ENVIRONMENTAL-PRODUCT DECLARATION

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

Owner of the Declaration	fischerwerke GmbH & Co. KG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-FIW-20210314-CBD1-EN
Issue date	22/02/2022
Valid to	21/02/2028

Insulation fixings

fischerwerke GmbH & Co. KG

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

www.ibu-epd.com | https://epd-online.com



General Information

fischerwerke GmbH & Co. KG

Programme holder

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

Declaration number

EPD-FIW-20210314-CBD1-EN

This declaration is based on the product category rules:

Wall plugs made of plastic and metal, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

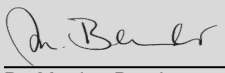
22/02/2022

Valid to

21/02/2028



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



Dr. Martina Bender
(Managing Director Institut Bauen und Umwelt e.V.)

Insulation fixings

Owner of the declaration

fischerwerke GmbH & Co. KG
Klaus-Fischer-Straße 1
72178 Waldachtal
Germany

Declared product / declared unit

The declaration refers to the production of average ETICS anchors for fastening 1 square meter (sq m) ETICS system with the usable lengths 75 - 120 mm, 121 - 140 mm and 141 - 160 mm. The core EPD contains the data and results for the usable lengths 121 - 140 mm. The additional usable lengths are declared in the annexe. 5 anchors per sq m ETICS system are required. The average is calculated depending on the produced annual quantity of the products mentioned under chapter “Product description/Product definition”.

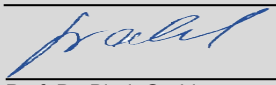
Scope:

This EPD refers to average ETICS anchors manufactured at the plant in Waldachtal Germany and at fischer Vyskov spol s.r.o in Ivanovice na Hané in the Czech Republic. The data basis is the year 2020.
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 bezeichnet*.

Verification

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



Prof. Dr. Birgit Grahl,
(Independent verifier)

Product

Product description/Product definition

Fixing systems from fischerwerke GmbH & Co. KG are made of different materials. These consist of a sleeve made of plastic and an expansion element made of steel or plastic and be delivered in
recyclable cartons. All product components consist of new and recycled materials. The anchors differ, for example, in their specific effective length. The declaration applies to average anchors used in 3 different external thermal insulation composite systems (ETICS) with different effective lengths. For the averaging, insulation anchors from the following product range are considered. The following system-related and non-system-related insulation anchors (product names) are preferably used in ETICS facades (external thermal insulation composite system):

- TermoZ PN, CN, CNplus, CS 8, CS II, CS 8 DT 110 V, CS II DT 110 V , 8U, SV II with accessories.
- TermoZ 6H
- TermoFix 6H-NT, B, H
- Additional plate DT 90, DT 110, DT 140
- FIF-PN, FIF-CN, FIF-CS, FIF-SV II, DIPK

The following insulation anchors are preferably used in VHF façades (curtain-type, rear-ventilated façade):

- DHK
- DHM, FDM

The anchors are used for ETICS include the following usable lengths:

- 75 - 120 mm
- 121 - 140 mm
- 141 - 160 mm

fischer anchors with a working length of more than 160 mm are covered in the *EPD "ETICS Anchors"* of the VDPM (Verband für Dämmsysteme, Putz und Mörtel e.V.). The results are shown for the usable length 121 - 140 mm. The results for the other usable lengths (75 - 120 mm and 141 - 160 mm) are presented in the annexe.

The product portfolio includes products which have a European Technical Assessment or national approval by the building authorities, as well as products without any approval. For further information see
www.fischer-international.com
For the placing of the product on the market in the European Union/European Free Trade Association /EU/EFTA) the Regulation (EU) No. 305/2011 (*CPR*) applies. The product needs a declaration of performance taking into consideration of an ETA on the basis of the guideline *EOTA EAD 330196-01-0604* or *EOTA ETAG 014* and the CE-marking.
The rules of application are regulated in *EOTA ETAG 014* or *EOTA EAD 330196-01-0604*. Situationally, the respective national regulations also apply.

The use of products with national approvals is
subject to the respective national regulations at the place of use apply and
the technical regulations based on these regulations.

Application

The anchors used in ETICS are installed in a push-through installation. In this process, the same drill diameter is drilled through the installation object (insulation material or support rail) as in the substrate. The anchor is then pushed through the installation object into the drill hole and expanded. There
is no impact on the environment and health after correct use (usage). Approved
insulation anchors cannot be re-used due to the approval.
For ETICS anchors, the maximum useful length is specified by the anchor. To determine the required effective length, the product declaration fischerwerke GmbH & Co. KG - Insulation anchor, thickness of the insulation material, the adhesive layer and any existing non-load-bearing layers (old plaster, insulation, etc.) must be taken into account. When fixing through the mesh, the thickness of the base plaster must be taken into account.

Technical Data

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to its specific ETA or with respect to its characteristics in accordance with the relevant technical provision (no CE-marking) or with respect to its technical data sheets.
The main technical parameters for usable length 121-140mm are listed in the following table.

Name	Value	Unit
Screw diameter	4.4 - 6	mm
Wall plug diameter	8 - 10	mm
Plate diameter	45 - 110	mm
Drill hole depth	35 - 90	mm
Anchoring depth	25 - 80	mm
Plate stiffness of the anchor acc. EOTA Technical Report TR 026	0.6 - 1.29	kN/mm
Spot-related heat transition coefficient (Chi value) of the anchor acc. EOTA Technical Report TR 025	0 - 0.002	W/K

Please select one of the following options and delete the header of the selected [alternative]:

[Alternative 1a: Product according to the CPR, based on a hEN]:

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN xyz:date, title*.
- Voluntary data: *source, date, title* (not part of CE-marking).

[Alternative 1b: Product according to the CPR, based on an ETA]:

- Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *ETA no. xyz, date, title*.
- Voluntary data: *source, date, title* (not part of CE-marking).

[Alternative 2a: Product not harmonised in accordance with the CPR but in accordance with other provisions for harmonisation of the EU]:

Performance data of the product according to the harmonised standards, based on provisions for harmonization.

Voluntary data: *source, date, title* (not part of CE-marking).

[Alternative 2b: Product harmonized as well in accordance with the CPR as with other legal provisions of the EU]:

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

characteristics according to *EN xyz: date, title* or *ETA no. xyz, date, title* respectively.
- Performance data of the product, based on the harmonised standards, in accordance with the other provisions for harmonization.
- Voluntary data: *source, date, title* (not part of CE-marking)

[Alternative 3: Product for which no legal provisions for harmonisation of the EU exist]:

Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).

Base materials/Ancillary materials

The basic materials or pre-products for fischer insulation anchors and their mass-related share of the total product are listed in the following chart:

Name	Value	Unit
Polyamide PA 6	7	%
Polyamide PA 6 glass fibre reinforced	36	%
Polyethylene PE-HD	0	%
Polypropylene PP	14	%
Steel	42	%
EPS	0.1	%

1) This product/article/at least one partial article contains substances listed in the *candidate list* (date: 17.12.2021) exceeding 0.1 percentage by mass: no.
2) This product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the *candidate list*, exceeding 0.1 percentage by mass: no.
3) 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.
In addition to the raw material, auxiliary and operating materials are used for processing and finishing. These auxiliary and operating materials are subject to continuous monitoring. If they can no longer be used, they are recycled externally by specialised waste management companies.

Environment and health during use

Reference service life

The lifetime of the insulation anchors is verified according to *EOTA EAD 040083-00-0404*. This assumes a lifetime for the ETICS of at least 25 years.

LCA: Calculation rules

Declared Unit

This declaration refers to the declared unit of 1m^2 average ETICS system with a specific usable length, given in mm. The average dowels used for ETICS systems with 3 different usable lengths (75 - 120 mm; 121 - 140 mm; 141 - 160 mm) are calculated. The usable length of 121 - 140 mm is declared in the EPD and the 2 other usable lengths are in the annexe. “Average” describes all the anchor types produced in a specific usable length class. The average is calculated according to production shares (quantities). The dowels were grouped according to their useful lengths. The quality of the relevant data used for the EPD in terms of its time, geography and technology representativeness is mostly very good.

The current average number of anchors is 5 anchors per m^2 (as used in the *EPD ETICS*). In order to be able to convert the declared unit of 1 m^2 average ETICS system to one kg dowel, it must be multiplied by the required conversion factor. To get the results for 1 dowel, the results have to be divided by 5.

Specification of the declared unit

Name	Value	Unit
Conversion factor to 1 kg (mass in kg per declared unit)	0.1388	-
Declared unit	5	Pce/m^2$_{system}$

For IBU core EPDs (where clause 3.6 is part of the EPD): for average EPDs, an estimate of the robustness of the LCA values must be made, e.g. concerning variability of the production process, geographical representativeness and the influence of background data and preliminary products compared to the environmental impacts caused by actual production.

System boundary

The type of EPD is cradle to factory gate - with options. The environmental product declaration relates to the production stage (module A1: provision of raw materials; A2: transport; A3: manufacture). The energetic recovery of the packaging (A5), reuse, recovery (C3) as well as the dumping of the dowels (C4) including credits outside the system boundary (module D) are taken into account. The product installation (module A4) as well as the usage stage (module B) and the dismantling / demolition (C1) are not taken into account in this study. Transport of the waste to the landfill (100 km) is taken into account (C2) The waste is treated further (C3) and a closed-loop scenario has been modelled in the end-of-life (EoL) phase.The dowels produced in Germany and the Czech Republic are modelled on the boundary conditions typical for each country (electricity, diesel). The material composition and the energy requirement of the average dowels were calculated according to their production shares (based on the quantity) in the two production countries.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Global

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 biogenic carbon content quantifies the amount of biogenic carbon in a construction product leaving the factory gate, and it shall be separately declared for the product and for any accompanying packaging.
If the total mass of biogenic carbon containing materials is less than 5 % of the total mass of the product and accompanying packaging, the declaration of biogenic carbon content may be omitted. The mass of packaging containing biogenic carbon shall always be declared.

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic carbon content in accompanying packaging	0.66	kg C

The following technical scenario information is required for the declared modules.

Installation in the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (packaging material)	3.1E-06	kg

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies for the reference conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list on service life by BNB is declared.

End of Life (C1-C4)

Name	Value	Unit
Collected separately waste type waste type	0.1388	kg

There
are three scenarios for 100% of the used
product that have been considered. C3/1 represents the generic incineration scenario and C3/2 represents the incineration considered in the close loop
Scenario in EoL phase. In C4 the product is completely landfilled. A transport
distance of 100 km to the landfill is assumed.

Reuse,
recovery and recycling potential (D)

Module D considers the credit from
the three end-of-life scenarios. D/1 represents the credit related to the incineration of plastic and
recycling benefits of steel considered in the incineration scenario. D/2 represents
the credit linked to the incineration of packaging material considered in module
A5 in the landfill scenario whereas the D/3 represents the material credit along with incineration of plastic
considered in a closed-loop scenario.

LCA: Results

Disclaimer EP-freshwater:
This indicator has been calculated as “kg P eq” as required in the characterisation model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml).

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	MND	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² ETICS system (121-140mm)

Parameter	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
GWP-total	kg CO_2 eq	7.15E-01	1.15E-02	0	1.16E-03	1.6E-01	1.29E-02	7.81E-03	-2.12E-01	-4.6E-03	-6.97E-01
GWP-fossil	kg CO_2 eq	7.26E-01	9.3E-04	0	1.15E-03	1.6E-01	1.29E-02	8.07E-03	-2.11E-01	-4.57E-03	-6.95E-01
GWP-biogenic	kg CO_2 eq	-1.13E-02	1.05E-02	0	-1.97E-06	7.88E-06	1.29E-05	-2.71E-04	-8.7E-05	-1.92E-05	-2.43E-03
GWP-luluc	kg CO_2 eq	5E-04	8.06E-07	0	9.32E-06	3.59E-06	5.61E-06	7.64E-06	-5.1E-05	-5.92E-06	-1.77E-04
ODP	kg CFC11 eq	9.7E-14	3.5E-18	0	1.38E-19	3.67E-17	8.42E-17	1.91E-17	-1.23E-16	-7.09E-17	-1.84E-15
AP	mol H^+ eq	1.38E-03	3.94E-06	0	4.04E-06	4.75E-05	1.09E-05	2.66E-05	-4.71E-04	-5.05E-06	-8.32E-04
EP-freshwater	kg P eq	1.25E-06	8.58E-10	0	3.5E-09	6.43E-09	1.03E-08	1.38E-06	-1.13E-07	-9.69E-09	-5.53E-07
EP-marine	kg N eq	3.59E-04	1.37E-06	0	1.85E-06	1.46E-05	2.66E-06	6.04E-06	-1.05E-04	-1.63E-06	-2.72E-04
EP-terrestrial	mol N eq	3.54E-03	1.84E-05	0	2.06E-05	2.26E-04	3.21E-05	6.62E-05	-1.13E-03	-1.74E-05	-2.44E-03
POCP	kg NMVOC eq	1.03E-03	3.45E-06	0	3.59E-06	3.82E-05	7.19E-06	1.94E-05	-3.38E-04	-4.38E-06	-7.5E-04
ADPE	kg Sb eq	1.27E-05	5.87E-11	0	8.25E-11	5.21E-10	1.11E-09	5.57E-10	-8.82E-09	-9.99E-10	-7.53E-08
ADPF	MJ	1.12E+01	5.27E-03	0	1.53E-02	4.18E-02	6.8E-02	1.15E-01	-2.28E+00	-6.55E-02	-1.34E+01
WDP	m^3 world eq deprived	2.25E-04	1.37E-03	0	1.03E-05	1.63E-02	1.74E-03	-2.94E-05	-4.03E-03	-5.27E-05	1.44E-02

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² ETICS system (121-140mm)

Parameter	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
PERE	MJ	1.17E+00	2.68E-02	0	8.61E-04	8.68E-03	2.96E-02	8.51E-03	-1.37E-01	-1.66E-02	-4.41E-01
PERM	MJ	2.59E-02	-2.59E-02	0	0	0	0	0	0	0	0
PERT	MJ	1.19E+00	9.12E-04	0	8.61E-04	8.68E-03	2.96E-02	8.51E-03	-1.37E-01	-1.66E-02	-4.41E-01
PENRE	MJ	8.5E+00	6.51E-03	0	1.53E-02	2.77E+00	6.8E-02	1.15E-01	-2.29E+00	-6.55E-02	-1.34E+01
PENRM	MJ	2.73E+00	-1.24E-03	0	0	-2.73E+00	0	0	0	0	0
PENRT	MJ	1.12E+01	5.27E-03	0	1.53E-02	4.18E-02	6.8E-02	1.15E-01	-2.29E+00	-6.55E-02	-1.34E+01
SM	kg	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0
FW	m^3	1.47E-03	3.24E-05	0	9.97E-07	3.85E-04	5.55E-05	3.07E-06	-3.71E-04	-9.07E-06	-1.15E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² ETICS system (121-140mm)

Parameter	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
HWD	kg	1.51E-08	6.27E-11	0	7.14E-10	7.76E-11	3.16E-11	5E-10	-1.37E-09	-3.45E-11	-3.72E-09
NHWD	kg	8.13E-03	2.3E-04	0	2.35E-06	3.39E-03	2.4E-04	1.39E-01	-2.47E-03	-3.11E-05	-3.14E-03

RWD	kg	1.87E-04	1.22E-07	0	1.9E-08	1.25E-06	1E-05	1.38E-06	-6.44E-05	-2.41E-06	-6.54E-05
CRU	kg	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	6.94E-02	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	1.46E-02	0	0	2.68E-01	1.53E-02	0	0	0	0
EET	MJ	0	3.36E-02	0	0	6.15E-01	3.5E-02	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 m² ETICS system (121-140mm)

Parameter	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
PM	Disease incidence	1.2E-08	2.25E-11	0	2.21E-11	2.63E-10	8.4E-11	2.7E-10	-5.72E-09	-3.81E-11	-5.31E-09
IR	kBq U235 eq	1.59E-02	1.13E-05	0	2.75E-06	1.13E-04	1.64E-03	1.93E-04	-1.17E-02	-2.17E-04	-5.9E-03
ETP-fw	CTUe	5.45E+00	2.8E-03	0	1.08E-02	1.62E-02	2.9E-02	1.1E-01	-4.36E-01	-1.15E-02	-7.42E+00
HTP-c	CTUh	3.36E-10	1.21E-13	0	2.27E-13	1.66E-12	8.69E-13	5.41E-12	-2.28E-10	-6.46E-13	-1.84E-10
HTP-nc	CTUh	8E-09	5.15E-12	0	1.35E-11	1.04E-10	3.42E-11	4.5E-10	-1.23E-09	-2.66E-11	-7.68E-09
SQP	SQP	2.57E+00	1.62E-03	0	5.38E-03	1.16E-02	2.15E-02	9E-03	-9.87E-02	-1.47E-02	-3.96E-01

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator IRP
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 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 ADPE, ADPF, WDP, ETPfw, HTPc, HTPnc, SQP. 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

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., 2021.
www.ibu-epd.com

PCR Part A

PCR - Part A: Calculation Rules for the Life Cycle

Assessment and Requirements on the Project Report,

Berlin: Institut Bauen und Umwelt e.V., www.ibu-epd.com, 2020

PCR Part B

PCR
Part B: Requirements on the EPD for Wall plugs made of plastic and metal, Berlin: Institut Bauen und Umwelt e.V., 11-2017

ISO 4042
ISO 4042:2018-08, Fasteners - Electroplated coating systems

ISO 9001
DIN EN ISO 9001:2015-11, Quality management systems - Requirements (ISO 9001:2015)

ISO 14001
DIN EN ISO 14001:2015-11, Environmental management systems - Requirements with guidance for use

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

EN 15804

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

CPR

REGULATION
(EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 2011
laying down harmonised conditions for the marketing of construction products
and repealing Council Directive 89/106/EEC, Official Journal of the European
Union, 2011

EOTA ETAG 014
Guideline for European Technical Approval of plastic anchors for fixing of external thermal insulation composite systems with rendering, 2011

EOTA EAD 040083-00-0404
European Assessment Document for external thermal insulation composite systems (ETICS) with renderings, 2019

EOTA EAD 330196-01-0604
European Assessment Document for plastic anchors made of virgin or non-virgin material for fixing of external thermal insulation composite systems with rendering, 2017

EOTA Technical Report TR 025
Point thermal transmittance of plastic anchors for ETICS, 2016

EOTA Technical Report TR 026
Plate stiffness of plastic anchors for ETICS, 2016

EPD “ETICS Anchors”

Environmental Product Declaration: WDVS mit EPS geklebt und gedübelt (ETICS with EPS glued and anchored), VDPM (Verband für Dämmsysteme, Putz und Mörtel e.V.), EPD-WDV-20170077-IBG2-DE. Berlin: Institut Bauen und Umwelt e.V. (Ed.), Jun 07, 2017.

Environmental Product Declaration: WDVS mit Mineralfaser Dämmplatte geklebt und gedübelt (ETICS with mineral wool insulation board glued and anchored), VDPM (Verband für Dämmsysteme, Putz und Mörtel e.V.), EPD-WDV-20170078-IBG2-DE. Berlin: Institut Bauen und Umwelt e.V. (Ed.), Jun 07, 2017.

ETA
European Technical Assessment (e.g. ETA-14/0372 for TermoZ plastic anchors), 2021

GaBi ts software

Sphera Solutions GmbH

GaBi Software System and Database for Life Cycle

Engineering

CUP Version: 2020.2

University of Stuttgart

LeinfeldenEchterdingen

GaBi ts documentation

GaBi life cycle inventory data documentation

(https://www.gabisoftware.

com/support/gabi/gabidatabase2020lcidocumentation/)

Ordinance on Biocide Products
REGULATION
(EU) No 528/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 May 2012
concerning the making available on the market and use of biocidal products,

Ordinance
regulating the manufacture, labelling, placing on the market and use of
biocidal products. Official Journal of the European Union, 2012

REACH/ECHA candidate list

List
of substances considered for authorisation

substances
of very high concern (SVHCs)

(ECHA

candidate list), published in accordance with

Article
59, paragraph 10 of the REACH, Regulation
Helsinki: European
Chemicals Agency, view of 17.12.2021

Technical data sheets of engineered products,
see www.fischer-international.com
The literature referred to in the Environmental Product Declaration must be listed in full.Standards already fully quoted in the EPD do not need to be listed here again.
The current version of PCR Part A and PCR Part B of the PCR document on which they are based must be referenced.

Annex
For Insulation fixings
fischerwerke GmbH & Co. KG

to the

ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	fischerwerke GmbH & Co. KG
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-FIW-20210314-CBD1-EN
Issue date	22/02/2022
Valid to	21/02/2028

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

www.ibu-epd.com / https://epd-online.com



General Information

fischerwerke GmbH & Co. KG

Programme holder
IBU – Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Declaration number
EPD-FIW-20210314-CBD1-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
22/02/2022

Valid to
21/02/2027



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



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

Insulation anchors

Owner of the declaration
fischerwerke GmbH & Co. KG
Klaus-Fischer-Straße 1
72178 Waldachtal
Germany

Declared product / declared unit
The declaration refers to the production of average ETICS anchors for fastening 1 squaremeter (sq m) ETICS system with the usable lengths 75 - 120 mm, 121 - 140 mm and 141 - 160 mm. The core EPD contains the data and results for the usable length 121 - 140 mm. The additional usable lengths are declared in this annex. 5 anchors per sq m ETICS system are required. The average is calculated depending on the produced annual quantity of the products mentioned under chapter “Product description/Product definition” in the core EPD.

Scope:
This EPD refers to average ETICS anchors manufactured at the plant in Waldachtal Germany and at fischer Vyskov spol s.r.o in Ivanovice na Hané in the Czech Republic. The data basis is the year 2020.

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 14025:2010*
☐ internally ☒ externally



Prof. Dr. Birgit Grahl
(Independent verifier)

LCA: Calculation rules

Declared Unit
This declaration refers to the declared unit of 1 m^2 average ETICS system with a specific usable length, given in mm. The average dowels used for ETICS systems with 3 different usable lengths (75 - 120 mm; 121 - 140 mm; 141 - 160 mm) are calculated. In this annex is declared two usable lengths: 75 - 120 mm and 141 - 160 mm. “Average” describes all the anchor types produced in a specific usable length class. The average is calculated according to production shares (quantities). The dowels were grouped according to their useful lengths. The quality of the relevant data used for the EPD in terms of its time, geography and technology representativeness is mostly very good.

The current average number of anchors is 5 anchors per m^2 (as used in the EPD ETICS). In order to be able to convert the declared unit of 1 m^2 average ETICS system to one kg dowel, it must be multiplied by the required conversion factor. To get the results for 1 dowel, the results have to be divided by 5.

Specification of the declared unit

Name	Value	Unit
Declared unit (product weight) - 75 - 120 mm	0.0833	kg/m^2
Conversion factor to 1 kg 75 - 120 mm	12.0	-
Declared unit (product weight)	0.1049	kg/m^2

141 - 160 mm		
Conversion factor to 1 kg 141 - 160 mm	9.5	-
Declared unit	5	Pce/m^2_{system}

System boundary

The type of EPD is cradle to factory gate - with options. The environmental product declaration relates to the production stage (module A1: provision of raw materials; A2: transport; A3: manufacture). The energetic recovery of the packaging (A5), reuse, recovery (C3) as well as the dumping of the dowels (C4) including credits outside the system boundary (module D) are taken into account. The product installation (module A4) as well as the usage stage (module B) and the dismantling / demolition (C1) are not taken into account in this study. Transport of the waste to the landfill (100 km) is taken into account (C2) The waste is treated further (C3) and a closed-loop scenario has been modelled in EoL phase.

The dowels produced in Germany and the Czech Republic are modeled on the boundary conditions typical for each country (electricity, diesel). The material composition and the energy requirement of the average dowels were calculated according to their production shares (based on the quantity) in the two production countries.

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.

Background database: GaBi ts software, CUP 2020.2.

LCA: Scenarios and additional technical information

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Biogenic Carbon Content in accompanying packaging 75 - 120 mm	0.63	kg C
Biogenic Carbon Content in accompanying packaging 141 - 160 mm	0.37	kg C

The following technical scenario information is required for the declared modules.

Installation in the building (A5)

Name	Value	Unit
Output substances following waste treatment on site (packaging material) 75 - 120 mm	0,0077	kg
Output substances following waste treatment on site (packaging material)	0,0043	kg

End of Life (C1-C4)

Name	Value	Unit
Collected separately waste type 75 - 120 mm	0.083	kg
Collected separately waste type 141 - 160 mm	0.1049	kg

There are three scenarios for 100% of the used product have been considered. C3/1 represents the generic incineration scenario and C3/2 represents the incineration considered in the close loop Scenario in EoL phase. In C4 the product is completely landfilled. A transport distance of 100 km to the landfill is assumed.

Reuse, recovery and recycling potential (D)

The module D considers the credit from the three end of life scenarios. D/1 represents the credit related to the incineration of plastic and recycling benefits of steel considered in the incineration scenario. D/2 represents the credit linked to the incineration of packaging material considered in module A5 in the landfill scenario whereas the D/3 represents the material credit along with incineration of plastic considered in closed-loop scenario.

LCA: Results for 75 – 120mm usable length

Disclaimer:
EP-freshwater: This indicator has been calculated as “kg P eq” as required in the characterization model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml).

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	X	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 ETICS system (75-120 mm)

Core Indicator	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
GWP-total	[kg CO_2-Eq.]	4.36E-01	1.18E-02	0.00E+00	6.97E-04	1.38E-01	7.76E-03	4.71E-03	-1.14E-01	-4.84E-03	-4.22E-01
GWP-fossil	[kg CO_2-Eq.]	4.47E-01	1.77E-03	0.00E+00	6.92E-04	1.38E-01	7.75E-03	4.86E-03	-1.13E-01	-4.81E-03	-4.21E-01
GWP-biogenic	[kg CO_2-Eq.]	-1.14E-02	1.01E-02	0.00E+00	-1.18E-06	6.78E-06	7.76E-06	-1.63E-04	-1.27E-04	-2.03E-05	-1.47E-03
GWP-luluc	[kg CO_2-Eq.]	3.56E-04	7.91E-07	0.00E+00	5.62E-06	3.09E-06	3.38E-06	4.61E-06	-4.48E-05	-6.29E-06	-1.10E-04
ODP	[kg CFC11-Eq.]	9.15E-14	3.41E-18	0.00E+00	8.34E-20	3.16E-17	5.07E-17	1.15E-17	-4.35E-16	-7.55E-17	-1.14E-15
AP	[mol H^+-Eq.]	8.12E-04	3.86E-06	0.00E+00	2.44E-06	4.09E-05	6.59E-06	1.60E-05	-2.15E-04	-5.33E-06	-5.04E-04
EP-freshwater	[kg PO_4-Eq.]	8.45E-07	8.38E-10	0.00E+00	2.11E-09	5.53E-09	6.23E-09	8.32E-07	-8.82E-08	-1.03E-08	-3.38E-07
EP-marine	[kg N-Eq.]	2.23E-04	1.33E-06	0.00E+00	1.11E-06	1.26E-05	1.60E-06	3.64E-06	-5.02E-05	-1.73E-06	-1.64E-04
EP-terrestrial	[mol N-Eq.]	2.18E-03	1.80E-05	0.00E+00	1.24E-05	1.94E-04	1.93E-05	3.99E-05	-5.42E-04	-1.84E-05	-1.48E-03
POCP	[kg NMVOC-Eq.]	6.38E-04	3.36E-06	0.00E+00	2.16E-06	3.29E-05	4.33E-06	1.17E-05	-1.57E-04	-4.62E-06	-4.54E-04
ADPE	[kg Sb-Eq.]	4.39E-06	5.74E-11	0.00E+00	4.97E-11	4.48E-10	6.69E-10	3.35E-10	-9.36E-09	-1.06E-09	-4.58E-08
ADPF	[MJ]	7.79E+00	5.19E-03	0.00E+00	9.23E-03	3.60E-02	4.10E-02	6.93E-02	-1.46E+00	-6.88E-02	-8.09E+00
WDP	[m^3 world-Eq deprived]	-1.81E-04	1.38E-03	0.00E+00	6.20E-06	1.40E-02	1.05E-03	-1.77E-05	-4.82E-03	-5.60E-05	8.64E-03

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water use

RESULTS OF THE LCA - RESOURCE USE according to EN 15804+A2: 1 m² ETICS system (75-120 mm)

Indicator	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
PERE	[MJ]	8.14E-01	8.94E-04	0.00E+00	5.19E-04	7.47E-03	1.78E-02	5.13E-03	-1.81E-01	-1.77E-02	-2.73E-01
PERM	[MJ]	2.48E-02	-2.48E-02								
PERT	[MJ]	8.14E-01	8.94E-04	0.00E+00	5.19E-04	7.47E-03	1.78E-02	5.13E-03	-1.81E-01	-1.77E-02	-2.73E-01
PENRE	[MJ]	7.79E+00	5.19E-03	0.00E+00	9.24E-03	3.60E-02	4.10E-02	6.94E-02	-1.46E+00	-6.88E-02	-8.09E+00
PENRM	[MJ]	2.23E+00	-3.37E-03			-2.23E+00					
PENRT	[MJ]	7.79E+00	5.19E-03	0.00E+00	9.24E-03	3.60E-02	4.10E-02	6.94E-02	-1.46E+00	-6.88E-02	-8.09E+00
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	9.66E-04	3.26E-05	0.00E+00	6.01E-07	3.31E-04	3.34E-05	1.85E-06	-2.75E-04	-9.65E-06	-6.94E-04

Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES according to EN 15804+A2: 1 m² ETICS system (75-120 mm)

Indicator	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D
HWD	[kg]	1.41E-08	6.20E-11	0.00E+00	4.30E-10	6.68E-11	1.90E-11	3.01E-10	-7.46E-10	-3.63E-11	-2.26E-09
NHWD	[kg]	4.81E-03	2.25E-04	0.00E+00	1.41E-06	2.92E-03	1.44E-04	8.35E-02	-1.14E-03	-3.28E-05	-1.91E-03
RWD	[kg]	1.09E-04	1.23E-07	0.00E+00	1.14E-08	1.08E-06	6.04E-06	8.34E-07	-6.53E-05	-2.57E-06	-4.05E-05
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	1.56E-02	0.00E+00	0.00E+00	2.31E-01	9.20E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	3.50E-02	0.00E+00	0.00E+00	5.29E-01	2.11E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² ETICS system (75-120 mm)

Indicator	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
PM	[Disease Incidence]	6.48E-09	2.21E-11	0.00E+00	1.33E-11	2.26E-10	5.06E-11	1.62E-10	-2.41E-09	-4.03E-11	-3.21E-09
IR	[kBq U235-Eq.]	9.48E-03	1.17E-05	0.00E+00	1.65E-06	9.70E-05	9.88E-04	1.17E-04	-1.10E-02	-2.31E-04	-3.66E-03
ETP-fw	[CTUe]	3.96E+00	2.77E-03	0.00E+00	6.53E-03	1.39E-02	1.75E-02	6.64E-02	-2.79E-01	-1.23E-02	-4.48E+00
HTP-c	[CTUh]	1.68E-10	1.21E-13	0.00E+00	1.37E-13	1.43E-12	5.24E-13	3.26E-12	-8.46E-11	-6.81E-13	-1.11E-10
HTP-nc	[CTUh]	5.06E-09	5.13E-12	0.00E+00	8.11E-12	8.96E-11	2.06E-11	2.71E-10	-6.51E-10	-2.80E-11	-4.64E-09
SQP	[-]	2.14E+00	1.59E-03	0.00E+00	3.24E-03	9.97E-03	1.30E-02	5.43E-03	-1.32E-01	-1.56E-02	-2.46E-01

Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans; HTP-nc = Potential comparative Toxic Unit for humans; SQP = Potential soil quality index

LCA: Results for 141 – 160mm usable length

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² ETICS system (141-160 mm)

Core Indicator	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
GWP-total	[kg CO_2-Eq.]	5.70E-01	6.39E-03	0.00E+00	8.73E-04	1.74E-01	9.72E-03	5.90E-03	-1.38E-01	-2.56E-03	-5.26E-01
GWP-fossil	[kg CO_2-Eq.]	5.75E-01	4.89E-04	0.00E+00	8.68E-04	1.74E-01	9.71E-03	6.10E-03	-1.38E-01	-2.54E-03	-5.24E-01
GWP-biogenic	[kg CO_2-Eq.]	-5.53E-03	5.90E-03	0.00E+00	-1.48E-06	8.56E-06	9.73E-06	-2.05E-04	-1.47E-04	-1.07E-05	-1.83E-03
GWP-luluc	[kg CO_2-Eq.]	3.61E-04	4.51E-07	0.00E+00	7.04E-06	3.90E-06	4.24E-06	5.77E-06	-5.20E-05	-3.29E-06	-1.33E-04
ODP	[kg CFC11-Eq.]	5.55E-14	1.96E-18	0.00E+00	1.04E-19	3.99E-17	6.36E-17	1.44E-17	-5.00E-16	-3.95E-17	-1.37E-15
AP	[mol H^+-Eq.]	1.03E-03	2.20E-06	0.00E+00	3.05E-06	5.16E-05	8.27E-06	2.01E-05	-2.63E-04	-2.81E-06	-6.28E-04
EP-freshwater	[kg PO_4-Eq.]	9.11E-07	4.80E-10	0.00E+00	2.64E-09	6.99E-09	7.80E-09	1.04E-06	-1.03E-07	-5.39E-09	-4.16E-07
EP-marine	[kg N-Eq.]	2.69E-04	7.66E-07	0.00E+00	1.39E-06	1.59E-05	2.01E-06	4.56E-06	-6.13E-05	-9.09E-07	-2.05E-04
EP-terrestrial	[mol N-Eq.]	2.61E-03	1.03E-05	0.00E+00	1.56E-05	2.45E-04	2.42E-05	5.00E-05	-6.62E-04	-9.70E-06	-1.84E-03
POCP	[kg NMVOC-Eq.]	7.69E-04	1.93E-06	0.00E+00	2.71E-06	4.15E-05	5.43E-06	1.47E-05	-1.92E-04	-2.44E-06	-5.66E-04
ADPE	[kg Sb-Eq.]	5.41E-06	3.28E-11	0.00E+00	6.23E-11	5.66E-10	8.38E-10	4.20E-10	-1.11E-08	-5.56E-10	-5.67E-08
ADPF	[MJ]	9.85E+00	2.94E-03	0.00E+00	1.16E-02	4.54E-02	5.13E-02	8.69E-02	-1.78E+00	-3.65E-02	-1.01E+01
WDP	[m^3 world-Eq deprived]	-1.46E-03	7.65E-04	0.00E+00	7.77E-06	1.77E-02	1.32E-03	-2.22E-05	-6.07E-03	-2.93E-05	1.09E-02

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water use

RESULTS OF THE LCA - RESOURCE USE according to EN 15804+A2: 1 m² ETICS system (141-160 mm)

Indicator	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
PERE	[MJ]	9.41E-01	5.10E-04	0.00E+00	6.51E-04	9.43E-03	2.23E-02	6.43E-03	-2.16E-01	-9.25E-03	-3.30E-01
PERM	[MJ]	1.45E-02	-1.45E-02								
PERT	[MJ]	9.41E-01	5.10E-04	0.00E+00	6.51E-04	9.43E-03	2.23E-02	6.43E-03	-2.16E-01	-9.25E-03	-3.30E-01
PENRE	[MJ]	9.85E+00	2.94E-03	0.00E+00	1.16E-02	4.54E-02	5.13E-02	8.69E-02	-1.79E+00	-3.65E-02	-1.01E+01
PENRM	[MJ]	2.59E+00	-6.14E-04			-2.59E+00					
PENRT	[MJ]	9.85E+00	2.94E-03	0.00E+00	1.16E-02	4.54E-02	5.13E-02	8.69E-02	-1.79E+00	-3.65E-02	-1.01E+01
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	1.22E-03	1.81E-05	0.00E+00	7.53E-07	4.18E-04	4.19E-05	2.32E-06	-3.39E-04	-5.04E-06	-8.63E-04

Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES according to EN 15804+A2: 1 m² ETICS system (141-160 mm)

Indicator	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D
HWD	[kg]	8.33E-09	3.51E-11	0.00E+00	5.39E-10	8.43E-11	2.38E-11	3.78E-10	-9.05E-10	-1.92E-11	-2.80E-09
NHWD	[kg]	6.59E-03	1.29E-04	0.00E+00	1.77E-06	3.68E-03	1.81E-04	1.05E-01	-1.40E-03	-1.73E-05	-2.37E-03
RWD	[kg]	1.49E-04	6.83E-08	0.00E+00	1.43E-08	1.36E-06	7.57E-06	1.05E-06	-8.07E-05	-1.34E-06	-4.89E-05
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.94E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	8.14E-03	0.00E+00	0.00E+00	2.91E-01	1.15E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	1.87E-02	0.00E+00	0.00E+00	6.68E-01	2.65E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² ETICS system (141-160 mm)

Indicator	Unit	A1-A3	A5	C1	C2	C3/1	C3/2	C4	D/1	D/2	D/3
PM	[Disease Incidence]	8.04E-09	1.26E-11	0.00E+00	1.67E-11	2.85E-10	6.35E-11	2.04E-10	-2.97E-09	-2.12E-11	-4.00E-09
IR	[kBq U235-Eq.]	1.28E-02	6.27E-06	0.00E+00	2.07E-06	1.23E-04	1.24E-03	1.46E-04	-1.37E-02	-1.21E-04	-4.41E-03
ETP-fw	[CTUe]	4.97E+00	1.57E-03	0.00E+00	8.18E-03	1.76E-02	2.19E-02	8.32E-02	-3.41E-01	-6.42E-03	-5.60E+00
HTP-c	[CTUh]	2.11E-10	6.74E-14	0.00E+00	1.71E-13	1.80E-12	6.57E-13	4.09E-12	-1.04E-10	-3.59E-13	-1.39E-10
HTP-nc	[CTUh]	6.34E-09	2.88E-12	0.00E+00	1.02E-11	1.13E-10	2.58E-11	3.40E-10	-7.93E-10	-1.48E-11	-5.79E-09
SQP	[-]	1.69E+00	9.05E-04	0.00E+00	4.06E-03	1.26E-02	1.63E-02	6.80E-03	-1.56E-01	-8.18E-03	-2.97E-01

Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans; HTP-nc = Potential comparative Toxic Unit for humans; SQP = Potential soil quality index

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 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 fossil resources”, “abiotic depletion potential for non-fossil resources”, “water (user) deprivation potential”, “deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans - cancer effects”, “potential comparative toxic unit for humans – non-cancer effects”, “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.

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