



Tenax
S.p.A.



ENVIRONMENTAL PRODUCT DECLARATION

PRODUCT NAME:

HD Plus
High drainage
geocomposite

SITE:

Via dell'Industria, 17, 23897
Viganò (LC) - Italy

In conformity to ISO 14025 and EN 15804:2012+A2:2019

Program Operator	EPDItaly
Publisher	EPDItaly

Declaration Number	EPDHDPLUS_2024_rev.1.0
Registration Number	EPDITALY1276

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Valid until	2031/03/26



GENERAL INFORMATION

EPD OWNER	
Company name	Tenax S.p.A.
Registered office	Via dell'Industria, 17, 23897 Viganò (LC) – Italy.
Contacts for information on the EPD	Silvia Manzoni – silvia.manzoni@tenax.net Piergiorgio Recalcati – piergiorgio.recalcati@tenax.net

PROGRAM OPERATOR	
EPDItaly www.epditaly.it	Via Gaetano De Castillia n° 10 - 20124 Milano, Italy.

INFORMATION REGARDING THE EPD	
Product name(s)	HD Plus.
Site(s)	Via dell'Industria, 17, 23897 Viganò (LC) – Italy.
Short description and technical information of the product(s)	High drainage geocomposite, made through extrusion and transverse stretching of the threads.
Field of application of the product(s)	Waste disposals; underground structures; retaining walls; road foundations; waterproof channels and reservoirs.
EPD type	Product specific EPD.
Product(s) reference standards (if any)	Not applicable.
CPC Code (number) https://unstats.un.org/unsd/classifications/Econ	36950 - Builders' ware of plastics n.e.c.

VERIFICATION INFORMATION	
PCR (title, version, date of publication or update)	CORE PCR per i Prodotti e Servizi da Costruzione: ICMQ 001 Rev.4, last update of 10/11/2025.
EPDItaly Regulation (version, date of publication or update)	Regulation of the EPDItaly Programme, Rev. 7.1, issue date: 05/09/2025.
Project Report LCA	Analisi del ciclo di vita del geocomposito HD Plus, Rev.05, March 2026.
Independent Verification Statement	The PCR review was performed by the EPDItaly Technical Committee - info@epditaly.it. Independent verification of the declaration and data, carried out according to ISO 14025: 2010. ☐ Internal ☒ External Third party verification carried out by: ICMQ S.p.A., via Gaetano De Castilia n° 10 - 20124 Milan, Italy. Accredited by Accredia.
Comparability Statement	Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019.
Liability Statement	The EPD Owner releases EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence. EPDItaly disclaims any responsibility for the information, data and results provided by the EPD Owner for life cycle assessment.

ADDITIONAL INFORMATION	
Technical Support	LCA study carried out by Greenwich S.r.l.  Luca Micheletti - l.micheletti@greenwichsrl.it Lorenzo Calisse - l.calisse@greenwichsrl.it Paride Romano - p.romano@greenwichsrl.it

COMPANY

Company

Tenax S.p.A. is an international company operating in various sectors, including gardening, DIY, construction, agriculture, geosynthetics and industry.

Story

Founded in Italy in 1960, it developed tubular and double-expanded meshes. It also managed to distinguish itself on the market thanks to extrusion heads up to 20 inches in diameter.

In the 1970s, the company aimed to replace metal meshes with double-expanded meshes, based on longitudinal and transverse stretching technology, which allowed the extruded meshes to achieve properties similar to metal meshes.

In the following decades, it first developed a drainage geomesh twice as wide as those commercially available at the time. It then invested in research and experimentation in the fields of civil engineering and geotechnical engineering, leading to an expansion of its production facilities in Baltimore, MD, and Evergreen, AL, in the United States, and the establishment of new offices in Lindau, Germany.

Vision

The company's vision for the coming years appears clearly oriented toward profitable and sustained growth, with a strong focus on increasing sales volumes and revenues. The expansion into emerging markets is identified as one of the main strategic drivers, highlighting a determined effort to strengthen its global position and capture new competitive opportunities.

The path toward these objectives is structured around three key pillars:

- *Becoming the first choice for current and potential customers: the company aims to reinforce its reputation and attractiveness in order to be perceived as the preferred partner within its sector;*
- *Promoting a culture of continuous improvement: this commitment spans all areas from technology to product development and service, reflecting a constant drive for innovation and efficiency;*
- *Fostering a strong sense of belonging: Great importance is placed on promoting internal identity, with the aim of creating pride and engagement among employees, defined as "TENAX people".*

Tenax S.p.A. also owns:

- ISO 9001, certification number IT93/0008;
- ISO 14001, certification number IT22/00000132;
- CE marking for many products, including HD Plus.



PRODUCT DESCRIPTION

Name:

HD Plus.

Identification:

High drainage geocomposite.

Description:

The HD Plus geocomposite consists of an internal drainage core made of a high-profile rectangular 3D geonet, manufactured by extruding polypropylene (PP) and transversely stretching the ribs, combined with two nonwoven geotextile layers with a filtration function, thermally bonded to the inner structure.

At the junction points, the geonet features robust rounded protrusions that provide significant thickness and high compressive strength, up to 500 kPa. The specific configuration of the structure, together with its thickness and mechanical performance, ensures very high drainage capacity, even when tested under soft/rigid conditions (soft surface on one side), under loads up to 200 kPa and with very low hydraulic gradients (down to $i = 0.03$, corresponding to installation on 3% slopes). The geometry of the geonet also guarantees a transverse flow capacity of at least 40% of the longitudinal flow, as well as long-term compressive strength verified through sustained load tests up to 200 kPa, with an expected service life of 100 years.

Thanks to these characteristics, HD Plus represents a valid alternative to traditional natural drainage layers (such as gravel) in environmental engineering applications. It is particularly suitable for landfill cover systems, where, especially at the crest, high drainage capacities for rainwater and biogas are required, even with minimal slopes and drainage lengths exceeding 100 m.

Within environmental engineering works, its hydraulic performance, compressive strength, and chemical inertness also allow its use along the slopes of newly constructed basins for leachate drainage. The same properties make HD Plus particularly suitable for underground works, for example along excavation walls of below-ground structures, against piled retaining walls, or retaining structures, where an effective drainage function must be ensured.

In transportation engineering, it is used at the base of road and railway embankments as a drainage layer and as a barrier against capillary rise.

When combined with impermeable geomembranes, it can be used as a drainage layer beneath the geomembrane in artificial reservoirs, along the upstream or downstream faces of concrete or earth dams, as well as on the sides or bottom of canals.

Geographical scope:

Europe.

LCA INFORMATION

Declared Unit (DU):

The declared unit for this study is 1 kg of product.

Reference Service Lifetime:

Since the impacts of the products do not change over time, no RSL was adopted.

Time representativeness:

Solar year 2024.

Database and LCA software used:

Ecoinvent 3.11 – allocation, cut-off by classification - Unit, SimaPro 10.2.0.2, the method that has been used is consistent with EN 15804+A2; EF 3.1 package has been considered.

System boundaries:

Cradle-to-gate with options (A4, A5) with modules C1-C4 and module D (phases A1-A5, C1-C4, D).

Technical Specifications:

Thickness at 2 kPa = 11,0 mm; test method: ISO 9863; notes: A.

Unit weight = 840 g/m²; test method: ISO 9864; notes: B.

Roll width = 4,0 m; notes: C, D.

Roll length = 50 m.

Peak tensile strenght = 21,0 kN/m; test method: ISO 10319; notes: A, G.

Elongation = 35%; test method: ISO 10319; notes: B, G.

Unit weight = 120/120 g/m²; test method: ISO 9864; notes: A, H.

Opening size = 90 µm; test method: ISO 12956; notes: B, H.

Permeability normal to the plane = 0,105 m/s; test method: ISO 11058; notes: B, H.

Static puncture resistance = 1400 N; test method: EN ISO 12236; notes: B, H.

Dynamic perforation test = 33 mm; test method: EN ISO 13433; notes: B, H.

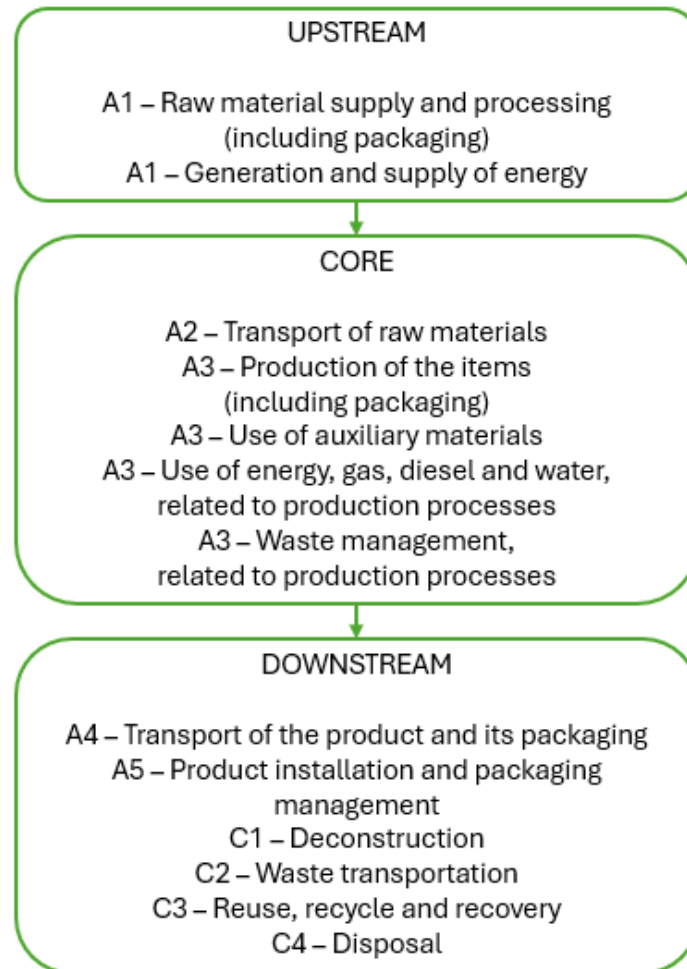
Hydraulic flow = see table below; test method: ISO 12958; notes: see table below.

Pressure	Gradient			Notes
	1,0	0,1	0,03	-
σV (kPa)	Hydraulic flow (L/(s*m))			Notes
20	5,30	1,60	0,75	A, E, G
100	4,15	1,30	0,63	A, E, G
200	3,30	1,00	0,46	A, E, G
20	4,50	-	-	A, F, G

Notes:

- A = Tolerance: -10%;
- B = Nominal value;
- C = Tolerance: -2,5%;
- D = On request available rolls with 3,85 m width;
- E = Boundary condition: Rigid/Soft;
- F = Boundary condition: Soft/Soft;
- G = MD: Parallel to roll's lenght (Longitudinal Direction);
- H = Values before the lamination process.

System diagram:



Process description

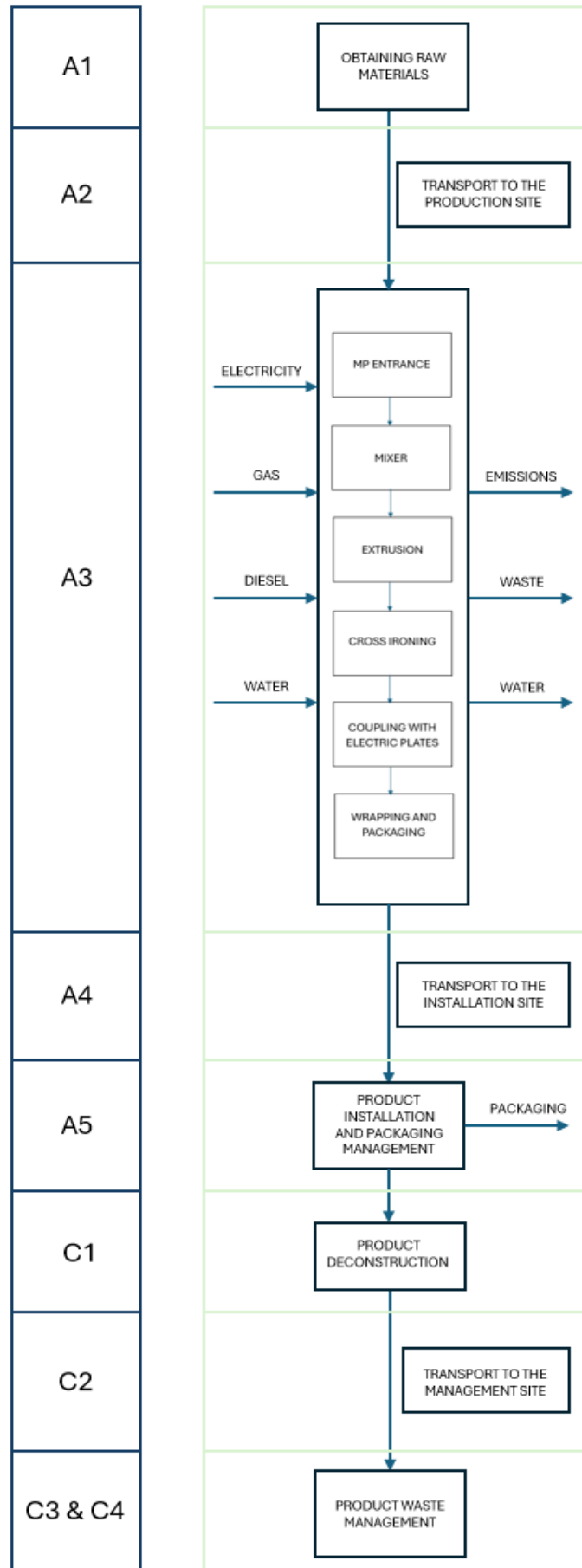
The product in question is manufactured at the Tenax S.p.A. plant at Via dell'Industria, 17, 23897 Viganò (LC) – Italy. This is where the raw materials are processed to produce the final product, HD Plus.

The first step in the production process involves transporting the raw materials from external silos to a gravimetric feeder, where they are weighed and then sent to a hopper. This is then mixed, melted, and extruded to form a mesh, which exits the extrusion head and is then cooled in a water bath to set its shape.

The cooling water is constantly replenished via a tap inside the tank, while excess water is conveyed to the recovery tank, where it is purified.

The mesh is then heated and hooked at the ends, then stretched crosswise to widen the mesh. These ends are then removed and ground, they will be used as recycled material in a subsequent production unit.

Finally, the mesh is heated using electric plates to bond it to the geotextile; the final product is then manually packaged, ready for shipping.



Allocation

Gas, diesel and water consumption, as well as waste production, have been allocated to the total production of the entire site of 2024, which consists of 9.543.711 kg; whereas regarding energy consumption and emissions, only data related to the product have been considered, such as the operating machines involved in the process and the related chimneys.

Data quality

For generic data, the criteria of geographic and technological equivalence and equivalence with respect to system boundaries were considered throughout the analysis. Site-specific data refers to the year 2024.

Cut-off

There are no cut-off within this LCA study.

Proxy data

No proxy data were used within the study.

Electric energy modelling

Electricity was modeled using the Italian medium voltage dataset, which has been modified to represent a 100% renewable energy case.

Installation phase

The geographical area represented by the study, for these phases, is Europe.

Phase A4: for the transport of the product and its packaging, Chapter 2.5.3 of PCR-4-ed4-EN-2021 09 06 - PCR edition 4 has been considered, which includes a 3,500 km scenario for intracontinental transport.

Phase A5: this phase was added only for the proper treatment of packaging waste; therefore, installation processes were excluded for the reason stated above. The scenario considered for packaging treatment is the one defined in the next paragraph, also used for C3 and C4.

End-of-life scenarios

The geographical area represented by the study, for these phases, is Europe.

Phase C1: for the product deconstruction, since the reference PCR does not address this aspect in detail, reference was made to Table 4 of the EPD International Construction Products PCR, version 2.0.1; which recommends a consumption of 1.1 kWh/ton of diesel; which, if re-proportioned to 1 kg of product, results in a consumption of 0.0011 kWh/kg.

Phase C2: this transport involves only the product and has been modelled considering a scenario of 100 km for each kg of waste transported.

Phase C3: this phase considers the reuse, recycling, and incineration of the product. Since the actual fate of its wastes is unknown, an Italian scenario for 2023 was used, the link to which is below:

https://ec.europa.eu/eurostat/databrowser/view/env_waspac_custom_18264081/default/table.

Phase C4: this phase considers waste destined for landfill, the reference percentages of which are also defined in the link above.

The following table summarizes the percentages of EoL considered for this study:

MATERIAL	Recycling (%) – C3	Incineration (%) – C3	Landfill (%) – C4
Cardboard	92,6	5,9	1,5
Plastic	49,0	43,0	8,0

Data validation

The validity and accuracy of the specific data used for the UPSTREAM and CORE phases provided by Tenax S.p.A. were verified through a careful review of the mass balances and plant documentation. For the generic data used for the UPSTREAM, DOWNSTREAM, and D phases, reference was made to the validation models provided for in Annex E of the EN 15804:2012 + A2:2019 standard; in particular, Table E.1 was used.

The EPD covers the product: HD Plus, manufactured at the plant located at Via dell'Industria, 17, 23897 Viganò (LC) – Italy, which opened in 1960 and provided data for the year 2024. The product is manufactured using 100% renewable energy, gas and water consumption, and transported to the site via diesel forklifts. The EPD covers the upstream production phase and the end-of-life phase in Europe. Background data was taken from the Ecoinvent 3.11 database. During the assessment of the relevant data, using the EN 15804:2012+A2:2019 standard, Table E.1, no data classified as poor or very poor were found (reference: UNI EN 15941:2024, Annex C, Example 3).

Phase		Quality level		
		Geographical representativeness	Technical representativeness	Temporal representativeness
UPSTREAM	A1 - Production of raw materials and their packaging	Good	Good	Good
CORE	A2 – Supply of raw materials	Good	Good	Very good
	A3 - Product manufacturing – energy consumption	Very good	Good	Very good
	A3 - Product manufacturing – waste management	Good	Very good	Very good
DOWNSTREAM	A4 - Transport of the product and its packaging	Good	Good	Very good
	A5 - Product installation and packaging management	Good	Very good	Very good
	C1 - Waste Management – Deconstruction	Good	Very good	Very good
	C2 - Waste management – waste transportation	Good	Good	Very good
	C3 - Waste management – reuse, recycling and recovery	Good	Very good	Very good
	C4 - Waste management – disposal	Good	Very good	Very good
-	D - Benefits beyond system boundaries – reuse, recycling and recovery	Good	Very good	Very good

Modules declared, geographical scope, percentage of primary data (for GWP-GHG results):

	Production stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Area	IT	IT	IT	EU	EU	ND	ND	ND	ND	ND	ND	ND	EU	EU	EU	EU	EU
Specific data used	≈ 87%			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

LIFE CYCLE INVENTORY

Product composition

Raw materials	Weight per declared unit (kg)	Weight per declared unit (%)	Biogenic material, weight (%)
Filler	3,07E-02	3	0
PP	6,41E-01	64	0
Nucleant	1,02E-02	1	0
Selvedge	3,71E-02	4	0
TNT	2,81E-01	28	0
Total	1,00E+00	100	0

The product comes with a PE film as packaging, its mass is equal to 8,56E-03 kg per kg of product. Neither the product nor its packaging contain biogenic carbon, as shown by the table above.

ENVIRONMENTAL PERFORMANCE INDICATORS

Mandatory environmental impact category indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	Kg CO ₂ eq	2,78E+00	1,34E-03	3,33E-01	6,72E-01	1,24E-02	3,99E-04	1,90E-02	1,12E+00	7,42E-03	-1,79E+00
GWP-fossil	Kg CO ₂ eq	2,78E+00	1,33E-03	3,29E-01	6,71E-01	1,23E-02	3,99E-04	1,90E-02	1,12E+00	7,42E-03	-1,77E+00
GWP-biogenic	Kg CO ₂ eq	3,18E-04	6,95E-06	3,64E-03	4,47E-04	2,91E-05	1,10E-07	1,27E-05	3,43E-03	6,51E-06	-1,65E-02
GWP-land use	Kg CO ₂ eq	1,20E-03	1,37E-06	3,09E-05	2,22E-04	2,52E-06	3,27E-08	6,30E-06	2,98E-04	4,73E-07	-1,68E-03
ODP	Kg CFC11 eq	1,44E-07	2,30E-11	1,55E-09	1,47E-08	1,70E-11	8,63E-12	4,15E-10	2,11E-09	2,98E-11	-7,85E-08
AP	Mol H ⁺ eq.	7,98E-03	8,33E-06	2,56E-04	2,16E-03	5,62E-06	3,57E-06	6,11E-05	7,13E-04	6,35E-06	-4,93E-03
EP-freshwater	Kg P eq.	4,53E-05	3,67E-08	1,14E-06	4,92E-06	8,34E-08	1,31E-09	1,39E-07	9,85E-06	9,19E-09	-5,61E-05
EP-marine	Kg N eq.	1,73E-03	3,02E-06	8,12E-05	7,18E-04	1,25E-06	1,66E-06	2,03E-05	1,74E-04	8,34E-06	-9,58E-04
EP-terrestrial	Mol N eq.	1,86E-02	3,32E-05	8,89E-04	7,90E-03	1,38E-05	1,82E-05	2,24E-04	1,85E-03	2,61E-05	-1,04E-02
POCP	Kg NMVOC eq.	1,49E-02	1,03E-05	3,36E-04	3,27E-03	3,92E-06	5,48E-06	9,26E-05	5,16E-04	1,09E-05	-7,09E-03
ADPF*	MJ	7,96E+00	6,07E-03	1,55E-01	7,49E-01	1,45E-02	1,92E-04	2,12E-02	1,71E+00	1,59E-03	-9,22E+00
ADPE*	Kg Sb eq.	1,51E-05	4,16E-09	5,75E-07	2,26E-06	1,98E-09	1,38E-10	6,41E-08	2,55E-07	1,88E-09	-5,36E-06
Water Use*	m ³ world eq deprived	7,12E-01	1,47E-04	4,30E-02	3,69E-02	1,35E-04	8,89E-06	1,05E-03	6,97E-02	2,97E-01	-5,59E-01

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

Acronyms: **GWP-fossil** = Global Warming Potential fossil fuels; **GWP-biogenic** = Global Warming Potential biogenic; **GWP-land use** = Global Warming Potential land use and land use change; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential, Accumulated Exceedance; **EP-freshwater** = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-marine** = Eutrophication potential, fraction of nutrients reaching marine end compartment; **EP-terrestrial** = Eutrophication potential, Accumulated Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADPF** = Abiotic depletion for fossil resources potential; **ADPE** = Abiotic depletion potential for non-fossil resources; **Water use** = Water (use) deprivation potential, deprivation-weighted water consumption.

Additional indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG**	Kg CO ₂ eq	2,69E+00	1,29E-03	3,27E-01	6,68E-01	1,22E-02	3,99E-04	1,89E-02	1,11E+00	7,41E-03	-1,71E+00
PM	disease inc.	5,52E-08	1,11E-10	5,68E-09	5,34E-08	1,85E-11	1,02E-10	1,51E-09	2,46E-09	1,39E-10	-2,40E-08
IRP***	kBq U235 eq.	7,94E-02	5,12E-05	1,42E-03	4,11E-03	1,72E-04	9,92E-07	1,16E-04	2,02E-02	1,25E-05	-1,06E-01
ETP-fw*	CTUe	6,16E+00	3,99E-03	2,57E-01	1,26E+00	4,29E-03	2,45E-04	3,58E-02	2,22E+00	2,21E-02	-2,70E+00
HTP-nc*	CTUh	1,69E-08	1,04E-11	8,15E-10	5,94E-09	1,69E-11	6,34E-13	1,68E-10	3,72E-09	4,42E-11	1,67E-08
HTP-c*	CTUh	5,86E-10	3,28E-13	3,01E-11	1,14E-10	3,25E-13	4,02E-14	3,23E-12	1,01E-10	3,38E-13	-1,75E-10
SQP*	Pt	8,89E+00	1,19E-02	1,45E-01	5,63E+00	3,36E-03	3,07E-04	1,59E-01	3,70E-01	4,61E-02	-3,22E+00

* Disclaimer 1: The results of this environmental impact indicator should be used with caution, as the uncertainties of these results are high or experience with the indicator is limited.

** Disclaimer 2: This indicator takes into account all greenhouse gases, except absorption and emissions of biogenic carbon dioxide and biogenic carbon stored in the product. As such, the indicator is identical to the GWP-total, except that the carbon footprint (CF) for biogenic CO₂ is set to zero.

*** Disclaimer 3: 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.

Acronyms. **GWP-GHG** = Global Warming Potential greenhouse gases; **PM** = Particulate Matter; **IRP** = Ionizing Radiation Potential - Human Health; **ETP-fw** = Ecotoxicity Potential, freshwater; **HTP-nc** = Human Toxicity Potential, non-cancer; **HTP-c** = Human Toxicity Potential, cancer; **SQP** = Soil Quality Potential.

Resource use indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	3,25E+00	1,70E-03	3,57E+00	1,55E-01	4,34E-03	3,56E-05	4,40E-03	5,12E-01	4,87E-04	-2,76E+00
PERM	MJ	2,55E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	3,27E+00	1,70E-03	3,57E+00	1,55E-01	4,34E-03	3,56E-05	4,40E-03	5,12E-01	4,87E-04	-2,76E+00
PENRE	MJ	6,64E+01	2,04E-02	5,53E-01	1,01E+01	3,85E-01	5,52E-03	2,87E-01	2,61E+00	2,10E-02	-5,41E+01
PENRM	MJ	3,31E+01	0,00E+00	3,64E-01	0,00E+00	-3,64E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	9,95E+01	2,04E-02	9,16E-01	1,01E+01	2,18E-02	5,52E-03	2,87E-01	2,61E+00	2,10E-02	-5,41E+01
SM	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	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	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	0,00E+00	0,00E+00
FW*	m3	2,81E-02	6,73E-06	8,06E-04	1,18E-03	1,07E-05	2,88E-07	3,35E-05	2,52E-03	6,54E-03	-1,08E-02

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

Acronyms. **PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; **PERM** = Use of renewable primary energy resources used as raw materials; **PERT** = Total use of renewable primary energy resources; **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM** = Use of non-renewable primary energy resources used as raw materials; **PENRT** = Total use of non-renewable primary energy re-sources; **SM** = Use of secondary material; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Use of net fresh water.

Waste indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	2,56E-03	4,89E-07	6,60E-04	2,40E-04	1,12E-04	4,73E-08	6,81E-06	8,85E-03	1,50E-06	7,59E-04
NHWD	kg	1,58E-01	4,30E-04	1,50E-02	4,56E-01	7,76E-04	3,46E-06	1,29E-02	1,58E-02	8,01E-02	-4,57E-02
RWD	kg	6,83E-05	4,04E-08	1,13E-06	2,80E-06	1,41E-07	6,68E-10	7,93E-08	1,66E-05	7,25E-09	-8,57E-05

Acronyms. **HWD** = Hazardous waste disposed; **NHWD** = Non-hazardous waste disposed; **RWD** = Radioactive waste disposed.

Output flow indicators

Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
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	0,00E+00	8,18E-05
MFR	kg	0,00E+00	0,00E+00	2,38E-03	0,00E+00	4,20E-03	0,00E+00	0,00E+00	4,90E-01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	3,00E-02	0,00E+00	3,68E-03	0,00E+00	0,00E+00	4,30E-01	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	1,56E-03	0,00E+00	5,33E-02	0,00E+00	0,00E+00	4,78E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	3,13E-03	0,00E+00	1,03E-01	0,00E+00	0,00E+00	9,32E+00	0,00E+00	0,00E+00

Acronyms. **CRU** = Components for re-use; **MFR** = Material for recycling; **MER** = Materials for energy recovery; **EEE** = Exported energy, electricity; **EET** = Exported energy, thermal.

Biogenic carbon

Neither the product nor its packaging contain biogenic carbon.

ADDITIONAL INFORMATION

There is no further information to declare regarding HD Plus High drainage geocomposite.

REFERENCES

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- [5] https://ec.europa.eu/eurostat/databrowser/view/env_waspac__custom_18264081/default/table;
- [6] Background report: Analisi del ciclo di vita del geocomposito HD Plus, Rev.05, March 2026, by L. Micheletti, L. Calisse and P. Romano, Greenwich S.r.l.