**Environmental**
**Product**
**Declaration**
According to ISO14025 and EN15804+A2
(+indicators A1)

This declaration is for:
**Geotextile MIRAFI® Bidim®**

Provided by:
**Solmax**

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

MRPI® registration
**1.1.00723.2024**
date of first issue
**27-11-2024**
date of this issue
**27-11-2024**
expiry date
**27-11-2024**

## COMPANY INFORMATION

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## MRPI® REGISTRATION

1.1.00723.2024

## DATE OF ISSUE

27-11-2024

## EXPIRY DATE

27-11-2029

## SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Tim Mol, Ecoreview. The LCA study has been done by Darryl Kofi Safo, Solmax. 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'. EPD's 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

**Ing. L. L. Oosterveen MSc. MBA**
**Managing Director MRPI**

## PRODUCT

Geotextile **MIRAFI**® Bidim®

## DECLARED UNIT/FUNCTIONAL UNIT

1m²

## DESCRIPTION OF PRODUCT

A mechanically bonded continuous-filament nonwoven geotextile

## VISUAL PRODUCT

## MORE INFORMATION

https://www.solmax.com/emea/en/products/mirafi

| DEMONSTRATION OF VERIFICATION |
|---|
| CEN standard EN15804 serves as the core PCR(a) |
| Independent verification of the declaration on data according to ISO14025 and EN15804+A2 (+indicators A1)<br>internal: external: x |
| Third party verifier: Tim Mol. Ecoreview |
| [a] PCR = Product Category Rules |

## DETAILED PRODUCT DESCRIPTION

**MIRAFI** Bidim has been used for decades as separation, protection, and filtration elements in many applications, adding years to the life of any roadway, railroad, landfill, or civil / environmental engineering project. **MIRAFI** Bidim nonwoven geotextiles are ideal for separation and filtration for civil engineering applications. They provide excellent tensile strength, elongation properties, high permeability to water and retain the finest soil particles.

**MIRAFI** Bidim is available in various ranges. The following ranges are covered in this EPD: **MIRAFI** Bidim AR, **MIRAFI** Bidim GTX, **MIRAFI** Bidim F, **MIRAFI** Bidim P, **MIRAFI** Bidim S.

Manufacturing process

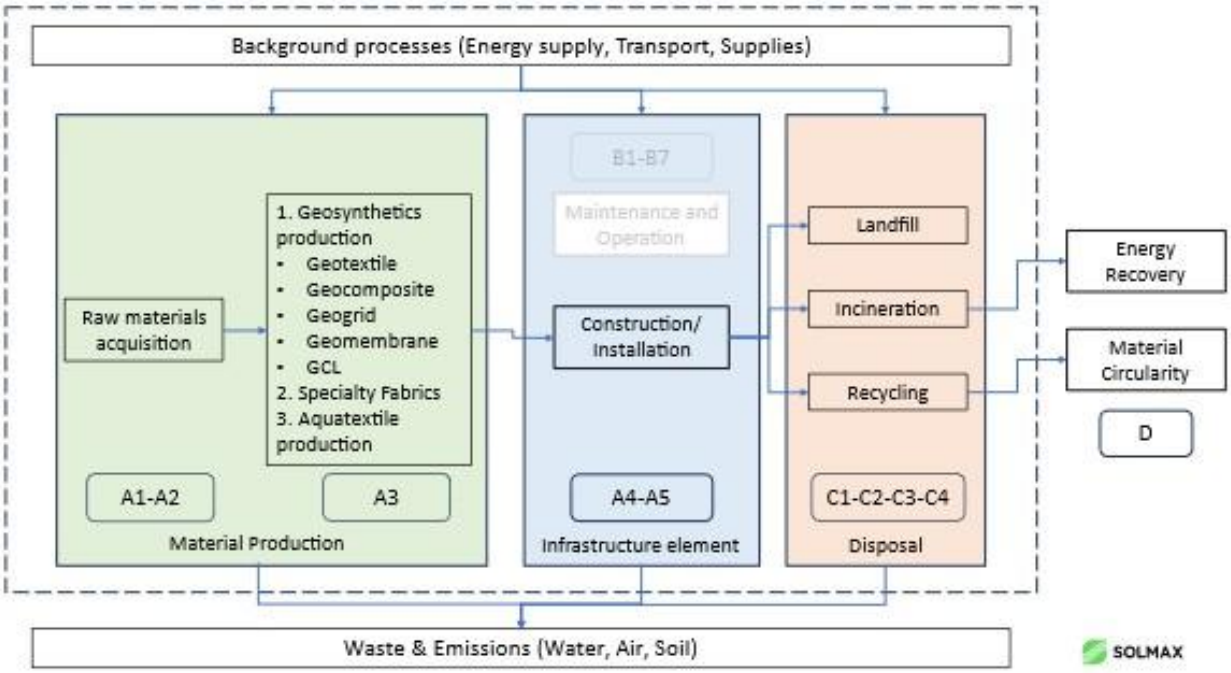
The principle of manufacturing geosynthetics is based on the processing and refinement of polymeric material. Depending on specific requirements, the manufacturing process of geosynthetics typically involves the selection of polymers which are processed with additives, such as stabilisers or dyes for the desired properties. To produce **MIRAFI** Bidim geotextiles, moulding compound, which is special stabilisers, is continuously melted in a melt spinning process, extruded, and spun into continuous filaments. The deposited continuous filaments are then mechanically consolidated. In preparation for shipment to customer, the finished geotextile is wound onto paperboard cores and wrapped with PE-film.

| Component (> 1% ) | (kg / %) |
|---|---|
| PP resin | 96-99% |
| Colour Masterbatch | 0.5-2% |
| UV Masterbatch | 0.5-2% |

## SCOPE AND TYPE

The geographical location is EMEA and the product is manufactured in Linz, Austria and Bezons, France. The product has various potential applications as a construction material or as a component in construction materials. Background database used for the calculations is Ecoinvent version 3.6 in combination with the Ecochain Helix 4.3.1 LCA software. The EPD is a Cradle-to-grave EPD.

| 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 | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| X= Modules Assessed<br>ND= Not Declared | | | | | | | | | | | | | | | | |




**REPRESENTATIVENESS**

In this study a specific product is considered, produced at specific production sites.

## ENVIRONMENT IMPACT per functional unit or declared unit (core indicators A1)

| | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADPE | kg Sb eq. | 3,68 E-06 | 5,29 E-07 | 2,83 E-07 | 4,49 E-06 | 5,31 E-07 | 2,66 E-07 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 5,53 E-09 | 4,96 E-08 | 1,00 E-07 | 0,00 E+00 | -2,01 E-07 |
| ADPF | MJ | 1,44 E+01 | 3,17 E-01 | 1,32 E+00 | 1,60 E+01 | 3,18 E-01 | 8,28 E-01 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 4,35 E-02 | 2,97 E-02 | 7,40 E-02 | 0,00 E+00 | -4,32 E+00 |
| GWP | kg CO2 eq. | 3,90 E-01 | 2,07 E-02 | 8,61 E-02 | 4,97 E-01 | 2,08 E-02 | 4,96 E-02 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,16 E-03 | 1,94 E-03 | 3,61 E-01 | 0,00 E+00 | -2,14 E-01 |
| ODP | Kg CFC11 eq. | 7,90 E-09 | 3,67 E-09 | 7,87 E-09 | 1,94 E-08 | 3,68 E-09 | 1,26 E-09 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 5,34 E-10 | 3,44 E-10 | 5,10 E-10 | 0,00 E+00 | -2,36 E-08 |
| POCP | Kg ethene eq. | 3,25 E-04 | 1,25 E-05 | 1,62 E-05 | 3,54 E-04 | 1,25 E-05 | 1,95 E-05 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,20 E-06 | 1,17 E-06 | 2,88 E-06 | 0,00 E+00 | -4,07 E-05 |
| AP | kg SO2 eq. | 1,19 E-03 | 9,11 E-05 | 1,86 E-04 | 1,46 E-03 | 9,13 E-05 | 8,31 E-05 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,34 E-05 | 8,53 E-06 | 4,12 E-05 | 0,00 E+00 | -1,77 E-04 |
| EP | kg (PO4 ) 3- eq. | 1,09 E-04 | 1,79 E-05 | 3,82 E-05 | 1,65 E-04 | 1,79 E-05 | 1,14 E-05 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,0 0E+00 | 0,00 E+00 | 0,00 E+00 | 5,26 E-06 | 1,68 E-06 | 1,47 E-05 | 0,00 E+00 | -2,47 E-05 |
| Toxicity indicators for Dutch market | | | | | | | | | | | | | | | | | | | |
| HTP | kg DCB-Eq | 5,62 E-02 | 8,72 E-03 | 9,65 E-03 | 7,46 E-02 | 8,74 E-03 | 9,66 E-03 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,20 E-03 | 1,96 E-03 | 3,65 E-01 | 0,00 E+00 | -1,27 E-02 |
| FAETP | kg DCB-Eq | 1,43 E-03 | 2,55 E-04 | 2,75 E-04 | 1,96 E-03 | 2,55 E-04 | 3,72 E-04 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,20 E-03 | 1,96 E-03 | 3,61 E-01 | 0,00 E+00 | -1,59 E-04 |
| MAETP | kg DCB-Eq | 3,64 E+00 | 9,16 E-01 | 1,24 E+00 | 5,80 E+00 | 9,18 E-01 | 8,00 E-01 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 1,23 E-06 | 9,03 E-07 | 3,77 E-03 | 0,00 E+00 | -6,16 E-01 |
| TETP | kg DCB-Eq | 2,43 E-04 | 3,08 E-05 | 1,54 E-04 | 4,28 E-04 | 3,09 E-05 | 2,76 E-05 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,34 E-07 | 7,17 E-07 | 2,76 E-06 | 0,00 E+00 | -4,33 E-05 |
| ECI | euro | 3,25 E-02 | 2,50 E-03 | 6,54 E-03 | 4,15 E-02 | 2,50 E-03 | 3,98 E-03 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 6,71 E-10 | 4,32 E-10 | 5,95 E-10 | 0,00 E+00 | -1,33 E-02 |
| ADPF | kg Sb eq. | 6,91 E-03 | 1,52 E-04 | 6,37 E-04 | 7,70 E-03 | 1,53 E-04 | 3,98 E-04 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,27 E-05 | 1,13 E-05 | 5,76 E-05 | 0,00 E+00 | -2,08 E-03 |

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.]

## ENVIRONMENT 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. | 4,09 E-01 | 2,09 E-02 | 8,78 E-02 | 5,18 E-01 | 2,10 E-02 | 5,45 E-02 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 1,30 E-03 | 8,17 E-04 | 1,32 E-02 | 0,00 E+00 | -2,20 E-01 |
| GWP-fossil | kg CO2 eq. | 4,08 E-01 | 2,09 E-02 | 8,67 E-02 | 5,15 E-01 | 2,09 E-02 | 4,78 E-02 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 1,68 E-05 | 2,39 E-05 | 4,09 E-03 | 0,00 E+00 | -2,17 E-01 |
| GWP-biogenic | kg CO2 eq. | 1,84 E-03 | 9,64 E-06 | 1,03 E-03 | 2,88 E-03 | 9,67 E-06 | 6,73 E-03 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 5,79 E-02 | 8,58 E-02 | 6,00 E+00 | 0,00 E+00 | -2,68 E-03 |
| GWP-luluc) | kg CO2 eq. | 1,42 E-04 | 7,65 E-06 | 4,80 E-05 | 1,98 E-04 | 7,67 E-06 | 1,07 E-05 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,87 E-06 | 2,89 E-06 | 2,11 E-05 | 0,00 E+00 | -1,51 E-05 |
| ODP | kg CFC11 eq. | 7,42 E-09 | 4,61 E-09 | 8,24 E-09 | 2,03 E-08 | 4,62 E-09 | 1,37 E-09 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 4,32 E-04 | 2,34 E-04 | 2,03 E-02 | 0,00 E+00 | -2,67 E-08 |
| AP | mol H+ eq. | 1,43 E-03 | 1,21 E-04 | 2,32 E-04 | 1,78 E-03 | 1,21 E-04 | 1,02 E-04 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,09 E-05 | 1,43 E-05 | 3,56 E-05 | 0,00 E+00 | -2,25 E-04 |
| EP-freshwater | kg PO4 eq. | 6,17 E-06 | 2,11 E-07 | 6,54 E-06 | 1,29 E-05 | 2,11 E-07 | 6,69 E-07 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,0 0E+00 | 0,00 E+00 | 0,00 E+00 | 1,30 E-03 | 8,17 E-04 | 1,32 E-02 | 0,00 E+00 | -5,09 E-07 |
| EP-marine | kg N eq. | 2,44 E-04 | 4,27 E-05 | 4,16 E-05 | 3,28 E-04 | 4,28 E-05 | 2,29 E-05 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 1,68 E-05 | 2,39 E-05 | 4,09 E-03 | 0,00 E+00 | -6,14 E-05 |
| EP-terrestrial | mol N eq. | 2,69 E-03 | 4,71 E-04 | 5,38 E-04 | 3,69 E-03 | 4,72 E-04 | 2,39 E-04 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 5,79 E-02 | 8,58 E-02 | 6,00 E+00 | 0,00 E+00 | -6,80 E-04 |
| POCP | kg NMVOC eq. | 1,25 E-03 | 1,34 E-04 | 1,34 E-04 | 1,52 E-03 | 1,35 E-04 | 9,17 E-05 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,87 E-06 | 2,89 E-06 | 2,11 E-05 | 0,00 E+00 | -2,34 E-04 |
| ADP-minerals & metals | kg Sb eq. | 3,68 E-06 | 5,29 E-07 | 2,83 E-07 | 4,49 E-06 | 5,31 E-07 | 2,66 E-07 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 4,32 E-04 | 2,34 E-04 | 2,03 E-02 | 0,00 E+00 | -2,01 E-07 |
| ADP-fossil | MJ, net calorific value | 1,45 E+01 | 3,15 E-01 | 1,22 E+00 | 1,60 E+01 | 3,16 E-01 | 8,29 E-01 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,09 E-05 | 1,43 E-05 | 3,56 E-05 | 0,00 E+00 | -3,90 E+00 |
| WDP | m3 world eq. Deprived | 2,85 E-01 | 1,13 E-03 | 1,16 E-02 | 2,98 E-01 | 1,13 E-03 | 1,51 E-02 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 1,30 E-03 | 8,17 E-04 | 1,32 E-02 | 0,00 E+00 | -2,89 E-02 |

| | |
|---|---|
| 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 experience with the indicator.

## ENVIRONMENT 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 incidence | 1,26 E-08 | 1,88 E-09 | 1,04 E-09 | 1,56 E-08 | 1,88 E-09 | 1,02 E-09 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 8,59 E-10 | 1,76 E-10 | 4,15 E-10 | 0,00 E+00 | -1,23 E-09 |
| IRP | kBq U235 eq. | 7,49 E-03 | 1,32 E-03 | 2,91 E-03 | 1,17 E-02 | 1,32 E-03 | 6,89 E-04 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 1,86 E-04 | 1,24 E-04 | 1,60 E-04 | 0,00 E+00 | -1,39 E-03 |
| ETP-fw | CTUe | 2,88 E+00 | 2,81 E-01 | 5,81 E-01 | 3,75 E+00 | 2,82 E-01 | 2,25 E-01 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,90 E-02 | 2,63 E-02 | 1,23 E-01 | 0,00 E+00 | -3,29 E-01 |
| HTP-c | CTUh | 8,37 E-11 | 9,11 E-12 | 1,61 E-11 | 1,09 E-10 | 9,14 E-12 | 8,43 E-12 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 1,51 E-12 | 8,54 E-13 | 1,65 E-11 | 0,00 E+00 | -1,70 E-11 |
| HTP-nc | CTUh | 2,49 E-09 | 3,07 E-10 | 4,60 E-10 | 3,26 E-09 | 3,08 E-10 | 2,32 E-10 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,83 E-11 | 2,88 E-11 | 5,50 E-10 | 0,00 E+00 | -2,92 E-10 |
| SQP | ---- | 7,06 E-01 | 2,73 E-01 | 3,34 E-01 | 1,31 E+00 | 2,74 E-01 | 8,71 E-02 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 5,78 E-03 | 2,56 E-02 | 3,93 E-02 | 0,00 E+00 | -1,00 E+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.

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 / A2)

| | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 1,46 E-06 | 7,98 E-07 | 1,06 E-06 | 3,32 E-06 | 8,00 E-07 | 2,46 E-07 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 1,21 E-07 | 7,48 E-08 | 4,19 E-07 | 0,00 E+00 | -4,35 E-06 |
| NHWD | kg | 1,34 E-02 | 2,00 E-02 | 5,39 E-03 | 3,88 E-02 | 2,00 E-02 | 4,44 E-03 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 7,97 E-05 | 1,87 E-03 | 5,20 E-03 | 0,00 E+00 | -2,13 E-03 |
| RWD | kg | 6,48 E-06 | 2,07 E-06 | 3,10 E-06 | 1,17 E-05 | 2,07 E-06 | 7,40 E-07 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,97 E-07 | 1,94 E-07 | 2,07 E-07 | 0,00 E+00 | -1,90 E-06 |
| CRU | kg | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 |
| MFR | kg | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 5,18 E-03 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 |
| MER | kg | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,26 E-03 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 |
| EEE | MJ | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 1,44 E+00 |
| ETE | MJ | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 8,36 E-01 |

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 / A2)

| | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 2,67 E-01 | 0,00 E+00 | 4,18 E-01 | 6,85 E-01 | 0,00 E+00 | 3,44 E-02 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,50 E-04 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | -1,71 E-01 |
| PERM | MJ | 0,00 E+00 | 3,94 E-03 | 0,00 E+00 | 3,94 E-03 | 3,95 E-03 | 5,65 E-04 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,69 E-04 | 2,50 E-03 | 0,00 E+00 | 0,00 E+00 |
| PERT | MJ | 2,67 E-01 | 3,94 E-03 | 4,18 E-01 | 6,89 E-01 | 3,95 E-03 | 3,49 E-02 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,50 E-04 | 3,69 E-04 | 2,50 E-03 | 0,00 E+00 | -1,71 E-01 |
| PENRE | MJ | 1,56 E+01 | 0,00 E+00 | 1,32 E+00 | 1,69 E+01 | 0,00 E+00 | 8,50 E-01 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 4,65 E-02 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | -4,31 E+00 |
| PENRM | MJ | 0,00 E+00 | 3,34 E-01 | 0,00 E+00 | 3,34 E-01 | 3,35 E-01 | 4,04 E-02 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,13 E-02 | 7,48 E-02 | 0,00 E+00 | 0,00 E+00 |
| PENRT | MJ | 1,56 E+01 | 3,34 E-01 | 1,32 E+00 | 1,72 E+01 | 3,35 E-01 | 8,90 E-01 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 4,65 E-02 | 3,13 E-02 | 7,48 E-02 | 0,00 E+00 | -4,31 E+00 |
| SM | kg | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 |
| RSF | MJ | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 |
| NRSF | MJ | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 |
| FW | m3 | 4,30 E-03 | 3,84 E-05 | 1,32 E-03 | 5,66 E-03 | 3,85 E-05 | 2,91 E-04 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 2,70 E-06 | 3,59 E-06 | 4,24 E-05 | 0,00 E+00 | -4,44 E-04 |

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

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

| | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBCpr | Kg C | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 |
| BCCpa | kg C | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 3,78 E-03 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | 0,00 E+00 | -7,78 E-03 |

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

## CALCULATION RULES

Cut off rules

All primary data of the production processes were considered. No materials or processes have been excluded from the study.

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 must be of higher quality than background data of other processes. 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.

Allocation

In accordance with the respective methodologies, the allocation procedures in the background processes are deemed to be consistent.

## SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Product stage (A1-A3)

The processes in A1-A3 consists of the extraction and processing of raw materials, transportation of the raw materials, the manufacturing process and product packaging. The required energy for production, external treatments, ancillary materials, packaging material and production emissions are included. Energy consumption was modelled based on a residual energy mix.

Construction Stage (A4-A5)

This life cycle stage details all impacts related to the transport of product to the construction site and on-site activities related to installation. This also includes any waste produced and its disposal.

Transport to construction site (A4); the distance is determined by using the city of Utrecht as ship-to address for products that are manufactured outside of Netherlands.

Assembly (A5); no impacts are associated with the installation, as the product is typically unrolled off suspended rolls manually. However, the environmental impacts related to the disposal of packaging material are considered.

| Description | Value | Unit |
|---|---|---|
| Vehicle type used for transport | Lorry unspecified | |
| Distance to construction site | 776 | km |
| Output materials as results of losses during construction | 5 | % |
| Output materials as results of waste processing of used packaging. | 0,0414 | kg |
| Distance to disposal site (winding core) | 60 | km |
| Distance to disposal site (Packaging film wrap and plugs) | 92,5 | km |

Use Stage (B1-B7)

This life cycle stage details impacts related to the use phase over the entire life cycle.

There are no impacts associated with the entire use stage, as it was assumed that no activities for maintenance, repair, replacement, refurbishment nor other material and energy flows take place during the operational phase

End of Life Stage (C1-C4)

The end of life stage accounts for the deconstruction/demolition and includes the impacts of transport to waste processing sites and the disposal of said waste. The deconstruction/demolition of waste product is done by the excavation of the subsoil. It is assumed that 0.03 m3 of soil must be moved per declared unit. The transport distance of waste material from the construction/installation site to the waste incineration plant is 100 km The transport to the waste recycling plant and to landfilling site have the same distance of 50 km. The distribution ratio for waste disposal follows the “geotextiel en geogrids grondwerken” waste stream (ENG: geotextiles and geogrids for earth works) which is 70% incineration, 25% remain inground and 5% recycling.

Benefits and Loads beyond the system boundary (D)
This life cycle stage covers the net benefits and loads arising from the reuse of products or the recycling or recovery of energy from waste materials. This study models the benefits and burdens of waste combustion using an electrical efficiency of 18% and thermal efficiency of 31%. As for the calculation of the avoided burden from material recycling, a quality factor of 67% is used.

| Description | Total energy recovery (MJ) | Avoided burden (kg) |
|---|---|---|
| Reference product | 2,276 | 0,0067 |

The following ranges are covered in this EPD: **MIRAFI** Bidim AR, **MIRAFI** Bidim GTX, **MIRAFI** Bidim F, **MIRAFI** Bidim P, **MIRAFI** Bidim S. The results are presented for **MIRAFI** Bidim S as the reference product, however the span between products within the product group is larger than the allotted percentage variance. For this reason, the reference product is selected as the worst case.

## 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

[1] 'ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006.

[2] 'ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.

[3] 'ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures', International Organization for Standardization, ISO14025:2006.

[4] 'NEN-EN 15804: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', NEN-EN 15804:2012+A2:2019.

[5] 'Bepalingsmethode Milieuprestatie Bouwwerken ', Stichting Nationale Milieudatabase, versie 1.1, maart 2022.

## REMARKS

None