ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	DuPont de Nemours (Luxembourg) s.à r.l
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DUP-20220321-CBA1-EN
Issue date	13/12/2022
Valid to	12/12/2027

DuPont™ Typar® / Xavan® / Plantex® / Zemdrain®

DuPont de Nemours (Luxembourg) s.à r.l

Institut Bauen und Umwelt e.V.

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ECO PLATFORM

EPD VERIFIED

General Information

DuPont de Nemours (Luxembourg) s.à r.l

Programme holder
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Germany

Declaration number
EPD-DUP-20220321-CBA1-EN

This declaration is based on the product category rules:
Technical Textiles, 2013
(PCR checked and approved by the SVR)

Issue date
13/12/2022

Valid to
12/12/2027

Dipl. Ing. Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
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DuPont™ Typar® / Xavan® / Plantex® / Zemdrain®

Owner of the declaration

DuPont de Nemours (Luxembourg) s.à.r.l.
Rue Général Patton
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Declared product / declared unit
1 m² DuPont™ Typar®

Scope:

This document applies to the whole of DuPont™ Typar® products manufactured in DuPont de Nemours (Luxembourg) s.à.r.l.

The declared unit weight is 100 g/m2.

LCA data were compiled using production data for the year 2021. The declaration holder is responsible for the underlying data and its verification.

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of *EN 15804+A2*. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard *EN 15804* serves as the core PCR
Independent verification of the declaration and data according to *ISO 14025:2011*
☐ internally ☒ externally

Vito D'Incognito
(Independent verifier)

Product

Product description/Product definition
DuPont™ Typar® is composed of thermally bonded continuous polypropylene filaments.
DuPont™ Typar® serves different markets with different functions and can be sold under different brand names in function of the application (Typar®, Xavan®, Plantex® and Zemdrain®).
For ease of reading, only Typar® will be used hereafter

Only for Typar® products carrying a CE Marking:

EU regulation no. /305/2011/ (CPR) applies for putting the product on the market in the EU/EFTA (with the exception of Switzerland). This product requires a declaration of performance taking into account the following standards relating to required characteristics for geotextiles and CE labelling.

EN 13249:2016/ Roads and other trafficked areas (excluding railways and asphalt inclusion)
EN 13250:2016/ Railways
EN 13251:2016/ Earthworks, foundations and retaining structures
EN 13252:2016/ Drainage systems
EN 13253:2016/ Erosion control works (coastal protection, bank revetments)
EN 13254:2016/ Reservoirs and dams
EN 13255:2016/ Canals
EN 13256:2016/ Tunnels and underground structures
EN 13257:2016/ Solid waste disposal sites
EN 13265:2016/ Liquid waste containment projects

Application

DuPont™ Typar® is used as geosynthetics in civil engineering (as a geotextile, filter for composite drains, and concrete lining products): its functions are separation, filtration, protection, and controlled permeability formwork liner.
In construction, DuPont™ Typar® is used as a substrate in composite sheet structures such as coatings, laminates.
Typar® products also serve other markets and applications such as:
-Landscape: weed control, root control and soil stabilization.
-Filtration (liquid filtration, air filtration, masks): substrate, carrier, and protection layer for filter medium.
-Primary carpet backing and reinforcement for footwear.

Technical Data

For the products carrying a CE Marking, the product's performance values comply with the declaration of performance in relation to its main features in accordance with the following European standards:

EN 13249:2016/ Roads and other trafficked areas (excluding railways and asphalt inclusion)
EN 13250:2016/ Railways
EN 13251:2016/ Earthworks, foundations and retaining structures
EN 13252:2016/ Drainage systems
EN 13253:2016/ Erosion control works (coastal protection, bank revetments)
EN 13254:2016/ Reservoirs and dams
EN 13255:2016/ Canals
EN 13256:2016/ Tunnels and underground structures
EN 13257:2016/ Solid waste disposal sites
EN 13265:2016/ Liquid waste containment projects

Constructional data

Name	Value	Unit
Mass per unit area EN ISO 9864	30 - 400	g/m2
Thickness (2kPa) EN ISO 9863-1	0.30 -0.90	mm
Tensile strength MD/XD EN 29073-3	90-1300	N/50mm
Elongation MD/XD (%) EN 29073-3	30-60	%

Base materials/Ancillary materials

Typar® is a high strength spunbond nonwoven fabric made of thermally bonded (endless) polypropylene filaments.
Polypropylene is thus the main material of the product (99 % on average), while a small amount of additives (1 %) are added to give specific properties.

This product/at least one partial article contains substances listed in the candidate list (date: 10.06.2022) exceeding 0.1 percentage by mass: no

This product/article/at least one partial article contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: no

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no

Reference service life

The service life of Typar® depends on the application and whether it is covered or not.
In geotextile applications, Typar® product are predicted to be durable for 100 years in natural soils with 4 ≤ pH ≤ 9 and soil temperatures ≤ 25°C.

LCA: Calculation rules

Declared Unit

The declared unit is 1 m² of geotextile. Its mass per unit of area in accordance with /*EN ISO 9864*/ is 30 to 400 g/m². A surface weight of 100 g/m² has been used when calculating the lifecycle analysis for this EPD.

To calculate the specific impacts of a Typar® product, the EPD results need to be multiplied by the ratio between its specific grammage and 100 g/m^2. The variations for DuPont™ Typar® is thus proportional to the variations of the grammage (factor of 13 between the minimum and maximum value).

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Mass per unit area EN ISO 9864	100	g/m2
Thickness (2kPa) EN ISO 9863-1	0.40	mm

Primary production data were collected to model the production process (A1-A3), and are representative of the year 2021.

The product is manufactured in Luxembourg. All energy and materials flows were considered. Only a few material flows were excluded from the modelling, but the sum of their weight did not exceed 1 % of the total input mass. Manufacturing of the production machines and systems and associated infrastructure were not taken into account for the life cycle assessment.

Transport to the construction site (A4) was based on European market shares of 2021 at country level, provided by DuPont Luxembourg s.à.r.l., to cover at least 90 % of the sales. Eurostat data representative of 2019 were used to model the shares between the packaging disposal routes during the installation into the building (A5).

Regarding background data, the Luxembourg electricity grid mix were applied to the production plant. Other background data were specific to Germany or the European average and were not older than 10

years. Some proxies were used for the modelling of additives.
The representativeness can be classified as very good for all the foreground data, and for most of the background data.

The *GaBi* database (Sphera Solutions GmbH, 2022.1) was used to model background data.

System boundary
Type of EPD: Cradle-to-gate (with options)
The system boundaries of the EPD follow the modular construction system as described by *EN 15804*.
The LCA considers the following modules:

- A1-A3: Manufacturing of pre-products, packaging, ancillary materials, transport to the factory and production, with the associated energy supply and waste handling
- A4: Transport to the construction site
- A5: Installation into the building including disposal of packaging
- C4: Waste disposal, namely landfill

Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

LCA: Scenarios and additional technical information

Characteristic product properties
Information on biogenic carbon
The product does not contain biogenic carbon.

Information on describing the biogenic Carbon Content at factury gate

Name	Value	Unit
Biogenic Carbon Content in accompanying packaging	0.0007	kg C

Transport to the building site (A4)

Name	Value	Unit
Transport distance (truck)	854	km
Transport distance (container ship)	6	km

Installation into the building (A5)

Name	Value	Unit
Cardboard/paper waste to landfill	2.48E-04	kg
Cardboard/paper waste to incineration	2.65E-04	kg
Plastic waste to landfill	5.52E-05	kg
Plastic waste to incineration	8.80E-5	kg

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste	0.1	kg
Landfilling	0.1	kg

LCA: Results

The results displayed below apply to 1 m^2 of DuPont™ Typar® product, with a declared unit weight of 100 g/m^2.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	X	X	ND	ND	MNR	MNR	MNR	ND	ND	ND	ND	ND	X	ND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m2 DuPont™ Typar®

Core Indicator	Unit	A1-A3	A4	A5	C4
Global warming potential - total	[kg CO_2-Eq.]	4.51E-1	7.48E-3	9.71E-4	7.02E-3
Global warming potential - fossil fuels	[kg CO_2-Eq.]	4.51E-1	7.31E-3	2.51E-4	7.09E-3
Global warming potential - biogenic	[kg CO_2-Eq.]	7.50E-4	1.22E-4	7.20E-4	-7.54E-5
GWP from land use and land use change	[kg CO_2-Eq.]	5.19E-5	4.15E-5	1.47E-8	3.45E-6
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.35E-12	4.47E-16	1.10E-16	9.52E-15
Acidification potential, accumulated exceedance	[mol H^+-Eq.]	2.47E-3	4.45E-5	2.31E-7	2.10E-5
Eutrophication, fraction of nutrients reaching freshwater end compartment	[kg P-Eq.]	9.84E-6	2.22E-8	2.73E-9	1.32E-6
Eutrophication, fraction of nutrients reaching marine end compartment	[kg N-Eq.]	3.39E-4	2.18E-5	1.00E-7	4.65E-6
Eutrophication, accumulated exceedance	[mol N-Eq.]	3.66E-3	2.42E-4	9.40E-7	5.10E-5
Formation potential of tropospheric ozone photochemical oxidants	[kg NMVOC-Eq.]	1.02E-3	4.13E-5	3.17E-7	1.49E-5
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	3.20E-8	6.23E-10	3.47E-12	4.92E-10
Abiotic depletion potential for fossil resources	[MJ]	1.00E+1	9.96E-2	5.00E-4	1.01E-1
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	[m^3 world-Eq deprived]	1.51E-1	6.68E-5	6.87E-5	-6.99E-5

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m2 DuPont™ Typar®

Indicator	Unit	A1-A3	A4	A5	C4
Renewable primary energy as energy carrier	[MJ]	7.21E-1	5.66E-3	8.33E-3	4.56E-6
Renewable primary energy resources as material utilization	[MJ]	3.59E-4	3.02E-14	8.58E-13	4.72E-16
Total use of renewable primary energy resources	[MJ]	7.21E-1	5.66E-3	8.33E-3	4.56E-6
Non-renewable primary energy as energy carrier	[MJ]	1.00E+1	9.98E-2	1.01E-1	5.55E-5
Non-renewable primary energy as material utilization	[MJ]	1.79E-4	3.50E-6	1.38E-6	7.54E-10
Total use of non-renewable primary energy resources	[MJ]	1.00E+1	9.99E-2	1.01E-1	5.55E-5
Use of secondary material	[kg]	3.23E-3	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	1.07E-7	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	9.87E-9	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m^3]	3.93E-3	6.40E-6	1.63E-6	1.30E-6

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m2 DuPont™ Typar®

Indicator	Unit	A1-A3	A4	A5	C4
Hazardous waste disposed	[kg]	2.87E-10	4.78E-13	6.52E-14	1.55E-11
Non-hazardous waste disposed	[kg]	1.03E-3	1.43E-5	2.69E-4	9.96E-2
Radioactive waste disposed	[kg]	1.28E-4	1.23E-7	1.33E-8	1.24E-6
Components for re-use	[kg]	0.00	0.00	0.00	0.00
Materials for recycling	[kg]	0.00	0.00	0.00	0.00
Materials for energy recovery	[kg]	0.00	0.00	0.00	0.00
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	9.68E-4	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	1.74E-3	0.00E+0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m2 DuPont™ Typar®

Indicator	Unit	A1-A3	A4	A5	C4
Potential incidence of disease due to PM emissions	[Disease Incidence]	ND	ND	ND	ND
Potential Human exposure efficiency relative to U235	[kBq U235-Eq.]	ND	ND	ND	ND
Potential comparative toxic unit for ecosystems	[CTUe]	ND	ND	ND	ND
Potential comparative toxic unit for humans - cancerogenic	[CTUh]	ND	ND	ND	ND
Potential comparative toxic unit for humans - not cancerogenic	[CTUh]	ND	ND	ND	ND
Potential soil quality index	[-]	ND	ND	ND	ND

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”.
This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”.
The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

References

EN 13249
EN 13249:2016, Geotextiles and geotextile-related products - Characteristics required for use in the construction of roads and other trafficked areas (excluding railways and asphalt inclusion).

EN 13250
EN 13250:2016, Geotextiles and geotextile-related products - Characteristics required for use in the construction of railways.

EN 13251
EN 13251:2016, Geotextiles and geotextile-related products - Characteristics required for use in earthworks, foundations and retaining structures.

EN 13252
EN 13252:2016, Geotextiles and geotextile-related products - Characteristics required for use in drainage systems.

EN 13253
EN 13253:2016, Geotextiles and geotextile-related products - Characteristics required for use in erosion control works (coastal protection, bank revetments).

EN 13254
EN 13254:2016, Geotextiles and geotextile-related products - Characteristics required for the use in the construction of reservoirs and dams.

EN 13255
EN 13255:2016, Geotextiles and geotextile-related products - Characteristics required for use in the construction of canals.

EN 13256
EN 13256:2016 Geotextiles and geotextile-related products - Characteristics required for use in the construction of tunnels and underground structures.

EN 13257
EN 13257:2016, Geotextiles and geotextile-related products - Characteristics required for use in solid waste disposals.

EN 13265
EN 13265:2016, Geotextiles and geotextile-related products - Characteristics required for use in liquid waste containment projects.

EN 15804
EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

EN 29073-3
EN 29073-3:1992, Textile; test method for nonwovens; Part 3: Determination of tensile strength and elongation

ISO 14025
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

EN ISO 9863-1
EN ISO 9863-1:2016/A1:2019, Geosynthetics - Determination of thickness at specified pressures - Part 1: Single layers

ISO 9864
EN ISO 9864:2005-05, Geosynthetics - Test method for the determination of mass per unit area of geotextiles and geotextile-related products.

Further References

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PCR 2021, Part A
PCR Guidance-Texts for Building-Related Products and Services: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019

PCR 2013, Part B
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