ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A1*

Owner of the Declaration	**Hilti AG**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-HIL-20220103-CBA1-EN
Issue date	29.09.2022
Valid to	28.09.2027

MFT-FOX V

Hilti AG

Institut Bauen und Umwelt e.V.

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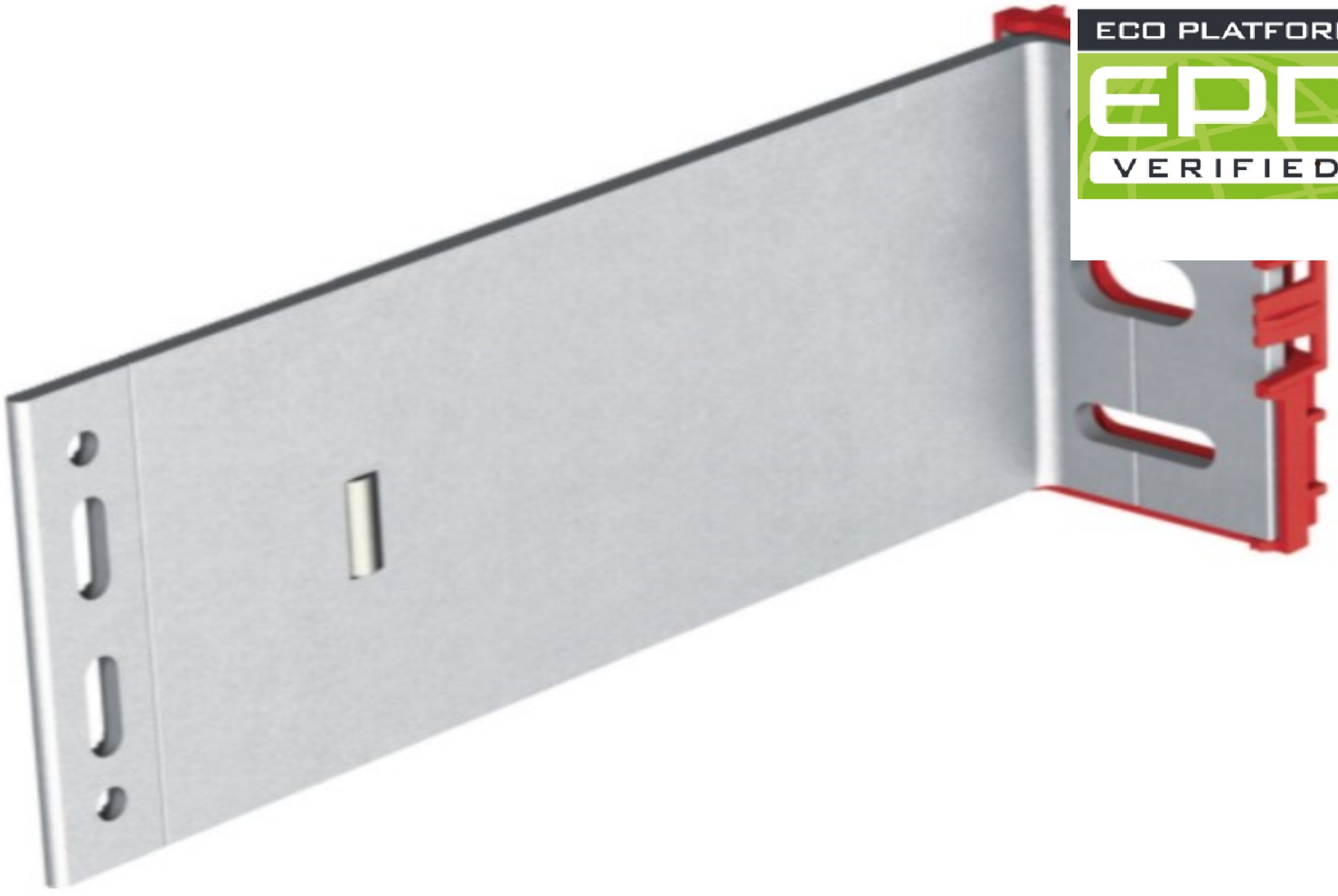

General Information

Hilti AG

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

Declaration number
EPD-HIL-20220103-CBA1-EN

This declaration is based on the product category rules:
Wall plugs made of plastic and metal, 11.2017
(PCR checked and approved by the SVR)

Issue date
29.09.2022

Valid to
28.09.2027

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

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(Managing Director Institut Bauen und Umwelt e.V.))

MFT-FOX V

Owner of the declaration
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Principality of Liechtenstein

Declared product / declared unit
The declared product is the MFT-FOX VI 160 M as a representative product for the FOX V portfolio. The declared unit relates to 1,5 pcs/m² of product. The packaging is also included in the calculation. The declared unit is given in [pcs/m²].

Scope:
This document relates to the MFT-FOX VI 160 M as a representative product for the FOX V portfolio.The FOX V portfolio can be divided into two classes with three different sizes small, medium and large. The first class contains the products with bracket and clip of aluminium and without the isolator of polypropylene.The second class contains the same products but with an additional plastic part of polypropylene named isolator.The declared product for this EPD is chosen from the second class, because it can be assumed that the environmental impacts are higher for these products with the additional isolator. The medium brackets are with 65% the most sold size from the FOX V portfolio in 2021. As the representative product for this EDP the FOX VI 160 M is chosen, because it displays nearly the average weight of this product group.

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+A1*. 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

Mrs Kim Allbury
(Independent verifier)

Product

Product description/Product definition
MFT-Fox V is designed as an aluminium substructure system. The brackets are suitable for all façade cladding. The products are used for fastening ventilated façade substructure to concrete, masonry, steel frame structure and wood. They enable mounting façade substructures on the primary structure as a helping hand bracket and can be used to install vertical support rails.
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 1090-1:2009+A1:2011*, No. Hilti MFT

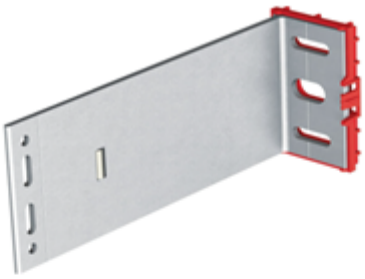
CPR-1346 and the CE-marking. For the application and use the respective national provisions apply.

Large Bracket

	Name	Article number	weight/item [kg]
without Isolator	FOX V 034 L 6.5 11	2305936	0,10
	FOX V 054 L 6.5 11	2305935	0,12
	FOX V 074 L 6.5 11	2305934	0,15
	FOX V 094 L 6.5 11	2305933	0,18
	FOX V 114 L 6.5 11	2305932	0,21
	FOX V 134 L 6.5 11	2305931	0,24
	FOX V 154 L 6.5 11	2305930	0,26
	FOX V 174 L 6.5 11	2305929	0,32
	FOX V 194 L 6.5 11	2305928	0,35
	FOX V 214 L 6.5 11	2305927	0,39
	FOX V 234 L 6.5 11	2305926	0,45
	FOX V 254 L 6.5 11	2305925	0,49
	FOX V 274 L 6.5 11	2305924	0,52
	FOX V 294 L 6.5 11	2305923	0,57
		Average weight	0,31

	Name	Article number	weight/item [kg]
with Isolator	FOX VI 040 L 6.5 11	2305950	0,12
	FOX VI 060 L 6.5 11	2305949	0,14
	FOX VI 080 L 6.5 11	2305948	0,17
	FOX VI 100 L 6.5 11	2305947	0,20
	FOX VI 120 L 6.5 11	2305946	0,23
	FOX VI 140 L 6.5 11	2305945	0,26
	FOX VI 160 L 6.5 11	2305944	0,28
	FOX VI 180 L 6.5 11	2305943	0,34
	FOX VI 200 L 6.5 11	2305942	0,37
	FOX VI 220 L 6.5 11	2305941	0,41
	FOX VI 240 L 6.5 11	2305940	0,47
	FOX VI 260 L 6.5 11	2305939	0,51
	FOX VI 280 L 6.5 11	2305938	0,54
	FOX VI 300 L 6.5 11	2305937	0,59
		Average weight	0,33

Medium Bracket



	Name	Article number	weight/item [kg]
without Isolator	FOX V 034 M 6.5 11	2305964	0,05
	FOX V 054 M 6.5 11	2305970	0,06
	FOX V 074 M 6.5 11	2305969	0,08
	FOX V 094 M 6.5 11	2305968	0,09
	FOX V 114 M 6.5 11	2305967	0,10
	FOX V 134 M 6.5 11	2305966	0,12
	FOX V 154 M 6.5 11	2305965	0,13
	FOX V 174 M 6.5 11	2305963	0,16
	FOX V 194 M 6.5 11	2305962	0,18
	FOX V 214 M 6.5 11	2305961	0,19
	FOX V 234 M 6.5 11	2305960	0,23
	FOX V 254 M 6.5 11	2305959	0,24
	FOX V 274 M 6.5 11	2305958	0,26
	FOX V 294 M 6.5 11	2305957	0,28
		Average weight	0,15

	Name	Article number	weight/item [kg]
with Isolator	FOX VI 040 M 6.5 11	2305984	0,06
	FOX VI 060 M 6.5 11	2305983	0,07
	FOX VI 080 M 6.5 11	2305982	0,09
	FOX VI 100 M 6.5 11	2305981	0,10
	FOX VI 120 M 6.5 11	2305980	0,12
	FOX VI 140 M 6.5 11	2305979	0,13
	FOX VI 160 M 6.5 11	2305978	0,14
	FOX VI 180 M 6.5 11	2305977	0,17
	FOX VI 200 M 6.5 11	2305976	0,19
	FOX VI 220 M 6.5 11	2305975	0,20
	FOX VI 240 M 6.5 11	2305974	0,24
	FOX VI 260 M 6.5 11	2305973	0,25
	FOX VI 280 M 6.5 11	2305972	0,27
	FOX VI 300 M 6.5 11	2305971	0,29
		Average weight	0,17

Small Bracket

	Name	Article number	weight/item [kg]
without isolator	FOX V 034 S 11 (FOX V 034 S 6,5)	2305914 (2305906)	0,03
	FOX V 054 S 11 (FOX V 054 S 6,5)	2305913 (2305907)	0,04
	FOX V 074 S 11 (FOX V 074 S 6,5)	2305912 (2305908)	0,05
	FOX V 094 S 11 (FOX V 094 S 6,5)	2305994 (2305909)	0,06
	FOX V 114 S 11 (FOX V 114 S 6,5)	2305767 (2305910)	0,07
	FOX V 134 S 11 (FOX V 134 S 6,5)	2305993 (2305911)	0,08
	FOX V 154 S 11 (FOX V 154 S 6,5)	2305992 (2305920)	0,09
	FOX V 174 S 11 (FOX V 174 S 6,5)	2305991 (2305919)	0,11
	FOX V 194 S 11 (FOX V 194 S 6,5)	2305990 (2305918)	0,12
	FOX V 214 S 11 (FOX V 214 S 6,5)	2305989 (2305917)	0,13
	FOX V 234 S 11 (FOX V 234 S 6,5)	2305988 (2305916)	0,15
	FOX V 254 S 11 (FOX V 254 S 6,5)	2305987 (2305921)	0,17
	FOX V 274 S 11 (FOX V 274 S 6,5)	2305986 (2305922)	0,18
	FOX V 294 S 11 (FOX V 294 S 6,5)	2305985 (2305915)	0,19
		Average weight	0,11

	Name	Article number	weight/item [kg]
with isolator	FOX VI 040 S 11 (FOX VI 040 S 6,5)	2305884 (2305768)	0,04
	FOX VI 060 S 11 (FOX VI 060 S 6,5)	2305883 (2305769)	0,05
	FOX VI 080 S 11 (FOX VI 080 S 6,5)	2305882 (2305892)	0,06
	FOX VI 100 S 11 (FOX VI 100 S 6,5)	2305881 (2305893)	0,07
	FOX VI 120 S 11 (FOX VI 120 S 6,5)	2305880 (2305894)	0,08
	FOX VI 140 S 11 (FOX VI 140 S 6,5)	2305897 (2305895)	0,09
	FOX VI 160 S 11 (FOX VI 160 S 6,5)	2305898 (2305896)	0,10
	FOX VI 180 S 11 (FOX VI 180 S 6,5)	2305899 (2305891)	0,12
	FOX VI 200 S 11 (FOX VI 200 S 6,5)	2305900 (2305890)	0,13
	FOX VI 220 S 11 (FOX VI 220 S 6,5)	2305901 (2305889)	0,14
	FOX VI 240 S 11 (FOX VI 240 S 6,5)	2305902 (2305888)	0,16
	FOX VI 260 S 11 (FOX VI 260 S 6,5)	2305903 (2305887)	0,17
	FOX VI 280 S 11 (FOX VI 280 S 6,5)	2305904 (2305886)	0,18
	FOX VI 300 S 11 (FOX VI 300 S 6,5)	2305905 (2305885)	0,20
		Average weight	0,11

Application
MFT-FOX V is developed to be fixed on base materials like concrete, masonry, steel frame structure and wood. This product is used as substructure for ventilated façade (rainscreen) applications. The brackets are supplied with pre-assembled isolators and, according to the method of installation to the base material – anchors, screws or direct fastening can be used – with different hole geometries in the base plate. The brackets are designed with both fixed and flexible points to allow for thermal expansion of the profile. The fixed point takes the weight of the panels and substructure and the proportional wind loads, while the flexible point only assumes the proportional wind loads.

During the application the vertical profiles are connected to the brackets with specially designed screws for fixed and flexible points. The fixed points do not allow the profiles vertical movement against the brackets, while the flexible points allow virtually frictionless sliding of the profiles against the brackets. The flexible point makes sure that there are no additional loads on the substructure from the profile's expansion forces. With this system, wall tolerances of up to 40 mm can be balanced.

The brackets are available in different sizes (large, medium & small) from 40 mm to 300 incl. 6mm isolator in 20 mm increments. The isolator separates the substructure from the base material to reduce thermal bridging.

Technical Data

Technical documentation according to *EN 1090-3.*

Name	Value	Unit
Thickness Baseplate	4	mm
Length	40-300	mm
Length Steps	20	mm
Height	55/80/155	mm
Width	53	mm
Thickness Isolator	6	mm

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 1090-1:2009+A1:2011 Standard for execution of steel structures and aluminium structures.* The structural parts made of aluminum correspond to following harmonized standards: *EN 1090-1, DIN EN 1999-1-1 + DIN EN 1991-1-4 incl. national annexes, DIN 18516-1.* The product has a CE-marking Hilti MFT CPR-1346.

Base materials/Ancillary materials
The raw material used for the production of this product is aluminium alloy according to the standard *EN AW-6063-T66* with 130g (92% of product weight). The alloy is a widely used extrusion alloy, suitable for various applications. The material used for the isolator is polypropylene with 10g (7% of product weight). The clip is stainless steel with 1g (1% of product weight).

This product/article/at least one partial article contains substances listed in the candidate list (date 05.04.2022) 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

Packaging
The packaging of this product is carton. This cardboard packaging can be recycled.

Reference service life
The MFT-FOX V systems have a minimum service life of 35 years when used as prescribed according to the BBA Certificate (British Board of Agrément). However, the actual service life can be considerably longer.

LCA: Calculation rules

Declared Unit
The declared product is the MFT-FOX VI 160 M as a representative product for the FOX V portfolio. The layout of a substructure for a ventilated façade is mainly driven by the local wind loads which are acting on the building and the weight of the façade panels, which will be installed. Taking these two forces into consideration a grid of brackets and profiles will carry

these loads leading in average to a need of 1,5 brackets / m². Because of this fact, the declared unit relates to 1,5 pcs/m² of product. The packaging with 0,0075 kg of carton is also included in the calculation. The following table shows the data of the declared unit.

Declared unit

Name	Value	Unit
FOX VI 160 M 6	1,5	pcs
Weight	0,2115	kg
Declared unit	1.5	Pce/m^2_{system}

System boundary
The type of the EPD is cradle to gate. The following information modules are defined as system limits in this study:

A1–A3 Product development:

- A1 – Production of raw materials
- A2 – Transport to the manufacturer
- A3 – Production

To record the indicators and potential environmental impacts of the declared unit, a total of three information modules are considered. The information modules A1 to A3 describe the provision of materials, the transport to the production facility, as well as the production process of the product itself and packaging.
All preliminary products are delivered from Europe to the manufacturing plant of HILTI AG in Lanzenkirchen, Austria. The transport is carried out exclusively by truck. In the first process step, the profile is sawed and the holes are stamped. Manufacturing the profiles results in 0,0234 kg of aluminium waste for recycling. Then the injection moulding of the isolator takes place. From the injection moulding of the the isolator, resulting 0,0020 kg PP of production waste which goes to recycling. The clip of stainless steel is only bent in the process. Finally, the product is packed into cartons. The following flow chart illustrates the information modules on which this is based.

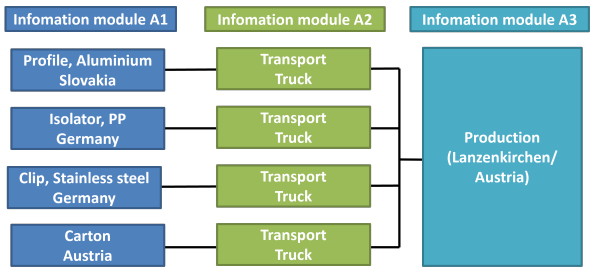


Illustration: Representation of the information modules

Allocation
The data presented in this EPD for MFT-FOX V 160 M are collected based on the yearly manufacturing output of the HILTI plant in Lanzenkirchen, Austria for the year 2021. Currently, this is the only location, where this product is manufactured. The allocation of the life cycle inventory data is based on the mass of the products produced.

Data Quality
For the calculation of the investigated product, completely representative data are used in this study in terms of time, location and technology. If data sets meet these requirements only partially or not at all, the assumptions or limitations made are documented and rated individual from 1 to 5. All background data used is less than 5 years old. The manufacturer's life cycle inventory data are from the year 2021 and correspond to the annual average. The technical background of the study corresponds to the physical reality. The assessment of data quality is considered appropriate (rated between 2 and 3). All background data of this calculation meet the requirements of the *EN 15804*.

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 following link documents the background data of the GaBi 10 Software from 2022, to which this study also refers *Sphera*.

The relevant data sets, which are used to calculate the raw material acquisition and the production of the declared unit, are current (EU-28: Aluminium extrusion profile, Source: *Sphera*, Reference year 2020; Corrugated board 2018, average composition, for use, Source: *Sphera*, Reference year 2018; AT: Electricity grid mix, Source: *Sphera*, Reference year 2017).

All information modules of this calculation are recorded in the way, that the requirements of the *EN 15804+A1* are met. No inputs and output flows are cut- off in this calculation.

LCA: Scenarios and additional technical information

As the information modules A1–A3 are observed in this study, no information is provided on the LCA scenarios and no further technical information is made available.

The packaging in this EPD is only declared in the information modules A1 to A3.

Installation into the building (A5)

Name	Value	Unit
Packaging Carton	0,0075	kg

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE 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	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1,5 pcs/m² MFT-FOX VI 160 M

Parameter	Unit	A1-A3
Global warming potential	[kg CO_2-Eq.]	1.96
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	3.50E-12
Acidification potential of land and water	[kg SO_2-Eq.]	8.24E-3
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	4.90E-4
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	4.52E-4
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	8.77E-7
Abiotic depletion potential for fossil resources	[MJ]	22.52

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1,5 pcs/m² MFT-FOX VI 160 M

Parameter	Unit	A1-A3
Renewable primary energy as energy carrier	[MJ]	11.86
Renewable primary energy resources as material utilization	[MJ]	0.11
Total use of renewable primary energy resources	[MJ]	11.97
Non-renewable primary energy as energy carrier	[MJ]	25.96
Non-renewable primary energy as material utilization	[MJ]	0.65
Total use of non-renewable primary energy resources	[MJ]	26.61
Use of secondary material	[kg]	0.00
Use of renewable secondary fuels	[MJ]	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0
Use of net fresh water	[m³]	2.77E-2

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1,5 pcs/m² MFT-FOX VI 160 M

Parameter	Unit	A1-A3
Hazardous waste disposed	[kg]	4.45E-9
Non-hazardous waste disposed	[kg]	5.47E-1
Radioactive waste disposed	[kg]	1.62E-3
Components for re-use	[kg]	0.00
Materials for recycling	[kg]	0.03
Materials for energy recovery	[kg]	0.00
Exported electrical energy	[MJ]	0.00
Exported thermal energy	[MJ]	0.00

All indicators are collected in accordance with *EN 15804*. The impact assessment of environmental categories is carried out according to */CML 2001 Apr. 2015/*. The paper of the packaging contains 0,12 [kg CO2 eq.] biogenic carbon dioxide, which reduces the results of the overall calculation for the information modules A1 to A3. In the production process of the product at Lanzenkirchen from the sawing and stamping of the profile resulting 0,0234 kg aluminium production waste for recycling. From the injection moulding of the of the isolator resulting 0,0020 kg polypropylene production waste for recycling. This aluminium and polypropylene wastes from the production are used outside the system and are reported as material for recycling in A3.

All environmental impacts and indicators for this calculation are mainly driven by the weight of the product and so also by the weight of the declared unit. That is why it can be expected that the variance of the environmental impacts and indicators for the different products in the FOX V portfolio is nearly the same as the variance of the weights for the different items, when you multiplicate these by 1,5 for the declared unit. The product mass of other products can be used as a proxy to the mass of this product (DU = 1.5 product mass) to determine the impact of other products in the product group.
Therefore, the declared unit for the FOX V product is 1.5 x products per m2 (so 1.5 x product mass). This also applies to all other products in the portfolio.

References

Standards

DIN EN 1090-3:2019-07
Standard for execution of steel structures and aluminium structures

DIN EN 1999-1-1 + DIN EN 1991-1-4
Eurocode 9: Design of aluminum structures - Part 1-4: General design rules

DIN 18516-1
Cladding for external walls, ventilated at rear - Part 1: Requirements, principles of testing

EN 1090-1:2009+A1:2011
Standard for execution of steel structures and aluminium structures

EN AW-6063-T66
Type of aluminium alloy

EN 15804
EN 15804:2012-04+A1 2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

ISO 14025
DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

Other references

BBA Certificate (British Board of Agrément)
The British Board of Agrément is a UK body issuing certificates for construction products and systems and providing inspection services in support of their designers and installers.

Calculation rules: PCR - Part A
Institut Bauen und Umwelt e.V. (IBU), 2021. Product Category Rules for Building-Related Products and Services. Part A: Calculation rules for the life cycle assessment and requirements on the project report. Version 2.1 (11.2021)

CML 2001 April. 2015
Indicators for environmental impacts, Leiden: Universität Leiden, http://cml.leiden.edu/software/data-cmlia.html#downloads (20.08.2022)

IBU 2021
General Instructions for the EPD programme of Institut Bauen und Umwelt e.V. Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021www.ibu-epd.de

Product category rules for construction products – Part B
Institut Bauen und Umwelt e.V. (IBU). Wall plugs made of plastic and metal, 11.2017

Sphera
GaBi 10 Software: Ganzheitliche Bilanzierung, Leinfelden-Echterdingen; Sphera Solution GmbH, https://gabi.sphera.com/databases/gabi-data-search/ (20.08.2022)

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