

# 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)
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DuPont™ Tyvek® laminated 2523B  
DuPont de Nemours (Luxembourg) s.à.r.l.

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## General Information

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

### Programme holder

IBU – Institut Bauen und Umwelt e.V.  
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10117 Berlin  
Germany

### Declaration number

EPD-DUP-20220251-CBA1-EN

### This declaration is based on the product category rules:

False ceiling and underlay sheeting, 11.2017  
(PCR checked and approved by the SVR)

### Issue date

16/11/2022

### Valid to

15/11/2027



Dipl. Ing. Hans Peters  
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Dr. Alexander Röder  
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DuPont™ Tyvek® laminated 2523B

### Owner of the declaration

DuPont de Nemours (Luxembourg) s.à.r.l.  
Rue Général Patton  
L-2984 Contern  
Luxembourg

### Declared product / declared unit

1 m² DuPont™ Tyvek® laminated 2523B

### Scope:

This document applies to DuPont™ Tyvek® laminated 2523B, which is a laminated high-density polyethylene (HDPE) membrane with spunbond polypropylene (SBPP). The declared unit weight is 165 g/m². LCA data were compiled using production data for the year 2019 for monolayer, lamination and finishing processes (used for EPDs of Tyvek® laminated published in 2021) and data for the year 2021 for the SBPP production. 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™ Tyvek® 2523B is a durable, water-resistant membrane that is reinforced by a laminated polypropylene nonwoven. This vapour-permeable membrane is extremely water-resistant and can be used for all supported and unsupported pitched roofs.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration EN13859-1: Flexible sheets for waterproofing – Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing and EN 13859-2 Part 2: Underlays for walls. For the placing on the market of the product in the UK market the product needs UK Conformity Assessed (UKCA) marking supported by a UK Approved Body. For the application and use the respective national provisions apply.

### Application

The product is placed in front or behind insulation and will improve water and wind tightness during construction and the lifetime of the building.

### Technical Data

#### Constructional data (nominal or average values)

Name	Value	Unit
Reaction to fire acc. to EN13501-1	E	class
Grammage acc. to EN 1849-2	0.165	kg/m²
Resistance to water penetration acc. to EN 1928 (class)	W1	-
Water vapor diffusion equivalent air layer thickness acc. to EN 12572 (C)	0.025	m
Resistance to air penetration acc. to EN 12114	0 - 2	m³/m² h 50Pa



Maximum tensile force acc. to EN 12311-1 (MD-XD)	275 - 275	N/50mm
Elongation acc. to EN 12311-1 (MD-XD)	11 - 23	%
Tear Resistance (nail) acc. to EN 12310-1 (MD-XD)	36 - 41	N/mm
Maximum tensile force after ageing acc. to EN 1297, EN 12311-1 (MD-XD)	225	N/50mm
Elongation after ageing acc. to EN 1297, EN 12311-1 (MD-XD)	10 - 12	%
Resistance to water penetration after ageing acc. to EN 1297, EN 1928 (class)	W1	-

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 13859-1* and *EN 13859-2*

#### Base materials/Ancillary materials

The product is made from HDPE (ca. 36 % of product weight), SBPP (ca. 55 % of product weight) and ethylene vinyl acetate (ca. 9 % of product weight).

This product/article/at least one partial article contains substances listed in the candidate list (date: 16. Nov 2022) exceeding 0.1 percentage by mass: no.

#### Reference service life

The service life of membranes out of plastic or elastomers is 40 years according to *BNB* (<http://www.nachhaltigesbauen.de/baustoff-und-gebaeuedaten/nutzungsdauern-von-bauteilen.html>). Since the whole lifecycle of the product is not considered and for sake of compliance with *EN 15804+A2 (2019)*, the functional unit does not have to be declared. Instead, the declaration unit is 1 m<sup>2</sup> of the envelope.

## LCA: Calculation rules

### Declared Unit

This declaration applies to 1 m<sup>2</sup> of DuPont™ Tyvek® 2523B membrane, with a declared unit weight of 165 g/m<sup>2</sup>.

### Declared unit

Name	Value	Unit
Declared unit	1	m <sup>2</sup>
Grammage	0.165	kg/m <sup>2</sup>

Primary production data were collected to model the four production steps for manufacturing (A1-A3). Manufacturing data are representative for the years 2019 and 2021; the product is manufactured in Luxembourg and Germany. 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) is based on market shares of 2021 at country level, provided by DuPont Luxembourg s.à.r.l., to cover at least 90 % of 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 possible off-cuts during installation, the amount is lower than 5 % and therefore neglected.

Regarding background data, the Luxembourg and German electricity grid mix were applied to the production plants in these countries. Other background data were specific to Germany or the European average and were not older than 10 years. A proxy was used for the colour paste for finishing (generic water-based colour paste composition).

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 incineration
- D: Potential for reuse, recovery and/or recycling including benefits for product incineration from module C4

### 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 factory gate

Name	Value	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in accompanying packaging	0.0037	kg C

#### Transport to the building site (A4)

Name	Value	Unit
Transport distance (truck)	502	km
Transport distance (container ship)	0	km

#### Installation into the building (A5)

Name	Value	Unit
Wood waste to landfill	2.74E-04	kg
Wood waste to incineration	2.26E-04	kg
Cardboard waste to landfill	2.66E-04	kg
Cardboard waste to incineration	2.84E-04	kg
Plastic waste to landfill	2.47E-05	kg
Plastic waste to incineration	3.94E-05	kg

#### End of life (C1-C4)

Name	Value	Unit
Collected separately Tyvek® waste	0.165	kg
Energy recovery	0.165	kg

## LCA: Results

The results displayed below apply to 1 m<sup>2</sup> of DuPont™ Tyvek® laminated 2523B membrane, with a declared unit weight of 165 g/m<sup>2</sup>.

**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	X

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m<sup>2</sup> DuPont™ Tyvek® 2523B

Core Indicator	Unit	A1-A3	A4	A5	C4	D
Global warming potential - total	[kg CO <sub>2</sub> -Eq.]	8.08E-1	7.19E-3	1.93E-3	5.32E-1	-3.11E-1
Global warming potential - fossil fuels	[kg CO <sub>2</sub> -Eq.]	8.09E-1	7.04E-3	1.56E-4	5.32E-1	-3.10E-1
Global warming potential - biogenic	[kg CO <sub>2</sub> -Eq.]	-1.39E-3	1.18E-4	1.77E-3	-3.15E-5	-1.17E-3
GWP from land use and land use change	[kg CO <sub>2</sub> -Eq.]	1.78E-4	4.00E-5	2.32E-8	0.00E+0	-2.34E-5
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.65E-11	4.30E-16	1.47E-16	3.51E-10	-1.26E-12
Acidification potential, accumulated exceedance	[mol H <sup>+</sup> -Eq.]	3.80E-3	4.27E-5	4.00E-7	7.01E-5	-3.14E-4
Eutrophication, fraction of nutrients reaching freshwater end compartment	[kg P-Eq.]	1.10E-5	2.14E-8	3.35E-9	1.27E-9	-2.64E-7
Eutrophication, fraction of nutrients reaching marine end compartment	[kg N-Eq.]	5.73E-4	2.10E-5	1.70E-7	1.20E-5	-9.62E-5
Eutrophication, accumulated exceedance	[mol N-Eq.]	6.19E-3	2.32E-4	1.65E-6	2.80E-4	-1.04E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg NMVOC-Eq.]	1.78E-3	3.96E-5	6.67E-7	3.51E-5	-2.74E-4
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	8.64E-8	6.00E-10	5.05E-12	7.49E-15	-3.39E-8
Abiotic depletion potential for fossil resources	[MJ]	1.83E+1	9.59E-2	8.11E-4	1.00E-1	-5.15E+0
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	[m <sup>3</sup> world-Eq deprived]	1.84E-1	6.43E-5	1.05E-4	4.68E-2	-1.98E-2

## RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m<sup>2</sup> DuPont™ Tyvek® 2523B

Indicator	Unit	A1-A3	A4	A5	C4	D
Renewable primary energy as energy carrier	[MJ]	1.68E+0	5.45E-3	1.03E-4	2.60E-3	-8.74E-1
Renewable primary energy resources as material utilization	[MJ]	1.47E-3	2.90E-14	6.33E-15	3.07E-6	-6.64E-11
Total use of renewable primary energy resources	[MJ]	1.69E+0	5.45E-3	1.03E-4	2.60E-3	-8.74E-1
Non-renewable primary energy as energy carrier	[MJ]	1.83E+1	9.61E-2	8.12E-4	1.00E-1	-5.15E+0
Non-renewable primary energy as material utilization	[MJ]	3.81E-4	3.37E-6	1.74E-8	2.96E-10	-1.21E-4
Total use of non-renewable primary energy resources	[MJ]	1.83E+1	9.61E-2	8.12E-4	1.00E-1	-5.15E+0
Use of secondary material	[kg]	7.11E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	1.85E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	2.00E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m <sup>3</sup> ]	8.12E-3	6.16E-6	2.49E-6	1.09E-3	-8.44E-4

## RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m<sup>2</sup> DuPont™ Tyvek® 2523B

Indicator	Unit	A1-A3	A4	A5	C4	D
Hazardous waste disposed	[kg]	3.69E-8	4.60E-13	1.11E-13	0.00E+0	-7.92E-10
Non-hazardous waste disposed	[kg]	4.43E-3	1.38E-5	4.11E-4	0.00E+0	-2.06E-3
Radioactive waste disposed	[kg]	2.87E-4	1.18E-7	2.01E-8	5.68E-6	-2.48E-4
Components for re-use	[kg]	0.00	0.00	0.00	0.00	0.00
Materials for recycling	[kg]	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	[kg]	0.00	0.00	0.00	0.00	0.00
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	1.38E-3	8.71E-1	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	2.49E-3	2.86E+0	0.00E+0

## RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m<sup>2</sup> DuPont™ Tyvek® 2523B



Indicator	Unit	A1-A3	A4	A5	C4	D
Potential incidence of disease due to PM emissions	[Disease Incidence]	ND	ND	ND	ND	ND
Potential Human exposure efficiency relative to U235	[kBq U235-Eq.]	ND	ND	ND	ND	ND
Potential comparative toxic unit for ecosystems	[CTUe]	ND	ND	ND	ND	ND
Potential comparative toxic unit for humans - cancerogenic	[CTUh]	ND	ND	ND	ND	ND
Potential comparative toxic unit for humans - not cancerogenic	[CTUh]	ND	ND	ND	ND	ND
Potential soil quality index	[-]	ND	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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, 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 as there is limited experience with the indicator.

## References

### Standards

#### EN 12114

EN 12114:2000, Thermal performance of buildings - Air permeability of building components and building elements - Laboratory test method

#### EN 12310-1

EN 12310-1:1999, Flexible sheets for waterproofing - Part 1: Bitumen sheets for roof waterproofing; determination of resistance to tearing (nail shank).

#### EN 12311-1

EN 12311-1:1999, Flexible sheets for waterproofing - Part 1: Bitumen sheets for roof waterproofing; Determination of tensile properties

#### EN 12572

EN 12572:2016, Hygrothermal performance of building materials and products — Determination of water vapour transmission properties — Cup method

#### EN 1297

EN 1297:2004, Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Method of artificial ageing by long term exposure to the combination of UV radiation, elevated temperature and water

#### EN 13501-1

EN 13501-1:2018, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

#### EN 13859-1

EN 13859-1:2014, Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing

#### EN 13859-2

EN 13859-2:2014, Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 2: Underlays for walls

#### 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 1849-2

EN 1849-2:2019, Flexible sheets for waterproofing - Determination of thickness and mass per unit area - Part 2: Plastic and rubber sheets

#### EN 1928

EN 1928:2000, Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of watertightness

#### ISO 14025

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

### Further References

#### BNB

Bewertungssystem Nachhaltiges Bauen  
<https://www.nachhaltigesbauen.de/austausch/nutzungs-dauern-von-bauteilen/>

#### GaBi software and database:2022

GaBi software/database, version 10.6.1.35. Sphera Solutions GmbH, 2022.

#### IBU 2021

Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021. [www.ibu-epd.com](http://www.ibu-epd.com)

#### 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 2017, Part B**

PCR Guidance-Texts for Building-Related Products and Services: Requirements on the EPD for False ceiling and underlay sheeting (version 1.6, 2017)

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