Bekaert

Environmental
Product
Declaration

According to EN15804+A2 (+indicators A1)

This declaration is for:
Duomix® fibers 18 & 32 micron

Provided by:
NV BEKAERT SA

MRPI® registration
1.1.00744.2025

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

date of first issue
8-7-2024
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8-7-2024
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8-7-2029

ECO PLATFORM EPD VERIFIED

MRPI milieu relevante product informatie

COMPANY INFORMATION

NV BEKAERT SA

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Geert Demeyere

https://www.bekaert.com/en/

MRPI® REGISTRATION

1.1.00744.2025

DATE OF THIS ISSUE

8-7-2024

EXPIRY DATE

8-7-2029

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Anne Kees Jeeninga, Advieslab VOF. The LCA study has been done by Ruben van Gaalen, EcoReview B.V. . The certificate is based on an LCA-dossier according to EN15804+A2 (+indicators A1). 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. 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

1043 GR

Amsterdam

PRODUCT

Duomix® fibers 18 & 32 micron

DECLARED UNIT / FUNCTIONAL UNIT

1 Mass (kg)

DESCRIPTION OF PRODUCT

Polypropylene concrete fibers from Bekaert are synthetic fibers designed for use as reinforcement in concrete. The product consists of polypropylene with spin finish oil as an additive. The addition of the spin finish oil ensures uniform dispersion of the synthetic fibers in the concrete after addition and mixing.

VISUAL PRODUCT

MORE INFORMATION

https://www.bekaert.com/en/products/construction/concrete-reinforcement

Ing. L. L. Oosterveen MSc. MBA **Managing Director MRPI**	DEMONSTRATION OF VERIFICATION CEN standard EN15804 serves as the core PCR [1]
	Independent verification of the declaration an data according to EN15804+A2 (+indicators A1) internal: external: X
	Third party verifier: Anne Kees Jeeninga, Advieslab VOF
	[1] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION (PART 1)

Bekaert specialized in the production of custom-made polypropylene (PP) fibers. The fibers are engineered to be compatible with all concrete compositions, making them suitable for use in both poured and sprayed concrete applications. The EPD is valid for both products: Duomix® M 6,12,20 (32 µ) and Duomix® M6,12-Fire (18 µ). This means that the environmental impact data provided in the EPD applies to these two product variations.

A variety of packaging options are included to meet diverse project needs. Fibers are available in bulk bags or in smaller, biodegradable paper bags with weights of 400-1000 grams, ensuring flexibility for any project size.

All fiber types produced by Bekaert are CE certified, ensuring they meet the stringent European standards for quality and safety. The commitment to quality and customization allows us to provide the best solutions for your concrete reinforcement needs.

DETAILED PRODUCT DESCRIPTION (PART 2)

This EPD is valid for the synthetic fiber reinforcement for 1 kg for each packaging option. The packaging material is responsible for the negative carbon content. The user of this EPD is responsible for properly adjusting this in their calculations.

Component (> 1%)	(kg / %)
Polypropylene Fibres	1
Packaging	0,02

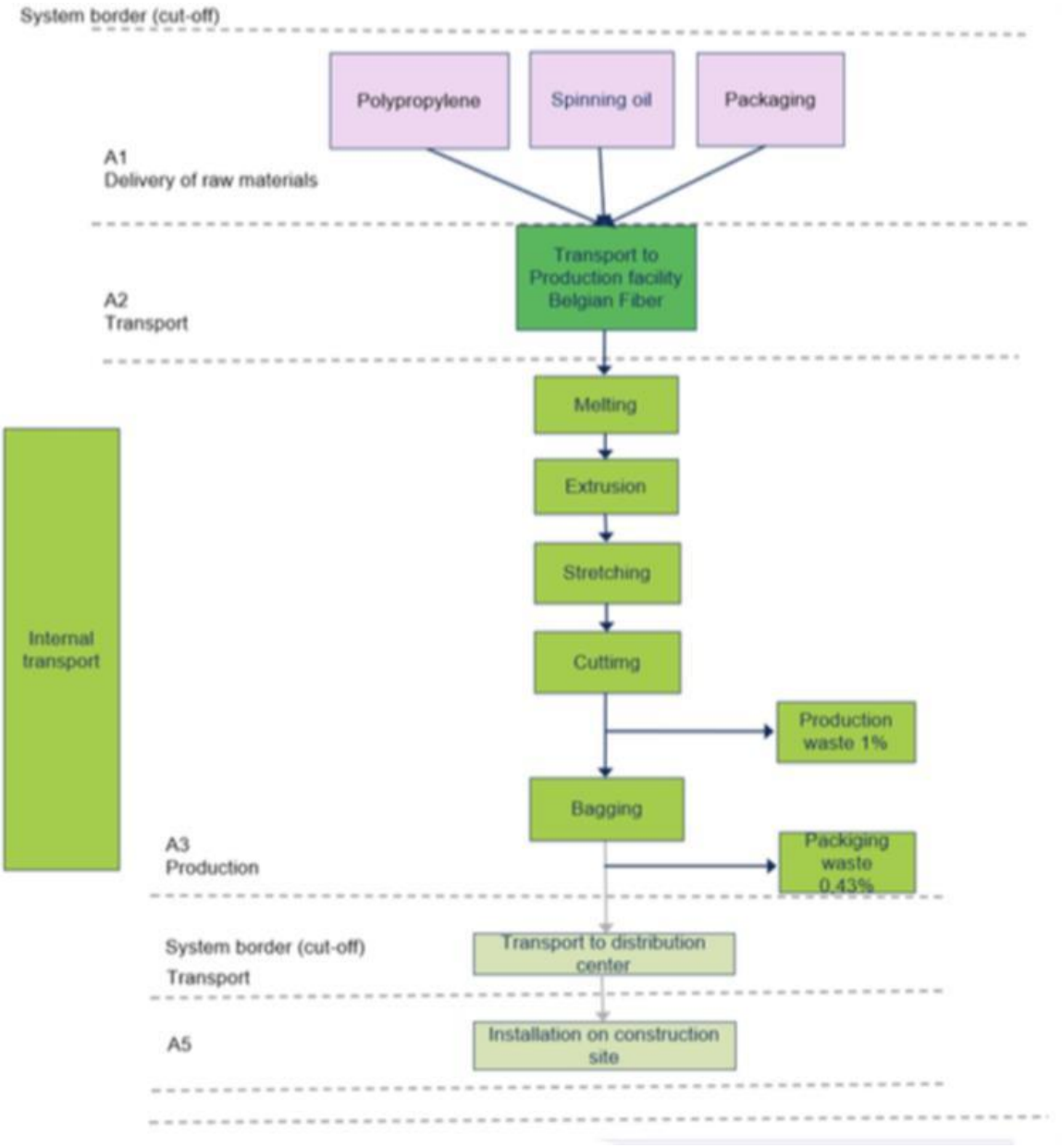
SCOPE AND TYPE

"The type of this EPD is Cradle-to-Gate. All major steps from the extraction of natural resources to the factory gate are included in the environmental performance of the manufacturing phase, except those that are not relevant to the environmental performance of the product.
The software SimaPro is used to perform the LCA. The background databases used are:
• Ecoinvent (v3.6)
It is not determined as to how the Polypropylene Fibers are to be processed at the end of life (after 50 years). Therefore, this module is not considered in this LCA study. As new and improved systems for the recycling of building products are developed over time, these can be determined and then applied to a future LCA study. Concrete produced with Polypropylene Fibers can however be broken into aggregates which in turn can be used to produce new concrete. It is economically unfeasible to retrieve the Polypropylene Fibers from the cement structure.
"

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USER 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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

X = Modules Assessed

ND = Not Declared



REPRESENTATIVENESS

This EPD is representative for products produced and sold in the EU. The polypropylene fibers are produced and cut to demand at the production site. The delivery will be made from Avenue Urbino 2, B-7700.

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

	Eenheid	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	1,86E-05	3,96E-07	3,08E-06	2,21E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADPF	MJ	7,26E+01	2,37E-01	1,68E+00	7,46E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP	kg CO2 eq.	1,97E+00	1,55E-02	1,56E-01	2,15E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11 eq.	4,41E-08	2,75E-09	3,92E-08	8,60E-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
POCP	kg ethene eq.	1,74E-03	9,34E-06	3,57E-05	1,78E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP	kg SO2 eq.	6,22E-03	6,81E-05	3,39E-04	6,62E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP	kg (PO4) 3- eq.	5,92E-04	1,34E-05	5,03E-05	6,56E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	2,96E-01	6,52E-03	3,90E-02	3,42E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FAETP	kg DCB eq.	1,20E-02	1,90E-04	1,41E-03	1,36E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MAETP	kg DCB eq.	1,92E+01	6,85E-01	4,34E+00	2,43E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETP	kg DCB eq.	2,36E-03	2,30E-05	1,64E-03	4,02E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ECI	euro	1,67E-01	1,90E-03	1,39E-02	1,83E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADPF	kg Sn eq.	3,49E-02	1,14E-04	8,06E-04	3,59E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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

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

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	2,03E+00	1,56E-02	1,60E-01	2,21E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-fossil	kg CO2 eq	2,06E+00	1,56E-02	1,58E-01	2,23E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-biogenic	kg CO2 eq	-2,75E-02	7,21E-06	2,17E-03	-2,53E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GWP-luluc	kg CO2 eq	1,30E-03	5,72E-06	3,32E-04	1,63E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11 eq	4,31E-08	3,45E-09	2,68E-08	7,33E-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AP	mol H+ eq.	7,46E-03	9,06E-05	4,22E-04	7,97E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-fresh water	kg PO4 eq.	3,65E-05	1,58E-07	4,52E-06	4,11E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-marine	kg N eq.	1,27E-03	3,19E-05	8,02E-05	1,39E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EP-terrestrial	mol N eq.	1,39E-02	3,52E-04	9,67E-04	1,52E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
POCP	kg NMVOC eq.	6,57E-03	1,00E-04	2,56E-04	6,93E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADP-minerals & metals	kg Sb eq.	1,86E-05	3,96E-07	3,08E-06	2,21E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ADP-fossil	MJ, net calorific value	7,33E+01	2,35E-01	5,11E+00	7,86E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WDP	m3 world eq. Deprived	1,45E+00	8,42E-04	5,92E-02	1,51E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

GWP-total = Global Warming Potential total

GWP-fossil = Global Warming Potential fossil fuels

GWP-biogenic = Global Warming Potential biogenictotal

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 [1]

ADP-fossil = Abiotic Depletion for fossil resources potential [1]

WDP = Water (user) deprivation potential, deprivation-weighted water consumption [1]

Disclaimer [1]:

- 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 experience with the indicator.

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

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease inci-dence	6,57E-08	1,40E-09	2,42E-09	6,95E-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IRP	kBq U235 eq.	3,97E-02	9,87E-04	5,89E-02	9,97E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	1,17E+01	2,10E-01	2,97E+00	1,49E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	4,30E-10	6,81E-12	6,93E-11	5,06E-10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	1,29E-08	2,30E-10	2,24E-09	1,54E-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	-	4,11E+00	2,04E-01	1,40E+00	5,71E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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.

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 experience with the indicator.

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

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	8,82E-06	5,97E-07	9,90E-06	1,93E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NHWD	kg	6,73E-02	1,49E-02	1,25E-02	9,47E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RWD	kg	3,60E-05	1,55E-06	5,01E-05	8,76E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EEE	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETE	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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

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

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	1,52E+00	2,95E-03	1,09E+00	2,61E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PERT	MJ	1,52E+00	2,95E-03	1,09E+00	2,61E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRE	MJ	7,86E+01	2,50E-01	5,24E+00	8,41E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PENRT	MJ	7,86E+01	2,50E-01	5,24E+00	8,41E+01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NSRF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FW	m3	2,25E-02	2,87E-05	1,89E-03	2,44E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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
NSRF = Use of non-renewable secondary fuels
FW = Use of net fresh water

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

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
BBCpr	kg C	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BCCpa	kg C	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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

CALCULATION RULES (PART 1)

"""Data quality
Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

Data collection period
The dataset is representative for the production processes used in 2023.

Methodology and reproducibility
The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented. In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated.

Cut Off
In this study, all inputs and outputs - such as emissions, energy and material inputs - are included in the calculation according to the Determination Method (5). The contribution to each impact category by the capital goods is calculated to be no more than 5%.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 1)

"A1. Raw materials supply
All materials needed for production as well as packaging is taken into account.

A2. Transport of raw materials to manufacturer
The transportation of the suppliers to Bekaert is done by truck.

A3. Manufacturing
The production starts with the melting of the raw material. It is then extruded by an extrusion machine. After extrusion the material is cooled through water and span on spindles in order to stretch it into the required thickness. A winding machine assembles a bundle of strings onto a bobbin. Afterwards the cutting to the correct size and bagging in paper packaging takes place. Use of electricity is taken into account."

For energy purposes the following reference was selected: A grey low voltage market for with 0,244 kg GWP per KWh (Electricity, low voltage {BE}| market for)

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

• CEN/TC 51 PCR for cement and building lime, 2015
• CML - Department of Industrial Ecology, CML-IA Characterisation Factors, Dated August 2016, Leiden University, Leiden, Netherlands Available at: https://www.universiteitleiden.nl/en/research/research-output/science/cml-ia-characterisation-factors
• Simapro 9.1.1.1
• EN 15804: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', I.S. EN 15804:2012+A1:2013 and EN 15804:2019+A2.
• ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006.
• ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.
• ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures', International Organization for Standardization, ISO14025:2006.
• NMD Bepalingsmethode Milieuprestatie Bouwwerken version 1.1 (maart 2022)

REMARKS

EPD of construction products may not be comparable if they do not comply with EN15804