



Environmental Product Declaration

as per ISO 14025 and EN 15804

Owner of the declaration: Naue GmbH & Co. KG

Publisher: Kiwa-Ecobility Experts

Programme operator: Kiwa-Ecobility Experts

Registration number: EPD-Kiwa-EE-000321-EN

Issue date: 16.11.2023

Valid to: 16.11.2028



GlacierProtect

UV-resistant, 100% bio-degradable, mechanically bonded nonwoven geosynthetic product

1. General information

Naue GmbH & Co. KG

Programme operator:

Kiwa-Ecobility Experts
Kiwa GmbH, Ecobility Experts
Wattstraße 11-13
13355 Berlin
Germany

Registration number:

EPD-Kiwa-EE-000321-EN

This declaration is based on the Product
Category Rules:

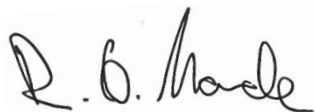
Kiwa-Ecobility Experts (Kiwa-EE) – Product
Category Rules for Geosynthetic Products,
EPD programme, Version 2, 2023-07-21

Issue date:

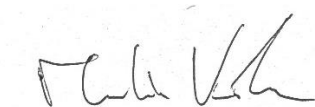
16.11.2023

Valid to:

16.11.2028



Raoul Mancke
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Martin Koehrer
(Verification body, Kiwa-Ecobility Experts)

GlacierProtect

Owner of the declaration:

Naue GmbH & Co. KG
Gewerbestraße 2
32339 Espelkamp
Germany

Declared product / declared unit:

1 m² Geotextile

Scope:

This EPD (type: Cradle-to-gate with modules C1-C4 and module D (A1-A3, C, D)) is based on the life cycle assessment of the GlacierProtect Geotextile produced by Naue GmbH & Co. KG. This product is specifically designed to cover snow mounds for protection against solar radiation.

Kiwa-Ecobility Experts assumes no liability for manufacturer's information, LCA data and evidence.

Verification:

The European standard EN 15804+A2:2019 serves as the core PCR.

Independent verification of the declaration and data according to ISO 14025:2010.

☐ internal

☒ external



Elisabet Amat Guasch
(Third party verifier)

2. Product

2.1 Product description

Naue GlacierProtect 50G1 is a geotextile made of Secutex® Green G1. Secutex® Green is a 100% biodegradable, mechanically bonded nonwoven. Its biodegradability is certified, which means that residues of the product cause no harm to the environment. It is UV-resistant and can therefore be used in uncovered applications. It is a temporary solution, and vegetation and their roots take over the desired filter properties after its service life. No plastic is entered into the environment during the installation, operation, or renaturation of the product, and after its service life it can be composted after renaturation.

2.2 Application

Naue GlacierProtect 50G1 is specifically designed to cover snow mounds for protection against solar radiation, and is used in glacier protection and snowfarming. It is single-layered.

2.3 Technical data

The technical data of GlacierProtect is listed below in Table 1.

Table 1. Technical data for Secutex Green G1, standard

Characteristic	Unit	Value
Raw material	NAUE GreenLine (organic fibre G1)	-
Mass per unit area	500	g/m ²
Roll dimension, width x length	4 x 60	m x m
Roll weight	130	kg

2.4 Placing on the market/ Application rules

For quality assurance purposes, geotextiles for use in earthworks and foundation engineering are regulated according to EN13249 ff. and marked with a CE mark by the manufacturer. For the placing on the market the regulation (EU) No. 305/2011 of March 9, 2011 applies. For the use of the products the national regulations apply.

2.5 Base materials / Ancillary materials

Naue GlacierProtect is made of Secutex® Green G1, which consists of NAUE GreenLine (organic fibre G1).

Component	Percentage [%]
Organic fibre	100

The product does not contain any substances from the candidate list of substances of very high concern for authorisation (SVHC).

2.6 Manufacturing

The manufacturing location of Secutex® Green is Gewerbestr. 2, 32339 Espelkamp, Germany. The raw material is brought there, and the nonwoven is produced by carding and needle punching. Then, the product is packaged and internally transported into stock. Afterwards, the product is transported to the building site and installed there.

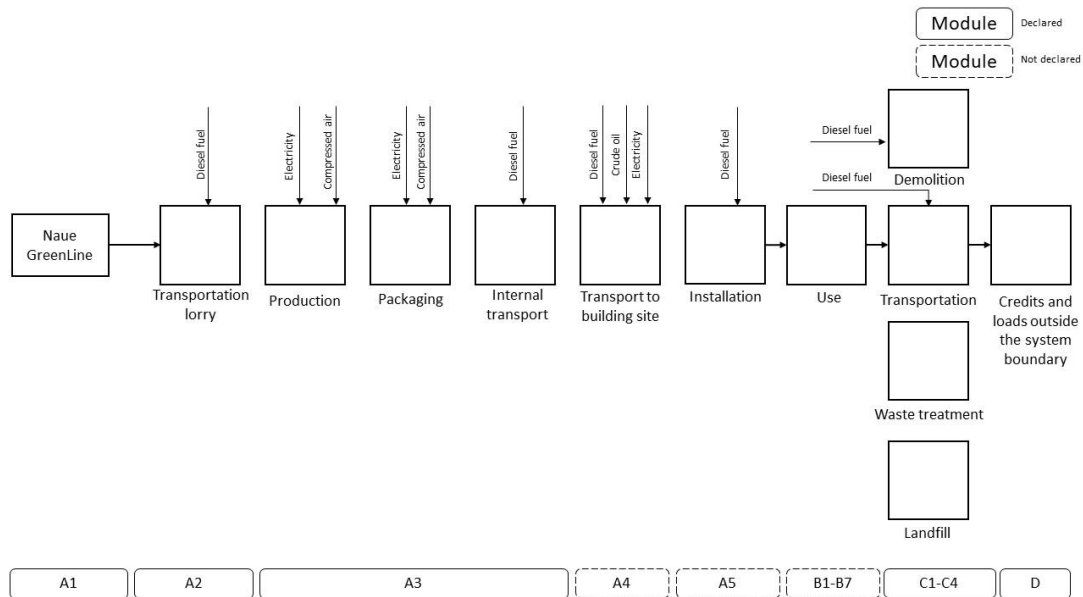


Figure 1. Process flow chart for GlacierProtect 50G1

2.7 Packaging

Packaging is carried out by rolling the goods onto paper core tubes and then wrapping them in Polyethylene (PE) foil. The tube is closed with a PE plug and a Polypropylene (PP) disk.

2.8 Reference Service Life (RSL)

In general, Naue GlacierProtect has an expected service life of three to five seasons. Naue GlacierProtect can be used in the summer seasons to protect glaciers, which can be done approximately 3 - 5 times (or years) before the product might lose its functionality.

2.9 Other Information

Further information on the product can be found on the manufacturer's website (<https://www.glacierprotect.com>).

3. LCA: Calculation rules

3.1 Declared unit

In accordance with the PCR B 1 m² geotextile is chosen as the declared unit.

Table 2. Declared unit and conversion factor to 1 kg

Product	Unit weight [g/m ²]	Unit weight [kg/m ²]	Conversion factor to 1 kg
GlacierProtect 50G1	500	0,5	2

3.2 System boundary

Table 3. System boundary

Module	Module declared	Within the system boundary	Outside the system boundary
A1 Raw Material	X	Raw materials	
A2 Transport	X	Transport from the supplier to the production place	
A3 Manufacturing	X	Electricity, auxiliary materials, packaging	
A4 Transport	MND		
A5 Installation	MND		
B1 Use Phase	MND		
B2 Maintance	MND		
B3 Repair	MND		
B4 Replacement	MND		
B5 Refurbishment	MND		
B6 Operational energy use	MND		
B7 Operational water use	MND		
C1 Deconstruction	X	-	
C2 Transport	X	-	
C3 Waste treatment	X	Industrial composting	
C4 Landfill	X	-	
D Considered loads and benefits outside of the system boundary in Module D	X	Recycling of product	

3.3 Estimates and assumptions

Since the raw material is supplied by one supplier, the distances for transport could be accurately determined. However, since no specific transport information is available, for all truck transports (suppliers, disposal transports and internal transports) a payload factor of 50%, is used for large HGVs (loading capacity '>32t'), which effectively corresponds to delivering full and going back empty. The return journey and the payload factor have already been incorporated into the Ecoinvent transport processes.

The supplier of the raw material has provided a confidential Life Cycle Assessment report for the purpose of conducting an EPD for Secutex® Green V01 that includes the necessary data on environmental

impact categories. The results of that report, created by Quantis, are grouped into three principal categories, which are the raw materials, the production of the fiber, and the waste generated during the production process. All three of these categories have also been considered in this LCA.

The electricity mix was chosen according to the geographical reference area (Germany) and time reference. As only the conventional electricity mix is used, no other energy sources were considered. No CO2 certificates were taken into account.

For Module C1, no machinal dismantling has been considered, which is why there are no inputs for Module C1.

3.4 Cut-off criteria

Potential environmental impacts were assigned to the material flows based on the Ecoinvent database version 3.6. All flows contributing to more than 1 percent of the total mass, energy or environmental impacts of the system were considered in the LCA. It can be assumed that the neglected processes would have contributed less than 5 percent to the impact categories considered.

Other operating resources and the corresponding waste were not considered part of the product system and accordingly not included in the balancing.

3.5 Period under review and geographical reference area

All product- and process-specific data were collected for the operating year 2021 and are therefore up-to-date. The geographical reference area is Germany.

3.6 Data quality

To ensure the comparability of the results, only consistent background data from the Ecoinvent database version 3.6 (2019) was used in the LCA (e.g. data sets on energy, transports, auxiliary and operating materials). The database is regularly checked and thus complies with the requirements of EN 15804 (background data not older than 10 years). Almost all consistent data sets contained in the Ecoinvent database version 3.6 are documented and can be viewed in the online documentation.

The raw material data were converted into reference flows (input per declared unit).

The general rule was followed that specific data from specific production processes or average data derived from specific processes must have priority in the calculation of an LCA. Data for processes over which the manufacturer has no influence were assigned generic data.

The LCA calculation was carried out using Nibe's LCA & EPD tool R< THiNK.

3.7 Allocation

Specific information on allocations within the background data can be found in the documentation of the Ecoinvent database version 3.6 datasets.

3.8 Comparability

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, definition of the system boundary, declared modules, data

selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPDs programs may differ. A comparability needs to be evaluated. For further guidance see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

4. LCA: Scenarios and additional technical information

A scaling method has been used to calculate the LCA results for the various Secutex® Green G1 products. The scaling has been done on the basis of the mass per unit weight (linear scaling). Since the Naue GlacierProtect 50G1 product is made of Secutex® Green G1, this product has been included in the LCA on Secutex® Green G1. More information on this scaling method can be found in the EPD for Secutex® Green G1. In this EPD, the results of this LCA are shown specifically for the Naue GlacierProtect 50G1 product.

For disposal, a waste scenario of composting has been applied to this product. The Secutex® Green G1 products are 100% biodegradable, but unlike the other products in the Secutex® Green G1 range, the Naue GlacierProtect 50G1 is not left in the soil. After its reference service life, Naue GlacierProtect can be composted. However, a waste scenario of 100% landfill has been adopted until it can be said with certainty that the product actually is composted.

5. LCA: Results

The following tables show the results of the impact assessment indicators, resource use, waste and other output streams. The results presented here refer to the declared average product.

Disclaimer on ADP-e, ADP-f, WDP, ETP-fw, HTP-c, HTP-nc, SQP: The results of these environmental impact indicators must be used with caution, as the uncertainties in these results are high or as there is limited experience with the indicator.

Disclaimer on IR: This impact category mainly addresses the potential effect of low dose ionizing radiation on human health in the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents and occupational exposures, nor does it consider radioactive waste disposal in underground facilities. Potential ionizing radiation from soil, radon, and some building materials is also not measured by this indicator.

Description of the system boundary																
Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manu-facturing	Transport from manu-facturer to place of use	Construction-installation process	Use	Main-tenance	Repair	Replacement	Refur-bishmen	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
X=Module declared MND=Module not declared																
LCA results - Indicators describing environmental impacts based on the impact assessment (LCIA): 1 m² GlacierProtect 50G1 (EN 15804+A2)																
Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D							
Core environmental impact indicators (EN 15804+A2)																
GWP-total	kg CO2 eqv.	1,66E+00	5,35E-02	5,21E-02	0,00E+00	6,91E-03	0,00E+00	8,98E-01	0,00E+00							
GWP-f	kg CO2 eqv.	1,64E+00	5,35E-02	6,68E-02	0,00E+00	6,90E-03	0,00E+00	5,66E-03	0,00E+00							
GWP-b	kg CO2 eqv.	2,05E-02	2,47E-05	-1,50E-02	0,00E+00	3,19E-06	0,00E+00	8,92E-01	0,00E+00							
GWP-luluc	kg CO2 eqv.	3,22E-03	1,96E-05	2,67E-04	0,00E+00	2,53E-06	0,00E+00	2,98E-06	0,00E+00							
ODP	kg CFC 11 eqv.	3,80E-07	1,18E-08	1,13E-08	0,00E+00	1,52E-09	0,00E+00	1,72E-09	0,00E+00							
AP	mol H+ eqv.	1,00E-02	3,10E-04	3,96E-04	0,00E+00	4,00E-05	0,00E+00	4,84E-05	0,00E+00							
EP-fw	kg P eqv.	1,14E-04	5,39E-07	5,42E-06	0,00E+00	6,96E-08	0,00E+00	1,58E-07	0,00E+00							
EP-m	kg N eqv.	1,92E-03	1,09E-04	8,88E-05	0,00E+00	1,41E-05	0,00E+00	3,02E-05	0,00E+00							
EP-T	mol N eqv.	2,03E-02	1,20E-03	9,65E-04	0,00E+00	1,55E-04	0,00E+00	1,72E-04	0,00E+00							
POCP	kg NMVOC eqv.	5,93E-03	3,44E-04	2,69E-04	0,00E+00	4,44E-05	0,00E+00	6,16E-05	0,00E+00							
ADP-mm	kg Sb-eqv.	8,23E-07	1,35E-06	4,88E-07	0,00E+00	1,75E-07	0,00E+00	7,26E-09	0,00E+00							
ADP-f	MJ	2,56E+01	8,06E-01	1,06E+00	0,00E+00	1,04E-01	0,00E+00	1,32E-01	0,00E+00							
WDP	m3 world eqv.	2,45E-02	2,89E-03	1,19E-02	0,00E+00	3,72E-04	0,00E+00	5,92E-03	0,00E+00							
Additional environmental impact indicators (EN 15804+A2)																
PM	disease incidence	2,45E-02	2,89E-03	1,19E-02	0,00E+00	3,72E-04	0,00E+00	5,92E-03	0,00E+00							
IR	kBq U235 eqv.	7,11E-02	3,38E-03	3,82E-03	0,00E+00	4,36E-04	0,00E+00	5,17E-04	0,00E+00							
ETP-fw	CTUe	7,26E-01	7,19E-01	1,62E+00	0,00E+00	9,28E-02	0,00E+00	9,98E-02	0,00E+00							
HTP-c	CTUh	1,29E-08	2,33E-11	2,82E-10	0,00E+00	3,01E-12	0,00E+00	3,20E-12	0,00E+00							
HTP-nc	CTUh	9,25E-08	7,87E-10	2,41E-09	0,00E+00	1,01E-10	0,00E+00	1,35E-10	0,00E+00							
SQP	Pt	1,71E+02	6,99E-01	8,16E+00	0,00E+00	9,02E-02	0,00E+00	3,12E-01	0,00E+00							
ADP-mm= Abiotic depletion potential for non-fossil resources ADP-f=Abiotic depletion for fossil resources potential AP= Acidification potential, Accumulated Exceedance EP-fw = Eutrophication potential, fraction of nutrients reaching freshwater end compartment EP-m= Eutrophication potential, fraction of nutrients reaching marine end compartment EP-T= Eutrophication potential, Accumulated Exceedance GWP-b=Global Warming Potential biogenic GWP-f=Global Warming Potential fossil fuels GWP-luluc=Global Warming Potential land use and land use change GWP-total=Global Warming Potential total ODP=Depletion potential of the stratospheric ozone layer POCP=Formation potential of tropospheric ozone WDP=Water (user) deprivation potential, deprivation- weighted water consumption ETP-fw=Potential Comparative Toxic Unit for ecosystems HTP-c=Potential Toxic Unit for Humans toxicity, cancer HTP-nc= Potential Toxic Unit for humans, non-cancer IRP=Potential Human exposure efficiency relative to U235, human health PM=Potential incidence of disease due to Particulate Matter emissions SQP=Potential soil quality index																

LCA results - Indicators describing resource use and environmental information derived from life cycle inventory (LCI): 1 m² GlacierProtect 50G1 (EN 15804+A2)

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	MJ	0,00E+00	1,01E-02	3,33E-01	0,00E+00	1,30E-03	0,00E+00	4,16E-03	0,00E+00
PERM	MJ	0,00E+00	0,00E+00	6,11E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	0,00E+00	1,01E-02	9,44E-01	0,00E+00	1,30E-03	0,00E+00	4,16E-03	0,00E+00
PENRE	MJ	0,00E+00	8,56E-01	3,64E-01	0,00E+00	1,10E-01	0,00E+00	1,41E-01	0,00E+00
PENRM	MJ	0,00E+00	0,00E+00	2,12E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	0,00E+00	8,56E-01	5,77E-01	0,00E+00	1,10E-01	0,00E+00	1,41E-01	0,00E+00
SM	Kg	0,00E+00	0,00E+00	4,30E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	M3	2,99E-02	9,82E-05	1,01E-03	0,00E+00	1,27E-05	0,00E+00	1,42E-04	0,00E+00
HWD	Kg	0,00E+00	2,04E-06	7,39E-07	0,00E+00	2,64E-07	0,00E+00	1,09E-07	0,00E+00
NHWD	Kg	0,00E+00	5,12E-02	7,20E-03	0,00E+00	6,60E-03	0,00E+00	5,12E-01	0,00E+00
RWD	Kg	0,00E+00	5,30E-06	2,50E-06	0,00E+00	6,83E-07	0,00E+00	7,90E-07	0,00E+00
CRU	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	2,15E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	1,25E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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 resources | SM=Use of secondary material | RSF=Use of renewable secondary fuels | NRSF=Use of non-renewable secondary fuels | FW=Use of fresh water | HWD=Hazardous waste disposed | NHWD=Non-hazardous waste disposed | RWD=Radioactive waste disposed | CRU=Components for re-use | MFR=Materials for recycling | MER=Materials for energy recovery | EET=Exported energy, thermal | EE=Exported energy, electrical

LCA results - information on biogenic carbon content at the factory gate: 1 m² GlacierProtect 50G1 (EN 15804+A2)

Parameter	Unit	Value
biogenic carbon content in product	kg C	0
biogenic carbon content in accompanying packaging	kg C	0
NOTE 1 kg biogenic carbon is equivalent to 44/12 kg CO ₂		

6. LCA: Interpretation

For easier understanding, the results are presented graphically in order to be able to see correlations and connections between the data more clearly.

The following figure shows the shares of the different product life phases in the environmental impacts.

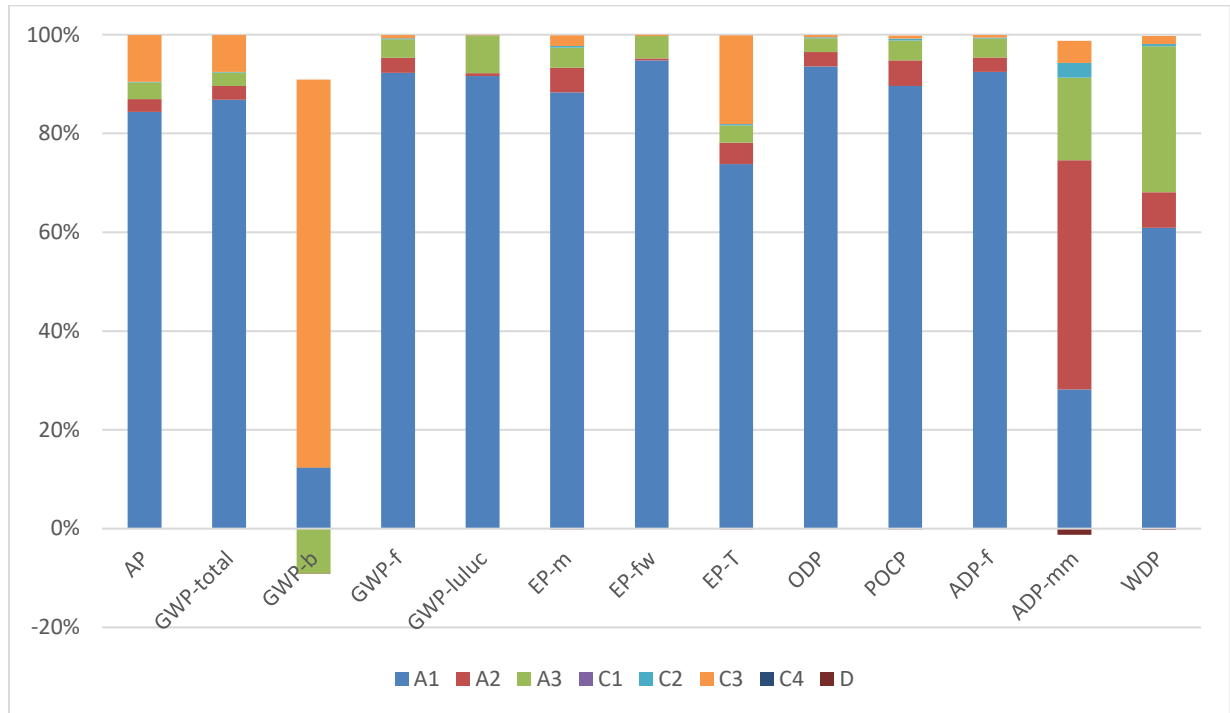


Figure 1. Shares of the product life phases in the environmental impacts for 1m² GlacierProtect 50G1

As can be seen in the graph, raw material provision (module A1) dominates in the production phase in almost all environmental impacts. Only in the environmental impact category Global warming potential - Biogenic (GWP-biogen) module C3 has a bigger influence, and in the environmental impact category Resource use, minerals and metals (ADP-mm) A2 has the biggest influence out of all modules.

7. References

Ecoinvent 2019	Ecoinvent Datenbank Version 3.6 (2019)
EN 15804	EN 15804:2012+A2:2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products
ISO 14025	ISO 14025:2010 Environmental labels and declarations — Type III environmental declarations — Principles and procedures EN 13249
ISO 14040	ISO 14040:2006 Environmental management - Life cycle assessment - Principles and framework
ISO 14044	ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines
NMD 2019	Nationale Milieudatabase (NMD). Environmental Performance Assessment Method for Construction; Version 1.1 (March 2022); Rijswijk
PCR A	Kiwa-Ecobility Experts, Berlin, 2022: PCR A – General Program Category Rules for Construction Products from the EPD programme of Kiwa-Ecobility Experts; Version 2.1
PCR B	Kiwa-Ecobility Experts (Kiwa-EE) – Product Category Rules for Geosynthetic Products, EPD programme, Version 2, 2023-07-21
R<THiNK 2023	R<THiNK; Online-EPD-Tool by NIBE B.V.
SimaPro Software	Industry data LCA library; website: https://simapro.com/databases/industry-data-lca-library/

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