 E+0	0.00
FAETP	kg DCB eq.	8.77 E+0	9.86 E-1	6.31 E-2	0.00	1.64 E-1	0.00	1.42 E+0	0.00
MAETP	kg DCB eq.	8.99 E+4	4.30 E+3	1.82 E+2	0.00	5.84 E+2	0.00	1.60 E+3	0.00
TETP	kg DCB eq.	1.40 E+0	1.54 E-1	3.18 E-2	0.00	1.98 E-2	0.00	1.86 E-2	0.00
ECI	Euro	1.07 E+2	1.90 E+1	0.00	0.00	1.58 E+0	0.00	8.32 E+0	0.00
ADPF	kg Sb. eq.	1.64 E+1	6.43 E-1	3.77 E-2	0.00	9.59 E-2	0.00	1.22 E-1	0.00

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water

EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources expressed in [kg Sb-eq.]

ENVIRONMENTAL IMPACT per functional unit or declared unit (core indicators A2)

	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	9.05 E+2	9.90 E+1	6.75 E+0	0.00	1.32 E+1	0.00	1.50 E+2	0.00
GWP-fossil	kg CO2 eq.	9.21 E+2	9.90 E+1	6.68 E+0	0.00	1.32 E+1	0.00	1.50 E+2	0.00
GWP-biogenic	kg CO2 eq.	-1.90 E+1	2.41 E-3	6.13 E-2	0.00	8.00 E-3	0.00	9.49 E-2	0.00
GWP-luluc	kg CO2 eq.	3.23 E+0	5.54 E-2	5.14 E-3	0.00	4.66 E-3	0.00	5.45 E-3	0.00
ODP	kg CFC11 eq.	2.10 E-4	2.09 E-5	4.80 E-7	0.00	3.03 E-6	0.00	3.30 E-6	0.00
AP	mol H+ eq.	4.83 E+0	2.19 E+0	2.24 E-2	0.00	7.50 E-2	0.00	1.61 E-1	0.00
EP-freshwater	kg PO4 eq.	1.48 E-2	5.40 E-4	2.26 E-4	0.00	1.08 E-4	0.00	2.12 E-4	0.00
EP-marine	kg N eq.	1.03 E+0	5.45 E-1	5.59 E-3	0.00	2.68 E-2	0.00	1.28 E-1	0.00
EP-terrestrial	mol N eq.	1.09 E+1	6.06 E+0	6.54 E-2	0.00	2.96 E-1	0.00	3.45 E-1	0.00
POCP	kg NMVOC eq.	5.47 E+0	1.59 E+0	1.89 E-2	0.00	8.45 E-2	0.00	1.35 E-1	0.00
ADP-minerals & metals	kg Sb eq.	1.19 E-1	1.34 E-3	8.16 E-5	0.00	3.40 E-4	0.00	1.15 E-4	0.00
ADP-fossil	MJ, net calorific value	3.44 E+4	1.35 E+3	7.37 E+1	0.00	2.02 E+2	0.00	2.54 E+2	0.00
WDP	m3 world eq. deprived	3.15 E+2	2.79 E+0	1.15 E+0	0.00	6.20 E-1	0.00	1.08 E+1	0.00

GWP-total = Global Warming Potential total
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 Exceedence
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 Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals = Abiotic Depletion Potential for non fossil resources [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

Disclaimer [2]

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

ENVIRONMENTAL IMPACT per functional unit or declared unit (additional indicators A2)

	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	4.76 E-5	4.67 E-6	2.93 E-7	0.00	1.19 E-6	0.00	1.78 E-6	0.00
IRP	kBq U235 eq.	4.60 E+1	5.85 E+0	2.76 E-1	0.00	8.83 E-1	0.00	1.03 E+0	0.00
ETP-fw	CTUe	1.49 E+4	9.58 E+2	2.89 E+2	0.00	1.64 E+2	0.00	3.41 E+2	0.00
HTP-c	CTUh	3.05 E-7	4.75 E-8	5.64 E-9	0.00	5.84 E-9	0.00	7.13 E-9	0.00
HTP-nc	CTUh	9.32 E-6	9.00 E-7	1.30 E-7	0.00	1.96 E-7	0.00	1.46 E-7	0.00
SQP	---	7.76 E+3	5.64 E+2	7.97 E+1	0.00	1.73 E+2	0.00	5.94 E+2	0.00

PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235 [1]
ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]
HTP-c = Potential Comparative Toxic Unit for humans [2]
HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]
SQP = Potential soil quality index [2]

Disclaimer [1]

- This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer [2]

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

RESOURCE USE per functional unit or declared unit (A1 / A2)

	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	1.36 E+3	1.29 E+1	2.27 E+1	0.00	2.90 E+0	0.00	5.36 E+0	0.00
PENRE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	3.66 E+4	1.44 E+3	7.84 E+1	0.00	2.14 E+2	0.00	2.70 E+2	0.00
SM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	m3	1.01 E+1	1.01 E-1	1.00 E-1	0.00	2.29 E-2	0.00	2.66 E-1	0.00

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy resources excluding non-renewable 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 resources
SM = Use of secondary materials
RSF = Use of renewable secondary fuels
NRSF = Use of non renewable secondary fuels
FW = Use of net fresh water

OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 / A2)

	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	1.68 E-2	2.15 E-3	1.08 E-4	0.00	5.17 E-4	0.00	3.84 E-4	0.00
NHWD	kg	2.42 E+2	3.47 E+1	2.65 E+0	0.00	1.25 E+1	0.00	1.00 E+3	0.00
RWD	kg	6.33 E-2	9.34 E-3	2.85 E-4	0.00	1.37 E-3	0.00	1.53 E-3	0.00
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ETE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

HWD = Hazardous Waste Disposed
NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 / A2)

	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
BCCpr	kg C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BCCpa	kg C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

ENVIRONMENTAL IMPACT per functional unit or declared unit (indicators A1): TRANSPORT

	UNIT	A4 Sweden	A5 Sweden	A4 Norway	A5 Norway	A4 Germany	A5 Germany
ADPE	kg Sb eq.	3.07 E-3	7.64 E-5	2.75 E-3	7.49 E-5	3.32 E-3	9.16 E-5
ADPF	MJ	2.39 E+3	5.32 E+1	2.21 E+3	5.14 E+1	2.52 E+3	9.74 E+1
GWP	kg CO2 eq.	1.68 E+2	5.07 E+0	1.55 E+2	4.91 E+0	1.75 E+2	7.95 E+0
ODP	kg CFC11 eq.	2.95 E-5	5.91 E-7	2.72 E-5	3.59 E-7	3.10 E-5	5.01 E-7
POCP	kg ethene eq.	1.48 E-1	2.34 E-3	1.41 E-1	2.27 E-3	1.51 E-1	2.69 E-3
AP	kg SO2 eq.	2.13 E+0	1.32 E-2	2.07 E+0	1.26 E-2	2.11 E+0	1.89 E-2
EP	kg (PO4)3- eq.	2.71 E-1	2.27 E-3	2.61 E-1	2.13 E-3	2.73 E-1	4.24 E-3

Toxicity indicators for Dutch market

HTP	kg DCB eq.	8.09 E+1	4.48 E+0	7.56 E+1	4.42 E+0	8.38 E+1	4.69 E+0
FAETP	kg DCB eq.	1.88 E+0	6.05 E-2	1.73 E+0	5.72 E-2	1.99 E+0	6.81 E-2
MAETP	kg DCB eq.	7.46 E+3	1.60 E+2	6.91 E+3	1.51 E+2	7.81 E+3	1.99 E+2
TETP	kg DCB eq.	2.62 E-1	3.07 E-2	2.43 E-1	3.06 E-2	2.74 E-1	3.25 E-2
ECI	Euro	2.79 E+1	7.58 E-1	2.64 E+1	7.40 E-1	2.85 E+1	9.70 E-1
ADPF	kg Sb. eq.	1.15 E+0	2.56 E-2	1.06 E+0	2.47 E-2	1.21 E+0	4.68 E-2

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water
EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources expressed in [kg Sb-eq.]

ENVIRONMENTAL IMPACT per functional unit or declared unit (core indicators A2): TRANSPORT

	UNIT	A4 Sweden	A5 Sweden	A4 Norway	A5 Norway	A4 Germany	A5 Germany
GWP-total	kg CO2 eq.	1.69 E+2	5.14 E+0	1.56 E+2	4.97 E+0	1.77 E+2	8.25 E+0
GWP-fossil	kg CO2 eq.	1.69 E+2	5.12 E+0	1.56 E+2	4.98 E+0	1.77 E+2	8.01 E+0
GWP-biogenic	kg CO2 eq.	4.45 E-2	-7.24 E-3	3.69 E-2	-1.29 E-2	5.14 E-2	2.37 E-1
GWP-luluc	kg CO2 eq.	8.11 E-2	2.07 E-2	7.66 E-2	3.20 E-3	8.29 E-2	6.50 E-3
ODP	kg CFC11 eq.	3.70 E-5	5.54 E-7	3.41 E-5	4.27 E-7	3.89 E-5	5.42 E-7
AP	mol H+ eq.	2.69 E+0	1.69 E-2	2.62 E+0	1.61 E-2	2.67 E+0	2.43 E-2
EP-freshwater	kg PO4 eq.	1.11 E-3	9.44 E-5	1.01 E-3	8.49 E-5	1.19 E-3	5.55 E-4
EP-marine	kg N eq.	7.24 E-1	4.66 E-3	6.98 E-1	4.47 E-3	7.24 E-1	5.78 E-3
EP-terrestrial	mol N eq.	8.03 E+0	5.18 E-2	7.75 E+0	4.92 E-2	8.03 E+0	7.02 E-2
POCP	kg NMVOC eq.	2.14 E+0	1.60 E-2	2.06 E+0	1.55 E-2	2.15 E+0	1.94 E-2
ADP-minerals & metals	kg Sb eq.	3.07 E-3	7.64 E-5	2.75 E-3	7.49 E-5	3.32 E-3	9.16 E-5
ADP-fossil	MJ, net calorific value	2.43 E+3	8.26 E+1	2.23 E+3	5.17 E+1	2.55 E+3	9.29 E+1
WDP	m3 world eq. deprived	6.14 E+0	1.28 E+0	5.55 E+0	1.00 E+0	6.57 E+0	1.03 E+0

GWP-total = Global Warming Potential total
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 Exceedence
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 Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals = Abiotic Depletion Potential for non fossil resources [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

Disclaimer [2]

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ENVIRONMENTAL IMPACT per functional unit or declared unit (additional indicators A2): TRANSPORT

	UNIT	A4 Sweden	A5 Sweden	A4 Norway	A5 Norway	A4 Germany	A5 Germany
PM	Disease incidence	1.14 E-5	2.70 E-7	1.02 E-5	2.64 E-7	1.22 E-5	2.92 E-7
IRP	kBq U235 eq.	1.05 E+1	1.28 E+0	9.70 E+0	1.91 E-1	1.11 E+1	2.95 E-1
ETP-fw	CTUe	1.83 E+3	2.64 E+2	1.67 E+3	2.55 E+2	1.93 E+3	2.83 E+2
HTP-c	CTUh	8.14 E-8	5.36 E-9	7.59 E-8	5.25 E-9	8.46 E-8	5.69 E-9
HTP-nc	CTUh	1.96 E-6	1.17 E-7	1.77 E-6	1.14 E-7	2.10 E-6	1.37 E-7
SQP	---	1.52 E+3	5.50 E+1	1.36 E+3	4.14 E+1	1.65 E+3	5.07 E+1

PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235 [1]
ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]
HTP-c = Potential Comparative Toxic Unit for humans [2]
HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]
SQP = Potential soil quality index [2]

Disclaimer [1]

- This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer [2]

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

RESOURCE USE per functional unit or declared unit (A1 / A2): TRANSPORT

	UNIT	A4 Sweden	A5 Sweden	A4 Norway	A5 Norway	A4 Germany	A5 Germany
PERE	MJ	0.00	0.00	0.00	0.00	0.00	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.82 E+1	1.79 E+1	2.54 E+1	2.52 E+1	3.02 E+1	1.01 E+1
PENRE	MJ	0.00	0.00	0.00	0.00	0.00	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.58 E+3	8.60 E+1	2.37 E+3	5.50 E+1	2.71 E+3	9.93 E+1
SM	MJ	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00
FW	m3	2.24 E-1	5.99 E-2	2.02 E-1	1.96 E-1	2.40 E-1	4.39 E-2

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy resources excluding non-renewable 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 resources
SM = Use of secondary materials
RSF = Use of renewable secondary fuels
NRSF = Use of non renewable secondary fuels
FW = Use of net fresh water

OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 / A2): TRANSPORT

	UNIT	A4 Sweden	A5 Sweden	A4 Norway	A5 Norway	A4 Germany	A5 Germany
HWD	kg	4.81 E-3	9.12 E-5	4.32 E-3	8.74 E-5	5.19 E-3	1.39 E-4
NHWD	kg	1.05 E+2	2.61 E+0	9.29 E+1	2.64 E+0	1.14 E+2	2.68 E+0
RWD	kg	1.66 E-2	7.02 E-4	1.53 E-2	2.26 E-4	1.75 E-2	3.83 E-4
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	0.00	0.00	0.00	0.00	0.00	0.00
ETE	MJ	0.00	0.00	0.00	0.00	0.00	0.00

HWD = Hazardous Waste Disposed
NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 / A2): TRANSPORT

	UNIT	A4 Sweden	A5 Sweden	A4 Norway	A5 Norway	A4 Germany	A5 Germany
BCCpr	kg C	0.00	0.00	0.00	0.00	0.00	0.00
BCCpa	kg C	0.00	0.00	0.00	0.00	0.00	0.00

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

CALCULATION RULES

Cut-off rules

The following processes are considered below cutoff:
- Maintenance and the use of auxiliary materials and equipment, with exception of such processes that are included in the Ecoinvent background processes.
- Capital goods and infrastructure processes, with exception of such processes that are included in the Ecoinvent background processes. Only the processes considered below cut-off are excluded from the study. No additional processes are excluded.

Allocation

Only facility level data were available for the use of electricity. The facility level data have been economically allocated to Flexigum production.

The characterization factors from Bepalingsmethode 'set 1', feb 2021 and Bepalingsmethode EN15804+A2, 'set 2' were applied. No additional or deviating characterisation factors were used.

Data quality and data collection period: Specific data was collected from Bitum Ltd. Data about the production of the main component, refined bitumen, are provided by the supplier of the components, BAZAN Refinery, complemented with data from literature (Eurobitume). The data on the production of crude oil is based on the ESU database. The data collection period for specific data was the year 2020.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

A1 - Extraction of raw materials and energy

This module considers the extraction and processing of all raw materials and energy which occur upstream to the Bitum manufacturing process, as well as waste processing up to the end-of waste state. This includes production of refined bitumen from crude oil.

A2 - Transport to production location

This includes the transport distance of the raw materials to the manufacturing facility via road and water.

A3 - Production

This module takes into account the manufacturing of Flexigum and includes all processes linked to the production such as mixing the ingredients and packaging Flexigum.

A4 - Transport
All Flexigum is transported to a storage in Stovring, Denmark. From the storage in Denmark it is transported to sites of application in Europe and specifically Denmark, Germany, Norway and Sweden. For each country a transport scenario is included.

A5 - Construction
This module includes the environmental aspects and impacts associated with the application of Flexigum. The Flexigum is applied with an electric spray pump. The electric spray pump is powered on site with electricity. Flexigum is applied in projects in Denmark, Germany, Norway and Sweden. For each country a construction scenario is included.

C1 - Demolition
The Flexigum sticks to the surface it is applied to and cannot be easily removed separately. Instead the entire structure is demolished at the structure's end-of-life, including Flexigum. Hence, no processes for de-construction demolition are included in this phase.

C2 - Transport to waste processing
This module includes one-way transportation distance from the demolition site to the landfill site.

C3-C4 - Waste processing and disposal
Assumed is that all material goes to landfilling and 0% to incineration and recycling.

Destination A4	Total distance by lorry (km)	Distance by ship (km)
Denmark	145	0
Germany	738	0
Norway	575.7	251.06
Sweden	664.7	251.06

The transport scenarios for Norway, Sweden and Germany replace the A4 scenario from Denmark.

Destination A5	Electricity mix
Denmark	Electricity mix Denmark
Germany	Electricity mix Germany
Norway	Electricity mix Norway
Sweden	Electricity mix Sweden

The construction scenarios for Norway, Sweden and Germany replace the A5 scenario from Denmark.

DECLARATION OF SVHC

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, or they do not exceed the threshold with the European Chemicals Agency.

REFERENCES

- ISO, 2006. “Environmental management. Life cycle assessment - Principles and framework”. ISO 14040:2006 and Requirements and Guidelines”. ISO 14044:2006;
- ISO/TR 14025, “Environmental labels and declarations – Type III environmental declarations”, ISO/TR 14025:2000;
- EN 15804+A1:2012 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products;
- EN 15804+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products;
- The Eurobitume Life-Cycle Inventory For Bitumen Version 3.1 – The European Bitumen Association – April 2020;
- Oil Refineries Ltd. Bazan Group Periodic Report - 2020;
- Bepalingsmethode Milieuprestatie Bouwwerken versie 1.0, juli 2020.

REMARKS

None