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ECO PLATFORM EPD VERIFIED

Owner: Alfix A/S
No.: MD-24075-EN
Issued: 16-05-2024
Valid to: 16-05-2029

3rd PARTY **VERIFIED**

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | **ISO 14025 & EN 15804**

Owner of declaration
Alfix A/S
H.C. Ørsteds Vej 13
6000 Kolding, Denmark.
VAT: 76443815

Programme
EPD Danmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

Declared product(s)
ProFix Plus flexible dust-reduced tile mortar

Number of declared datasets/product variations: 1

Production site
H.C. Ørsteds Vej 13
6000 Kolding, Denmark

Product(s) use
The ProFix Plus mortar can be used to attach tiles, clinker, mosaic, granite ceramics, or natural stones (not sensitive to moisture) to a substrate.

Declared/ functional unit
1 kg flexible dust-reduced tile mortar

Year of production site data (A3)
2023

EPD version
First

Issued: 16-05-2024
Valid to: 16-05-2029

Basis of calculation
This EPD is developed in accordance with the European standard EN 15804+A2.

Comparability
EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

Validity
This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

Use
The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

EPD type
☐Cradle-to-gate with modules C1-C4 and D
☒Cradle-to-gate with options, modules C1-C4 and D
☐Cradle-to-grave and module D
☐Cradle-to-gate
☐Cradle-to-gate with options

CEN standard EN 15804 serves as the core PCR

Independent verification of the declaration and data, according to EN ISO 14025

☐ internal ☒ external

Third party verifier:

Guangli Du, Aalborg University

Martha Katrine Sørensen
EPD Danmark

Life cycle stages and modules (MND = module not declared)																
Product			Construction process		Use							End of life				Beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Product information

Product description

The general composition of the mortar recipe for Alfix's ProFix Plus is shown in the table below. Due to confidentiality reasons, they are specified in ranges and some minor components are not shown. The materials are mixed at a dry state and the mortar sold as a powder. Water is added just before use at the installation site.

Material	Weight-% of declared product
Cement	40-50%
Quartz sand	40-50%
Other fillers	5-10%
Redispersible powder	1-10%
Others*	<1-5%

*Others represent specified constituents.

Product packaging:

The dry mortar is packed in paper bags with an inner layer of low amounts of recycled plastic, stacked on pallets and wrapped with a plastic foil. The composition of the sales- and transport packaging of the product is shown in the table below.

Material	Weight of packaging material (kg)	Weight-% of packaging
Paper	0,0068	18%
Recycled Polyethylene	0,0007	2%
Polyethylene foil	0,0004	1%
EUR-Pallet	0,0266	79%
Total	0,0339	100%

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of ProFix Plus mortar on the production site located in Kolding, Denmark. Product specific data are based on average values collected in the period 2023. Background data are based on Ecoinvent 3.9.1 databases and are less than 10 years old. Generally, the used background datasets are of good quality, and the majority of the datasets are only a couple of years old.

The products are manufactured and sold in Denmark. Therefore, a Danish installation and EoL scenario is included, and the geographical region covered is Denmark.

The installation phase of the mortar can vary slightly from project to project mostly depending on the substrate. Therefore, a representative scenario was chosen for consumption of materials and energy during installation and transport to construction site.

Hazardous substances

The product does not contain substances listed in the "Candidate List of Substances of Very High Concern for authorisation"

(http://echa.europa.eu/candidate-list-table)

Product(s) use

The mortar can be used to attach tiles, clinker, mosaic, granite ceramics, or natural stones (not sensitive to moisture) to a substrate.

Essential characteristics

ProFix Plus covered by harmonised technical specification DS/EN 12004 - DS/EN 12002. Declaration of performance according to EU regulation 305/2011 is available for all declared product variations.

Further technical information can be obtained by contacting the manufacturer or on the manufacturer's website:

https://www.alfix.com/da

Reference Service Life (RSL)

The reference service life is not defined as the use-phase is not included in the study.

Picture of product

Figure 1: ProFix Plus packed in paper bag.

LCA background

Declared unit

The LCI and LCIA results in this EPD relate to the declared unit of 1 kg dry mortar as stated in the table below.

Name	Value	Unit
Declared unit	1	kg
Density	1300	kg/m^3
Conversion factor to 1 kg.	1	-

Functional unit

Not defined.

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and EN 16757:2022 "Sustainability of construction works – Environmental product declarations – Product Category Rules for concrete and concrete elements"

Guarantee of Origin – certificates

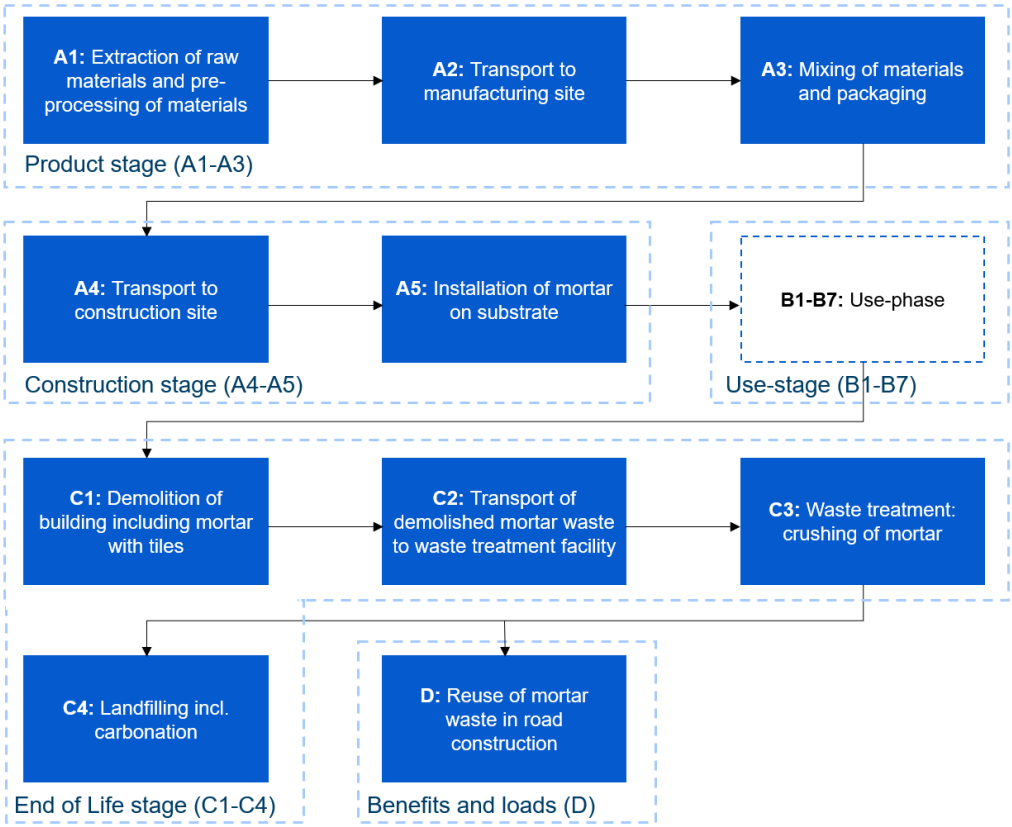
Foreground system:

The product is produced using wind energy covered by a GO certificate for 100% of Alfix electricity consumption on site. Furthermore, biogas is purchased for heat production.

Background system:

Upstream processes are modelled using consumption mix. Downstream processes are modelled using residual grid mix.

Flow diagram



System boundary

This EPD is based on a cradle-to-gate LCA, in which 100 %-weight of the product has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

Allocation is performed in accordance with EN 15804 and EN 16757. Energy, water and gas used at the production site as well as waste from the production facility is allocated based on mass (production volume).

Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials
A2 – Transport to the production site
A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the ”end-of-waste” state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

The raw materials for the mortar recipe are transported to the production facility in Kolding. There, they are mixed resulting in a dry powder. They powder is further packed into paper bags and loaded on pallets to be transported to the installation site.

Construction process stage (A4-A5) includes:

A representative scenario was chosen to cover the installation and construction stage. In this scenario, the packed mortar is transported 264 km to the construction site. The distance is defined by Alfix as a representative scenario for their customers. On the construction site, the mortar is mixed with water in an agitator and applied on a cement surface. No pretreatment or primer is needed before the application. Tiles are attached by hand on the mortar while it is still wet.

End of Life (C1-C4) includes:

At the End-of-Life stage, the mortar attached to the tiles is demolished, and excavated (C1). Next, the mortar is transported to landfill or the waste processing site (C2) where it is crushed to gravel size (C3). This EPD assumes that 97% of the crushed concrete is recycled (D) and the remaining 3% is disposed in landfill (C4). At the disposal of concrete waste on landfill, carbonation in module C4 is considered, complying with EN 16757:2022.

Re-use, recovery and recycling potential (D) includes:

The End-of-Life phase is assessed following a conservative approach. Thus, in module (D), the crushed concrete is being used as road filling as a substitution for gravel. It is assumed that 1 kg crushed mortar can replace 1 kg gravel for road filling.

LCA results

ENVIRONMENTAL IMPACTS PER [kg]										
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	4,45E-01	4,93E-02	3,13E-03	MND	1,40E-03	1,48E-02	1,10E-03	6,25E-05	-6,53E-03
GWP-fossil	kg CO_2 eq.	4,63E-01	4,93E-02	3,12E-03	MND	1,40E-03	1,48E-02	1,10E-03	6,23E-05	-6,39E-03
GWP-biogenic	kg CO_2 eq.	-1,84E-02	4,51E-05	2,35E-06	MND	1,43E-06	1,35E-05	1,04E-06	1,04E-07	-1,35E-04
GWP-luluc	kg CO_2 eq.	1,75E-04	2,43E-05	8,63E-07	MND	3,04E-07	7,30E-06	2,25E-07	1,10E-07	-4,03E-06
ODP	kg CFC 11 eq.	4,17E-08	1,07E-09	6,15E-11	MND	1,01E-10	3,22E-10	7,12E-11	5,28E-12	-1,21E-10
AP	mol H^+ eq.	1,49E-03	1,08E-04	1,20E-05	MND	8,32E-06	3,23E-05	7,01E-06	1,37E-06	-4,23E-05
EP-freshwater	kg P eq.	5,43E-05	3,50E-06	1,22E-06	MND	7,66E-08	1,05E-06	5,91E-08	1,52E-08	-9,63E-07
EP-marine	kg N eq.	2,92E-04	2,72E-05	2,55E-06	MND	2,81E-06	8,15E-06	2,54E-06	5,27E-07	-1,39E-05
EP-terrestrial	mol N eq.	3,12E-03	2,76E-04	2,63E-05	MND	2,87E-05	8,28E-05	2,64E-05	5,65E-06	-1,71E-04
POCP	kg NMVOC eq.	1,19E-03	1,67E-04	8,11E-06	MND	1,48E-05	5,02E-05	1,21E-05	1,97E-06	-4,93E-05
ADPm[1]	kg Sb eq.	2,14E-01	1,61E-07	2,14E-08	MND	8,57E-10	4,83E-08	6,48E-10	2,53E-10	-5,69E-08
ADPf[1]	MJ	6,30E+00	7,00E-01	4,95E-02	MND	6,20E-02	2,10E-01	4,38E-02	4,54E-03	-9,42E-02
WDP[1]	m^3 world eq. deprived	1,11E-01	2,88E-03	1,91E-02	MND	8,41E-05	8,65E-04	6,13E-05	2,01E-04	-1,04E-03
Caption	GWP-total = Global Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidifcation; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = water use									
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.									
Disclaimer	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.									

Additional environmental impacts, as declared in the project report of this EPD:

ADDITIONAL ENVIRONMENTAL IMPACTS PER [kg]										
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	1,69E-08	3,67E-09	1,53E-10	MND	1,54E-10	1,10E-09	1,43E-10	3,01E-11	-9,15E-10
IRP[2]	[kBq U235 eq.]	1,78E-02	9,47E-04	6,78E-04	MND	2,97E-05	2,84E-04	2,17E-05	2,88E-06	-9,37E-04
ETP-fw[1]	[CTUe]	3,66E+00	3,46E-01	9,58E-03	MND	2,69E-02	1,04E-01	1,90E-02	2,13E-03	-4,57E-02
HTP-c[1]	[CTUh]	2,22E-10	2,25E-11	1,44E-12	MND	5,64E-13	6,74E-12	4,57E-13	7,76E-14	-8,39E-12
HTP-nc[1]	[CTUh]	2,97E-09	4,97E-10	4,43E-11	MND	7,52E-12	1,49E-10	5,47E-12	9,71E-13	-8,89E-11
SQP[1]	-	3,03E+00	4,23E-01	1,26E-02	MND	3,56E-03	1,27E-01	2,54E-03	9,02E-03	-1,34E-01
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality									
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^2$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.									
Disclaimers	[1] The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. [2] 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.									

RESOURCE USE PER [kg]										
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	8,00E-01	8,31E-03	1,76E-03	MND	2,08E-04	2,49E-03	1,55E-04	2,75E-05	-1,42E-02
PERM	[MJ]	2,13E+00	2,71E-03	1,27E-03	MND	4,80E-05	8,12E-04	3,60E-05	1,13E-05	-4,01E-03
PERT	[MJ]	2,93E+00	1,10E-02	3,03E-03	MND	2,56E-04	3,31E-03	1,91E-04	3,89E-05	-1,82E-02
PENRE	[MJ]	6,32E+00	7,00E-01	4,94E-02	MND	6,20E-02	2,10E-01	4,38E-02	4,54E-03	-9,42E-02
PENRM	[MJ]	2,94E+00	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	9,26E+00	7,00E-01	4,94E-02	MND	6,20E-02	2,10E-01	4,38E-02	4,54E-03	-9,42E-02
SM	[kg]	1,08E-01	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	1,03E-01	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	1,73E-01	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	3,12E-03	1,01E-04	4,93E-04	MND	3,34E-06	3,02E-05	2,43E-06	4,82E-06	-3,65E-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 = Net use of fresh water									
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^{2}$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.									

WASTE CATEGORIES AND OUTPUT FLOWS PER [kg]										
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1-B7**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	4,59E-03	4,45E-06	1,11E-07	MND	4,11E-07	1,34E-06	2,90E-07	2,41E-08	-6,05E-07
NHWD	[kg]	1,81E-01	3,48E-02	7,16E-03	MND	4,52E-05	1,04E-02	3,48E-05	3,00E-02	-3,51E-03
RWD	[kg]	8,22E-06	2,30E-07	1,71E-07	MND	6,87E-09	6,90E-08	5,04E-09	6,71E-10	-2,13E-07
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	0,01E+00	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	9,70E-01	0,00E+00	0,00E+00
MER	[kg]	0,00E+00	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	MND	0,00E+00	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; EET = Exported thermal energy									
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: $1,95*10^{2}$ or 195, while 1,12E-11 is the same as $1,12*10^{-11}$ or 0,0000000000112.									

BIOGENIC CARBON CONTENT PER [kg]		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0,004
Biogenic carbon content in accompanying packaging	[kg C]	0,003
Note		1 kg biogenic carbon is equivalent to 44/12 kg of CO_2

Additional information

LCA interpretation

The raw material extraction and processing (A1) module is dominating the impact results across all core environmental indicators. This is linked to the production of cement for the mortar recipe. The second most impactful module is the transport of the product to the construction site (A4).

Technical information on scenarios

Transport to the building site (A4) per kg mortar

Scenario information	Value	Unit
Fuel type	Diesel mix	-
Vehicle type	Truck-trailer, Euro 6 (16-32 t total cap., average load factor 5.8t)	-
Transport distance	264	km
Capacity utilisation (including empty runs)	-	%
Average load factor	5,8	ton
Gross density of products transported	1250	kg/m^3

Installation of the product in the building (A5) per kg mortar

Scenario information	Value	Unit
Tap water for mixing and cleaning	0,0004	m^3
Electricity for mixing	0,0043	kWh
Mortar waste	1	%

End of life (C1-C4) per kg mortar

Scenario information	Value	Unit
Collected separately	-	kg/kg
Collected with mixed waste	-	kg/kg
For reuse	-	kg/kg
For recycling (97% for road filling)	0,97	kg/kg
For energy recovery	-	kg/kg
For final disposal (3% for landfill)*	0,03	kg/kg
Assumptions for scenario development	-	As appropriate

*During landfill carbonation takes place where a conservative scenario considering an uptake of 5 kg-CO_2e/m^3 is included, according to En 16757 and the products in scope.

Re-use, recovery and recycling potential (D) per kg mortar

Scenario information/Materiel	Value	Unit
Substitution of gravel for road filling	0,97	Kg/kg

Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.1.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.2.

References

Publisher	www.epddanmark.dk Template version 2023.1
Programme operator	Danish Technological Institute Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	Nele Teutloff Charlotte Merlin FORCE Technology Park Allé 345 2605 Brøndby www.forcetechnology.com
LCA software /background data	Ecoinvent 3.9.1 (www.ecoinvent.org)
3rd party verifier	Guangli Du Aalborg University A.C. Meyers Vænge 15 2450 København SV www.aau.dk

General programme instructions
General Programme Instructions, version 2.0, spring 2020
www.epddanmark.dk

EN 15804
DS/EN 15804 + A2:2019 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

EN 16757
EN 16757:2022 "Sustainability of construction works – Environmental product declarations – Product Category Rules for concrete and concrete elements"

EN 15942
DS/EN 15942:2021 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

ISO 14025
DS/EN ISO 14025:2010 – " Environmental labels and declarations – Type III environmental declarations – Principles and procedures"

ISO 14040
DS/EN ISO 14040:2008 – ” Environmental management – Life cycle assessment – Principles and framework”

ISO 14044
DS/EN ISO 14044:2008 – ” Environmental management – Life cycle assessment – Requirements and guidelines”