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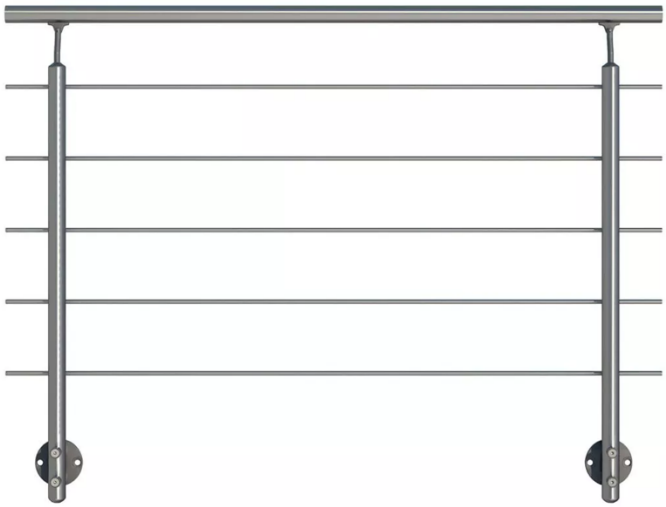
ECO PLATFORM EPD VERIFIED

Owner: Dolle A/S
No.: MD-23234-EN
Issued: 24-09-2024
Valid to: 24-09-2029

3rd PARTY **VERIFIED**

EPD

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



Owner of declaration
Dolle A/S
Vestergade 47, 7741 Frøstrup,
Denmark
69395015

Programme
EPD Danmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

Declared product(s)
Balustrade CLEAN KIT

Number of declared datasets/product variations: 1

Production site
Dolle Suzhou Industrial Company
32, Yongfang Rd. Huangqiao Town
Xiangcheng District, 215144 Suzhou, Jiangsu
China

There has been no use of green electricity or biogas is used in A3 (production)]

Product(s) use
Modern balustrade CLEAN kit made of aluminum with stainless steel fillings. Weather-resistant for both indoors and outdoors. Can be used for a variety of balustrades - for patios, stairs, balconies or parapets with the option of both wall or floor mounted posts.

Declared/ functional unit
The declared unit is one product as delivered to the customer, including packaging.

1 unit = 1.5 meter banister with a lifespan of 30 years.

Year of production site data (A3)
2022

EPD version
Version 1

Issued: 24-09-2024
Valid to: 24-09-2029

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:

Charlotte B. Merlin

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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Product information

Product description

The main product components are shown in the table below.

Material	Weight-% of declared product
Metal	90,8
Plastic	1,7

Product packaging:

The composition of the sales- and transport packaging of the product is shown in the table below.

Material	Weight-% of packaging
Cardboard/paper	69,1
Plastic	30,9

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of Balustrade CLEAN KIT on the production site located in Jiangsu, China. Product specific data are based on average values collected in the period 2022. Background data are based on Ecoinvent v3.8 Cut-off U. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

The geographical representativity of the data is mainly from the specific areas when possible. If not available, more general geography like Europe, Global or Rest-of-World has been used.

Hazardous substances

Balustrade CLEAN KIT does not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation". Declaration by the manufacturer signed: 02.02.2024.

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

Essential characteristics

Handrail banister with stainless steel fillings, made from high quality aluminium its fully weather resistant. Each pack is 150 cm in length, they can be joined together and cut to size.

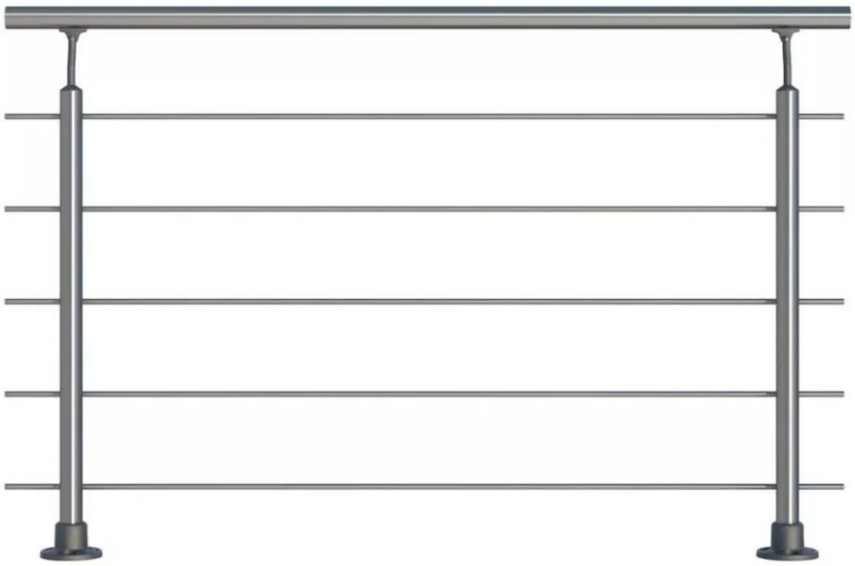
Further technical information can be obtained by contacting the manufacturer or on the manufacturers website:

www.dolle.com

Reference Service Life (RSL)

The lifespan of the Balustrade CLEAN KIT is assessed to be 30 years, this is based on technical assessment from Dolle A/S R&D and the experience and feedback from the Dolle distributors.

Picture of product(s)



LCA background

Declared unit

In this LCA, the packaging for the product is included in the scope and analyzed in accordance. The packaging constitutes 0.55 kilo of packaging materials and the banister itself constitutes a total of 6.71 kilo of material.

No conversion factor is included since the EPD is for a specific product and only the EPD content of that product has been verified and may be considered EPD information.

Name	Value	Unit
Declared unit	1,5	meter
Grammage/density	4,85	Kg/m
Conversion factor to 1 kg.	0,1376	-

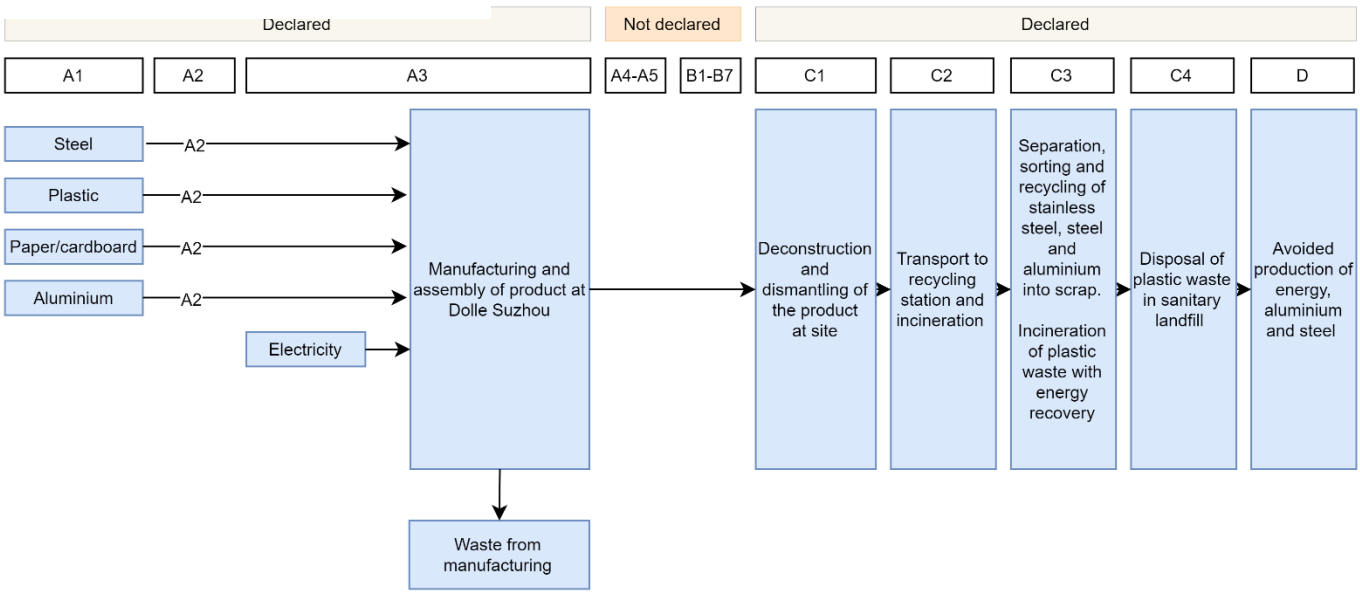
Functional unit

Not defined

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804, and CONSTRUCTION PRODUCTS PCR 2019:14 VERSION 1.3.1

Flowdiagram



Guarantee of Origin – certificates

Foreground system:

All energy used in production is using Chinese residual mix for Jiangsu Region

Background system:

Upstream processes are modelled using the national grid mix of the supplier in China. Downstream processes are modelled using the national grid mix

System boundary

This EPD is based on a cradle-to-gate with modules C1-C4 and D LCA, in which 99,86 weight-% 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.

The glue to be used when connecting the kit/handrail has not been included, since it has fallen under the cut-off criteria of 1% cumulative mass and has no significant environmental impact.

Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

In A2 the transport of materials and subcomponents from suppliers within 500 km of the manufacturing site is declared. Transport to Europe and any intermediate storage is not included, as it is part of A4 and not declared.

A3 – Manufacturing processes

The product life cycle encompasses the acquisition of all raw materials, components, and energy, transportation to production sites, packaging, and waste processing until the waste ceases to be waste or is finally disposed of.

In A1 the raw material phase, the plastic, aluminium, steel and packaging subcomponents and materials for the CLEAN Banister are produced.

In A2 the transport of materials and subcomponents from suppliers within 500 km of the manufacturing site is declared.

In A3 the manufacturing phase, the production of banisters takes place. The manufacturing process includes automated assembly lines, welding, metal work and packaging in boxes. Most of the production is assembly of components that are delivered from suppliers. A range of products are being assembled and manufactured at the factory. This includes staircases and other banister models.

Construction process stage (A4-A5) includes:

Not declared

Use stage (B1-B7) includes:

Not declared

End of Life (C1-C4) includes:

The EPD is intended for the Danish market, and as such, the banisters are considered disposed of in Denmark. The end-of-life scenario is modelled with reference to the Danish market.

The dismantling/removal of the banisters is primarily a manual process, although commonly available hand tools such as an electric screwdriver may be used. Any potential electricity consumption is assessed to be negligible, and it is not assumed that a lift is used to remove the banisters. Therefore, no activities are included in C1.

In C2, the product is transported from the site to the municipal recycling station. This is 10 km away. After sorting at the recycling station, the material fractions are transported 50 kilometers to the place of final recycling or incineration. Here it is processed to the end-of-waste-state.

In C3 waste processing, 100% of the steel and aluminium components will be separated, sorted, and recycled according to current law at a local waste facility/recycling station. 98% of the plastic components will be incinerated with energy recovery.

In C4 the remaining 2% of the plastic components will end up in a sanitary landfill.

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

For recycled materials only steel and aluminum is considered for primary material. Materials that are incinerated with energy recovery at end-of-life displace the average European electricity mix and heat.

LCA results

ENVIRONMENTAL IMPACTS PER DECLARED UNIT							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	1,23E+02	0,00E+00	5,22E-02	5,70E-01	0,00E+00	-2,74E+01
GWP-fossil	[kg CO_2 eq.]	1,23E+02	0,00E+00	5,21E-02	3,97E-01	0,00E+00	-2,73E+01
GWP-biogenic	[kg CO_2 eq.]	1,18E-02	0,00E+00	5,07E-05	1,73E-01	0,00E+00	-6,30E-03
GWP-luluc	[kg CO_2 eq.]	3,92E-02	0,00E+00	2,08E-05	1,57E-04	0,00E+00	-6,40E-02
ODP	[kg CFC 11 eq.]	3,75E-06	0,00E+00	1,22E-08	2,10E-08	0,00E+00	-1,10E-06
AP	[mol H^+ eq.]	7,47E-01	0,00E+00	2,13E-04	1,08E-03	0,00E+00	-1,66E-01
EP-freshwater	[kg P eq.]	2,97E-03	0,00E+00	3,78E-07	6,14E-06	0,00E+00	-9,24E-04
EP-marine	[kg N eq.]	1,27E-01	0,00E+00	6,33E-05	3,70E-04	0,00E+00	-2,70E-02
EP-terrestrial	[mol N eq.]	1,39E+00	0,00E+00	6,99E-04	3,32E-03	0,00E+00	-3,02E-01
POCP	[kg NMVOC eq.]	4,03E-01	0,00E+00	2,20E-04	9,18E-04	0,00E+00	-9,55E-02
ADPm[1]	[kg Sb eq.]	4,65E-04	0,00E+00	1,69E-07	4,95E-06	0,00E+00	-3,63E-04
ADPf[1]	[MJ]	1,12E+03	0,00E+00	7,97E-01	2,07E+00	0,00E+00	-2,62E+02
WDP[1]	[m^3 world eq. deprived]	1,66E+01	0,00E+00	2,63E-03	3,45E-02	0,00E+00	-6,28E+00
Caption	GWP-total = Globale 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 depletion potential						
	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, may be declared in this EPD:

ADDITIONAL ENVIRONMENTAL IMPACTS PER DECLARED UNIT							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	1,07E-05	0,00E+00	5,09E-09	1,67E-08	0,00E+00	-2,17E-06
IRP[2]	[kBq U235 eq.]	1,42E+00	0,00E+00	3,46E-03	1,09E-02	0,00E+00	-4,19E-01
ETP-fw[1]	[CTUe]	3,76E+03	0,00E+00	6,31E-01	1,52E+01	0,00E+00	-7,93E+02
HTP-c[1]	[CTUh]	3,33E-07	0,00E+00	1,98E-11	3,14E-10	0,00E+00	-6,08E-08
HTP-nc[1]	[CTUh]	2,55E-06	0,00E+00	6,70E-10	6,03E-09	0,00E+00	-6,90E-07
SQP[1]	-	3,34E+02	0,00E+00	7,00E-01	6,56E+00	0,00E+00	-6,94E+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 (dimensionless)						
	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 DECLARED UNIT							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	8,48E+01	0,00E+00	1,13E-02	2,01E-01	0,00E+00	2,77E+01
PERM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	[MJ]	8,48E+01	0,00E+00	1,13E-02	2,01E-01	0,00E+00	2,77E+01
PENRE	[MJ]	1,17E+03	0,00E+00	8,46E-01	5,26E+00	0,00E+00	2,79E+02
PENRM	[MJ]	8,51E+00	0,00E+00	0,00E+00	-3,06E+00	0,00E+00	0,00E+00
PENRT	[MJ]	1,18E+03	0,00E+00	8,46E-01	2,19E+00	0,00E+00	2,79E+02
SM	[kg]	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
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m^3]	4,44E-01	0,00E+00	9,51E-05	1,37E-03	0,00E+00	-2,17E-01
	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 DECLARED UNIT							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	7,48E-03	0,00E+00	2,02E-06	5,46E-06	0,00E+00	-1,00E-02
NHWD	[kg]	2,90E+01	0,00E+00	5,50E-02	1,55E-01	0,00E+00	-6,37E+00
RWD	[kg]	1,58E-03	0,00E+00	5,38E-06	1,28E-05	0,00E+00	-4,53E-04
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	3,20E-01	0,00E+00	0,00E+00	6,62E+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
EEE	[MJ]	0,00E+00	0,00E+00	0,00E+00	7,56E-01	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	2,27E+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 DECLARED UNIT		
Parameter	**Unit**	**At the factory gate**
Biogenic carbon content in product	[kg C]	0
Biogenic carbon content in accompanying packaging	[kg C]	0,165
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO_2	

Additional information

LCA interpretation

As the product consists of more than 90% metals, phase A1 appears with a relatively high climate impact. The production of aluminum in China, is accounting for 102 kg CO2eq. Being the main single negative impact associated with production and manufacturing.
The manufacturing process of the banister at Dolle Suzhou, contributes with <1 kg CO2eq. emission related to the energy consumption in the production. Constituting 1 % of the total impact of climate change.

The amount of biogenic carbon taken up in A1 from the packaging material is emitted in A5 installation of the product. This consist of 0,605 kg CO2 as declared in the table above.

Technical information on scenarios

The product is transported from the site to the municipal recycling station. This is 10 km away. After sorting at the recycling station, the material fractions are transported 50 kilometers to the place of final recycling or incineration. Here it is processed to the end-of-waste-state.

Recycled in fractions (100%)

Scenario information	Value	Unit
Aluminium waste for recycling	4,04	kg
Steel waste for recycling	2,58	kg

Waste for municipal incineration (98%)

Scenario information	Value	Unit
Plastic waste	0,09	kg

Waste for sanitary landfill (2%)

Scenario information	Value	Unit
Plastic waste	0,0018	kg

Transport to treatment facility

Scenario information	Value	Unit
Transport by truck	60	km
Amount of material in total	6,71	kg

Re-use, recovery and recycling potential (D)

Scenario information/Materiel	Value	Unit
Avoided electricity production	0,608	MJ
Avoided heat production	1,82	MJ
Avoided aluminium production	3,83	kg
Avoided steel production	2,37	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 Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	**Strandet APS** www.strandet.io Vesterhavsgade 22, Nørre Vorupør 7700 Thisted Julie Müller & Anton Malmkjær Møller Julie@strandet.io Phone.: +4530231734
LCA software /background data	**Ecochain Mobius** *EN 15804+A2 Method (Ecoinvent v 3.8 Cut-Off)*
3rd party verifier	**FORCE Technology** Park Allé 345 2605 Brøndby Charlotte B. Merlin Senior Team Leader Phone: +45 43 25 00 00 Mobile: +45 42 62 78 56 e-mail: chme@forcetechnology.com www:forcetechnology.com

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"

PCR 2019:14 VERSION 1.3.1
Construction Products

EN 15942
DS/EN 15942:2011 – " 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"