

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DUP-20220296-CBA1-EN
Issue date	13/12/2022
Valid to	12/12/2027

DuPont™ AirGuard® Air & Vapour Control Layer 5816X
DuPont de Nemours (Luxembourg) s.à.r.l.

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ECO PLATFORM

EPD
VERIFIED



General Information

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

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-DUP-20220296-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

13/12/2022

Valid to

12/12/2027

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

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.)

DuPont™ AirGuard® Air & Vapour Control Layer 5816X

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™ AirGuard® Air & Vapour Control Layer 5816X

Scope:

This document applies to DuPont™ AirGuard® Air & Vapour Control Layer 5816X, made of glass fibre, aluminium and adhesive. The declared unit weight is 171.5 g/m². LCA data were compiled using production data for the year 2021, as well as for the year 2019 for the finishing processing (used for EPDs of Tyvek® products published in 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™ AirGuard® A2 FR AVCL is a fire-retardant airtight vapour control layer for use within the internal lining of roof, ceiling and wall systems. Enhancing the building fabric in terms of airtightness, energy efficiency and moisture management, improving indoor air quality and providing exceptional fire safety to the building and its occupants.

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 *EN 13984: 2013*, Plastic and rubber vapour control layers and the CE-marking.

For the application and use the respective national provisions apply.

Application

This product is used on the warm side of the building envelope. It will provide a barrier to water vapour and air movement. Additional features:

- Fire-retardant. Reaction to fire: A2-s1, d0 to *EN 13501-1: 2007+A1:2009*
- AirGuard® A2 FR AVCL and DuPont™ AirGuard® FR System tape is tested and classified for free-span, on mineral wool slab, gypsum plasterboard or fibre cement board
- Suitable for all building types, heights and proximities
- High vapour resistance, limiting interstitial condensation
- Suitable for high humidity buildings, such as swimming pool halls etc
- Thermal benefit in combination with a cavity due to the low emissivity/reflective surface

Technical Data



Constructional data

The properties given below correspond to nominal values, as declared in the Technical Data Sheet of the product. There is nevertheless an intrinsic variability for these properties, which explains the small difference between the grammage declared below and the weight used for the LCA calculation.

Name	Value	Unit
Product designation acc. to EN 13984	A	type
Grammage acc. to EN 1849-2	0.1715	kg/m ²
Resistance to water penetration acc. to EN 1928 (class)	Pass	-
Water vapor diffusion equivalent air layer thickness acc. to EN 1931	4900	m
Maximum tensile force acc. to EN 12311-1	800	N/50mm
Elongation acc. to EN 12311-1	4	%
Tear Resistance (nail) acc. to EN 12310-1 (MD-XD)	170 - 150	N/mm
Water vapour permeability after ageing acc. to EN 13984, EN 1931	Pass	

Performance data of the product in accordance with the declaration of performance with respect to its

LCA: Calculation rules

Declared Unit

This declaration applies to 1 m² of DuPont™ AirGuard® Air & Vapour Control Layer 5816X, with a declared unit weight of 171.5 g/m².

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	m ²
Grammage	0.1715	kg/m ²
Layer thickness	0.00015	m

Primary production data were collected to model the two production steps for manufacturing (A1-A3). Manufacturing data are representative for the years 2019 (finishing process) and 2021; the product is manufactured in Finland 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 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 possible off-cuts during installation, the amount is lower than 5 % and therefore neglected.

Regarding background data, the Finish 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

essential characteristics according to *EN 13984: 2013*, Plastic and rubber vapour control layers

For more information please refer to: <https://energy-efficiency.dupont.com/products/>

Base materials/Ancillary materials

The product is made of glass fibre (49 % of product weight), aluminium (47 % of product weight) and adhesive (4 % of product weight).

This product/article/at least one partial article contains substances listed in the candidate list (08.07.2022) exceeding 0.1 percentage by mass: no.

Reference service life

The service life is assumed to be 30 years, even if longer lifetime can be obtained for membranes out of plastic or elastomers (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 to *EN 15804+A2 (2019)*, the functional unit does not have to be declared. Instead, the declaration unit is 1 m² of the envelope.

were not older than 10 years. A proxy was used for the adhesive.

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 accompanying packaging	0.0037	kg C

Transport to the building site (A4)

Name	Value	Unit
Transport distance (truck)	1099	km
Transport distance (container ship)	333	km

Installation into the building (A5)

Name	Value	Unit
Cardboard/paper waste to landfill	2.66E-04	kg
Cardboard/paper waste to incineration	2.84E-04	kg
Wood waste to landfill	2.74E-04	kg
Wood waste to incineration	2.26E-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 as mixed construction waste	0.1715	kg
Energy recovery	0.1715	kg

LCA: Results

The results displayed below apply to 1 m² of DuPont™ AirGuard® Air & Vapour Control Layer 5816X, with a declared unit weight of 171.5 g/m².

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 m² DuPont™ AirGuard® 5816X

Core Indicator	Unit	A1-A3	A4	A5	C4	D
Global warming potential - total	[kg CO ₂ -Eq.]	1.18E+0	1.68E-2	1.93E-3	5.53E-1	-3.24E-1
Global warming potential - fossil fuels	[kg CO ₂ -Eq.]	1.16E+0	1.65E-2	1.56E-4	5.53E-1	-3.22E-1
Global warming potential - biogenic	[kg CO ₂ -Eq.]	1.41E-2	2.68E-4	1.77E-3	-3.28E-5	-1.22E-3
GWP from land use and land use change	[kg CO ₂ -Eq.]	5.32E-4	9.09E-5	2.32E-8	0.00E+0	-2.43E-5
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	6.72E-12	1.01E-15	1.47E-16	3.64E-10	-1.31E-12
Acidification potential, accumulated exceedance	[mol H ⁺ -Eq.]	5.98E-3	1.15E-4	4.00E-7	7.29E-5	-3.26E-4
Eutrophication, fraction of nutrients reaching freshwater end compartment	[kg P-Eq.]	1.21E-6	4.88E-8	3.35E-9	1.32E-9	-2.74E-7
Eutrophication, fraction of nutrients reaching marine end compartment	[kg N-Eq.]	9.54E-4	5.24E-5	1.70E-7	1.25E-5	-1.00E-4
Eutrophication, accumulated exceedance	[mol N-Eq.]	1.04E-2	5.80E-4	1.65E-6	2.91E-4	-1.08E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg NMVOC-Eq.]	2.93E-3	1.03E-4	6.67E-7	3.65E-5	-2.85E-4
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.35E-7	1.38E-9	5.05E-12	7.78E-15	-3.53E-8
Abiotic depletion potential for fossil resources	[MJ]	1.58E+1	2.24E-1	8.11E-4	1.06E-1	-5.36E+0
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	[m ³ world-Eq deprived]	2.35E-1	1.47E-4	1.05E-4	4.86E-2	-2.06E-2

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² DuPont™ AirGuard® 5816X

Indicator	Unit	A1-A3	A4	A5	C4	D
Renewable primary energy as energy carrier	[MJ]	6.12E+0	1.24E-2	1.03E-4	2.70E-3	-9.08E-1
Renewable primary energy resources as material utilization	[MJ]	3.36E-4	6.83E-14	6.33E-15	3.20E-6	-6.90E-11
Total use of renewable primary energy resources	[MJ]	6.12E+0	1.24E-2	1.03E-4	2.70E-3	-9.08E-1
Non-renewable primary energy as energy carrier	[MJ]	1.58E+1	2.24E-1	8.12E-4	1.06E-1	-5.36E+0
Non-renewable primary energy as material utilization	[MJ]	3.32E-4	7.67E-6	1.74E-8	3.07E-10	-1.25E-4
Total use of non-renewable primary energy resources	[MJ]	1.58E+1	2.24E-1	8.12E-4	1.06E-1	-5.36E+0
Use of secondary material	[kg]	4.86E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	5.65E-8	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	6.23E-7	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m ³]	1.49E-2	1.40E-5	1.50E-6	0.00E+0	-8.77E-4

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² DuPont™ AirGuard® 5816X

Indicator	Unit	A1-A3	A4	A5	C4	D
Hazardous waste disposed	[kg]	2.24E-9	1.07E-12	1.03E-13	0.00E+0	-8.23E-10
Non-hazardous waste disposed	[kg]	2.63E-1	3.19E-5	4.08E-4	0.00E+0	-2.14E-3
Radioactive waste disposed	[kg]	8.60E-4	2.76E-7	1.51E-8	0.00E+0	-2.58E-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	0.00E+0	1.38E-3	9.05E-1
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	2.49E-3	2.98E+0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² DuPont™ AirGuard® 5816X

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 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

Standards

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 13501-1

EN 13501-1:2019, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

EN 13984

EN 13984:2013, Flexible sheets for waterproofing - Plastic and rubber vapour control layers - Definitions and characteristics

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 1931

EN 1931:2000, Bitumen, plastic and rubber sheets for roof waterproofing - Determination of water vapour transmission properties

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 10.6.2.9. 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

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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**Publisher**

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web www.ibu-epd.com

**Programme holder**

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 - 3087748 - 29
Mail info@ibu-epd.com
Web www.ibu-epd.com

**Author of the Life Cycle Assessment**

Luxembourg Institute of Science
and Technology (LIST)
Avenue des Hauts-Fourneaux 5
4362 Esch/Alzette
Luxembourg

Tel 00352-275888-1
Fax 00352-275888-555
Mail info@list.lu
Web www.list.lu

**Owner of the Declaration**

DuPont de Nemours (Luxembourg)
s.à r.l.
Rue Général Patton 1
2984 Contern
Luxembourg

Tel +352 3666 5210
Fax +352 3666 0000
Mail tyvek.info@dupont.com
Web www.dupont.com