ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	VELUX Group
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-VEL-20220111-CBB2-EN
Issue date	24.05.2022
Valid to	23.05.2027

VELUX BFX Underfelt collar

VELUX Group

Institut Bauen und Umwelt e.V.

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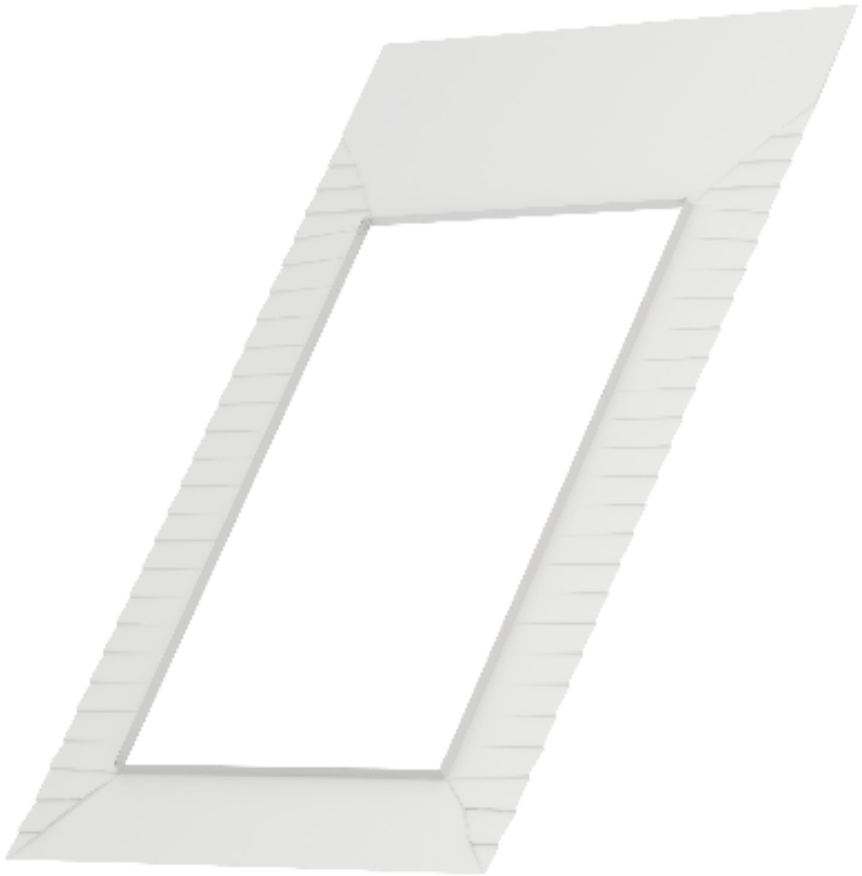

General Information

VELUX Group	BFX Underfelt collar
Programme holder IBU – Institut Bauen und Umwelt e.V. Hegelplatz 1 10117 Berlin Germany	**Owner of the declaration** VELUX Group Ådalsvej 99 2970 Hørsholm Denmark
Declaration number EPD-VEL-20220111-CBB2-EN	**Declared product / declared unit** 1m² underfelt collar BFX The declared unit is based on the configuration of a standard size window measuring 0.78m x 1.178m.
This declaration is based on the product category rules: Windows and doors , 01.2021 (PCR checked and approved by the SVR)	**Scope:** Productline BFX - Collar/installation product; manufactured by VELUX in France for sale in Europe. Declaration according to *ISO 14025* and *EN 15804* describing specific environmental performances of the construction product.
Issue date 24.05.2022	
Valid to 23.05.2027	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
Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)	
Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))	Prof. Dr. Birgit Grahl (Independent verifier)

Product

Product description/Product definition
The VELUX BFX underfelt collar is a product for sale in the European market.
The underfelt collar consists of mainly steel and plastics.

The calculations are based on the BFX underfelt collar.

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 *DIN EN 13859-1:2014 - Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing*. For the application and use the respective national provisions apply.

Application
VELUX BFX underfelt collar is used in renovation and new build.

Technical Data
The Declaration of Performance including relevant technical specifications and test methods/test standards can be downloaded from the website www.velux.com/ce-marking.

The performance values are specific for the BFX underfelt collar.

The declared values in the table relate to the reference product. For other covered product variants, specific values can be selected at the bottom of the above-mentioned download page.

Constructional data

Name	Value	Unit
Fire resistance class DIN EN 1634-1	E	class
Resistance to water penetration before artificial ageing	class W1	
Resistance to water penetration after artificial ageing	class W1	
Tensile strength in longitudinal direction before artificial ageing	200	N/50mm
Tensile strength in longitudinal direction after artificial ageing	120	N/50mm
Tensile strength in transverse direction before artificial ageing	200	N/50mm
Tensile strength in transverse direction after artificial ageing	120	N/50mm

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *DIN EN 13859-1:2014* - Flexible sheets for waterproofing – Definitions and characteristics of underlays – Part 1: Underlays for discontinuous roofing.

Base materials/Ancillary materials

Name	Value	Unit
Galvanized steel	67	%
Polypropylene	16	%
Polybutadiene	16	%
Hot-melt adhesive	0.3	%

REACH
This product/article/at least one partial article contains substances listed in the candidate list (date: 17.01.2022) exceeding 0.1 percentage by mass: no.

Recycled content

Name	Value	Unit
Steel	20	%
Polypropylene	0	%
Polybutadiene	0	%
Hot-melt adhesive	0	%

Reference service life
A calculation of the reference service life according to *ISO 15686* is not possible.

The Bundesinstitut für Bau, Stadt und Raumforschung/Federal office for building and regional planning (*BBSR)* table declares for the complete roof window a service life dependent on the applied window frame material between 25 and ≥ 50 years. This includes collars and flashings as declared with this EPD.

LCA: Calculation rules

Declared Unit
The declared unit is one m² related to a reference window, that the collar is installed in connection with.

The declared unit is based on the representative product measuring 0.78m x 1.178m.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Weight per area	1.77	kg/representative product
Weight per area	1.92	kg/declared unit

System boundary
Type of EPD: Cradle to gate - with options. The following life cycle stages were considered:

Production stage A1-A3:
Consideration of the production of raw materials and their processing; transport of major material to the manufacturing site; assembly of semi-finished products to the final product; packaging material (including waste paper input for paper and cardboard).

End-of-Life stage C1, C2, C3:
C1: a manual demolition is assumed, resulting in indicator value "0".
C2: For the transport to EoL by truck a distance of 50 km is assumed.
C3: A scenario for the incineration of plastics in a waste incineration plant (WIP) is assumed.

The EoL-Scenario does not assume waste to be disposed of on a landfill site. Module C4 is declared as "0".

Benefits for the next product system D:
Resulting electrical and thermal energy from the WIP, avoiding the generation of electricity and heat via fossil fuels, is considered.
The amount of metals after the reduction due to the net-flow calculations is sent to a recycling process. The effort for recycling, as well as the benefit for the regained metals are declared in module D.

Contribution of waste flows is considered in the modules where they occur.

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.

The *software GaBi* is used accompanied by the *GaBi background data base* (version 2021.2, 2021).

LCA: Scenarios and additional technical information

Characteristic product properties
Information on biogenic Carbon
The following declared values refer to the declared unit of 1m².

Information on describing the biogenic Carbon Content at factory gate
The declared biogenic content comprises the paper manual and the packaging material consisting of cardboard, paper and wood. As module A5 is not declared, the information on packaging supports further EoL calculations.

Name	Value	Unit
Biogenic Carbon Content in product	0	kg C
Biogenic Carbon Content in accompanying packaging	0.147	kg C

The value refers to the following packaging material (per 1m²):
Paper (manual): 0.009kg, Cardboard packaging: 0.329kg, Paper insert: 0.003kg, PE-LD: 0.009kg

Reference service life

Name	Value	Unit
Life Span (according to BBSR) depending on window frame material	25 - 50	a

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type	1.92	kg
Recycling	1.29	kg
Energy recovery	0.62	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Steel (net-flow calculation)	1.63	kg/1m² product

LCA: Results

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	ND	ND	ND	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² BFX

Core Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Global warming potential - total	[kg CO_2-Eq.]	6.69E+0	0.00E+0	5.84E-3	2.39E+0	0.00E+0	-3.41E+0
Global warming potential - fossil fuels	[kg CO_2-Eq.]	7.20E+0	0.00E+0	5.80E-3	2.39E+0	0.00E+0	-3.40E+0
Global warming potential - biogenic	[kg CO_2-Eq.]	-5.15E-1	0.00E+0	-6.90E-6	1.26E-4	0.00E+0	-7.17E-3
GWP from land use and land use change	[kg CO_2-Eq.]	3.39E-3	0.00E+0	4.73E-5	6.48E-5	0.00E+0	-8.66E-4
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	5.30E-12	0.00E+0	1.14E-18	5.47E-16	0.00E+0	-1.88E-14
Acidification potential, accumulated exceedance	[mol H^+-Eq.]	1.80E-2	0.00E+0	1.14E-5	2.79E-4	0.00E+0	-5.50E-3
Eutrophication, fraction of nutrients reaching freshwater end compartment	[kg P_4-Eq.]	3.40E-5	0.00E+0	1.72E-8	8.34E-8	0.00E+0	-2.03E-6
Eutrophication, fraction of nutrients reaching marine end compartment	[kg N-Eq.]	4.36E-3	0.00E+0	4.74E-6	7.15E-5	0.00E+0	-1.20E-3
Eutrophication, accumulated exceedance	[mol N-Eq.]	4.58E-2	0.00E+0	5.37E-5	1.28E-3	0.00E+0	-1.24E-2
Formation potential of tropospheric ozone photochemical oxidants	[kg NMVOC-Eq.]	1.91E-2	0.00E+0	1.02E-5	2.08E-4	0.00E+0	-4.65E-3
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	2.38E-5	0.00E+0	5.13E-10	7.96E-9	0.00E+0	-5.72E-6
Abiotic depletion potential for fossil resources	[MJ]	1.24E+2	0.00E+0	7.72E-2	7.15E-1	0.00E+0	-4.22E+1
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	[m^3 world-Eq deprived]	3.41E+0	0.00E+0	5.38E-5	2.35E-1	0.00E+0	-6.16E+0

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² BFX

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier	[MJ]	4.11E+0	0.00E+0	4.44E-3	1.53E-1	0.00E+0	-3.27E+0
Renewable primary energy resources as material utilization	[MJ]	5.43E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	9.54E+0	0.00E+0	4.44E-3	1.53E-1	0.00E+0	-3.27E+0
Non-renewable primary energy as energy carrier	[MJ]	9.66E+1	0.00E+0	7.74E-2	2.84E+1	0.00E+0	-4.22E+1
Non-renewable primary energy as material utilization	[MJ]	2.77E+1	0.00E+0	0.00E+0	-2.77E+1	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	1.24E+2	0.00E+0	7.74E-2	7.15E-1	0.00E+0	-4.22E+1
Use of secondary material	[kg]	3.98E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.31E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m^3]	9.20E-2	0.00E+0	5.09E-6	5.55E-3	0.00E+0	-1.46E-1

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² BFX

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	[kg]	1.42E-7	0.00E+0	4.08E-12	1.28E-10	0.00E+0	1.66E-10
Non-hazardous waste disposed	[kg]	2.13E-1	0.00E+0	1.21E-5	1.57E-1	0.00E+0	2.68E-1
Radioactive waste disposed	[kg]	4.71E-3	0.00E+0	1.40E-7	2.95E-5	0.00E+0	-1.49E-3
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	0.00E+0	1.04E+0	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	5.09E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	9.14E+0	0.00E+0	0.00E+0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² BFX

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Potential incidence of disease due to PM emissions	[Disease Incidence]	1.98E-7	0.00E+0	6.94E-11	3.32E-9	0.00E+0	-8.86E-8
Potential Human exposure efficiency relative to U235	[kBq U235-Eq.]	1.18E+0	0.00E+0	2.05E-5	4.02E-3	0.00E+0	-2.04E-1
Potential comparative toxic unit for ecosystems	[CTUe]	7.62E+1	0.00E+0	5.73E-2	4.86E-1	0.00E+0	-5.70E+0
Potential comparative toxic unit for humans - cancerogenic	[CTUh]	2.90E-9	0.00E+0	1.16E-12	2.89E-11	0.00E+0	-1.40E-9
Potential comparative toxic unit for humans - not cancerogenic	[CTUh]	9.62E-8	0.00E+0	6.29E-11	2.75E-9	0.00E+0	-3.45E-8
Potential soil quality index	[-]	2.40E+1	0.00E+0	2.65E-2	1.77E-1	0.00E+0	-2.85E+0

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 or as there is limited experience with the indicator.

Disclaimer 3 – for “potential soil quality index”. Due to a data lack in the foreground data of VELUX, the result has a very high uncertainty and refers only to the background data, which contain respective information.

References

BBSR
BBSR, 24.02.2017, Nutzungsdauer von Bauteilen nach BNB

DIN EN 1634-1
DIN EN 1634-1:2018-04: Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows

DIN EN 13859-1
DIN EN 13859-1:2014-07: Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing

EN 15804
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GaBi
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ISO 14025
EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.
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ISO 15686
ISO 15686:2011-05: Buildings and constructed assets - Service life planning - Part 1: General principles and framework

PCR part A
Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, version 1.2, Berlin: Institut Bauen und Umwelt e.V., 2021

PCR part B
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REACH
Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Regulation (EU) No. 305/2011 (CPR)
Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealingCounsicl Directive 89/106/EEC

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