

Owner: Dolle A/S
No.: MD-23233-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



Issued:
 24-09-2024

Valid to:
 24-09-2029

Programme
 EPD Danmark
www.epddanmark.dk



- Industry EPD
- Product EPD

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

Declared product(s)
 Modular staircase Graz

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
 Space saving and flexible staircase with paddle steps. The stair can be used both as straight flight, quarter turn or rotated kit staircase.

Declared/ functional unit
 The declared unit is one staircase with 12 steps as delivered to the customer including packaging.
 1 declared unit = 1 complete staircase with a lifespan of 30 years.

Year of production site data (A3)
 2022

EPD version
 Version

CEN standard EN 15804 serves as the core PCR
Independent verification of the declaration and data, according to EN ISO 14025
<input type="checkbox"/> internal <input checked="" type="checkbox"/> 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
Wood	15,5
Metal	77
Plastic	0,2

Product packaging:

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

Material	Weight-% of packaging
Wooden pallet	94,6
Cardboard/paper	5,4

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of modular staircase Graz 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 and are less than 10 years old. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

Hazardous substances

Modular staircase Graz does not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation"

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

Essential characteristics

Space saving and flexible staircase with paddle steps. The stair can be used both as straight flight, quarter turn or rotated kit staircase. Comes with grey spray-painted metal pipes with 12 treads in varnished beech.

The total weight of the Graz staircase as delivered to the customer is 87.79 kg

The stairs are certified for max. point load of 200 kg and max. total load of 560 kg.

The handrail is approved for a horizontal load of 50 kg/metre.

The stairs thereby comply with current European building standards defined in EN 1991 and EN 1993.

The maximum height of the stairs is 270 cm. The step rise is 18.5 – 22.5 cm, depending on which setup you choose. Screws for mounting at the top of the stairs are not included and must be purchased separately.

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

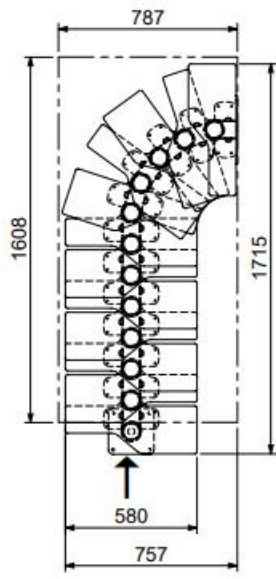
www.dolle.com

Reference Service Life (RSL)

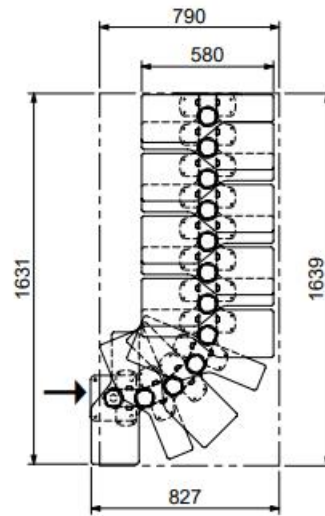
The lifespan of the staircase Graz is assessed to be 30 years, this is based on technical assessment from Dolle A/S R&D and the experience and feedback from the Dolle distributors.

Picture of product(s)

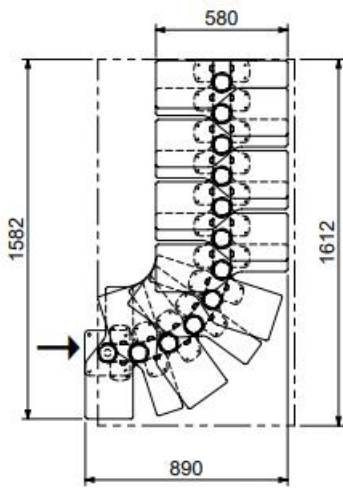
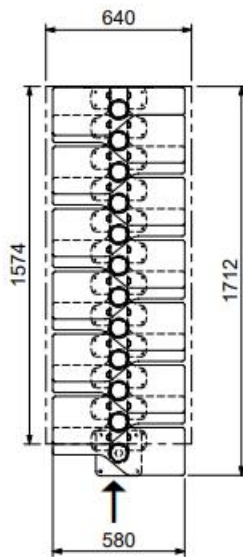




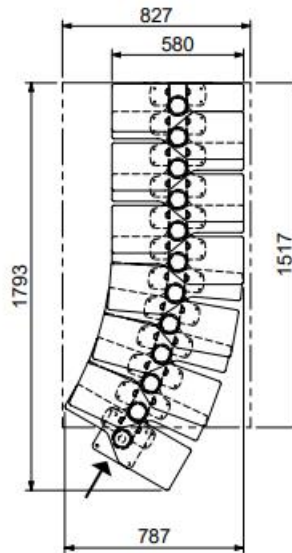
$\frac{1}{4} \varnothing 18^\circ$



$\frac{1}{4} \varnothing 22,5^\circ$



$\frac{1}{4} \varnothing 18^\circ$



$\varnothing 5^\circ$

68540_GR2 / 17-05-2011 Rev.18-10-2018

LCA background

Declared unit

this LCA, the packaging for the product is included in the scope and analyzed in accordance. The packaging constitutes 6.35 kg of packaging materials and the staircase itself constitutes a total of 81.45 kilo of material.

Name	Value	Unit
Declared unit	1	product
Grammage/density	87,79	Kg
Conversion factor to 1 kg.	0,01139	-

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

Guarantee of Origin – certificates

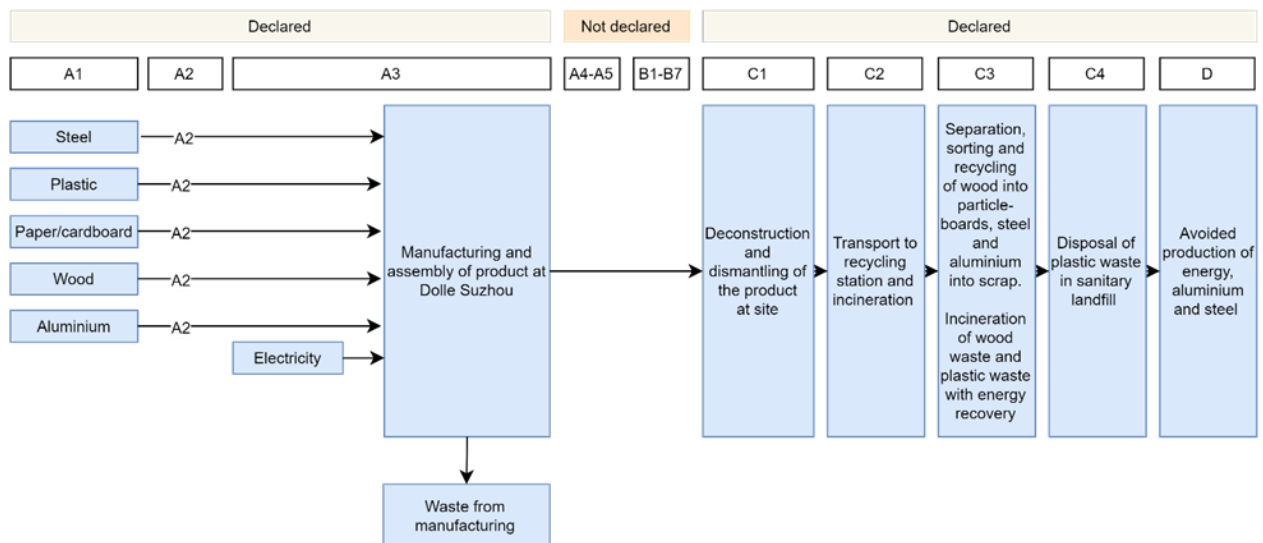
Foreground system:

All energy used in production is using Chinese residual mix

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

Flowdiagram



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.

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, wood and packaging subcomponents and materials for the GRAZ Modular Staircase 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 staircases takes place. The manufacturing process includes automated assembly lines, welding, metal work and packaging in boxes and pallets. 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 banisters and other staircase 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 staircase is considered disposed of in Denmark. The end-of-life scenario is modelled with reference to the Danish market.

The dismantling/removal of the staircase 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 staircase. 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 aluminum components will be separated, sorted, and recycled according to current law at a local waste facility/recycling station. 80% of the wooden steps will be recycled into wood chips for particleboard production. 98% of the plastic waste is incinerated with energy recovery along with the remaining 20% of the waste wood with 2% of which ends up as landfill.

In module C4, the remaining 2% of the plastic waste is disposed of in sanitary landfill, along with the 2% of the wood waste for incineration.

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	A1-3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	3,63E+02	0,00E+00	6,20E-01	9,31E+00	1,75E+00	-1,02E+02
GWP-fossil	[kg CO ₂ eq.]	3,82E+02	0,00E+00	6,19E-01	2,79E+00	0,00E+00	-1,21E+02
GWP-biogenic	[kg CO ₂ eq.]	-1,86E+01	0,00E+00	6,03E-04	6,51E+00	1,75E+00	1,82E+01
GWP-luluc	[kg CO ₂ eq.]	4,97E-01	0,00E+00	2,48E-04	1,90E-03	0,00E+00	-8,88E-02
ODP	[kg CFC 11 eq.]	2,26E-05	0,00E+00	1,44E-07	2,51E-07	0,00E+00	-5,31E-06
AP	[mol H ⁺ eq.]	1,76E+00	0,00E+00	2,53E-03	1,26E-02	0,00E+00	-5,30E-01
EP-freshwater	[kg P eq.]	1,57E-02	0,00E+00	4,50E-06	7,86E-05	0,00E+00	-5,11E-03
EP-marine	[kg N eq.]	3,83E-01	0,00E+00	7,53E-04	4,65E-03	0,00E+00	-1,06E-01
EP-terrestrial	[mol N eq.]	3,95E+00	0,00E+00	8,31E-03	3,92E-02	0,00E+00	-1,21E+00
POCP	[kg NMVOC eq.]	1,51E+00	0,00E+00	2,61E-03	1,10E-02	0,00E+00	-5,33E-01
ADPm ¹	[kg Sb eq.]	3,08E-03	0,00E+00	2,01E-06	5,24E-05	0,00E+00	-1,76E-03
ADPf ¹	[MJ]	4,39E+03	0,00E+00	9,48E+00	2,55E+01	0,00E+00	-1,20E+03
WDP ¹	[m ³ world eq. deprived]	9,84E+01	0,00E+00	3,12E-02	2,71E-01	0,00E+00	-2,68E+01
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 = Acidification; 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 PER DECLARED UNIT							
Parameter	Unit	A1-3	C1	C2	C3	C4	D
PM	[Disease incidence]	2,54E-05	2,54E-05	0,00E+00	6,05E-08	2,04E-07	0,00E+00
IRP ²	[kBq U235 eq.]	1,11E+01	1,11E+01	0,00E+00	4,11E-02	1,39E-01	0,00E+00
ETP-fw ¹	[CTUe]	1,63E+04	1,63E+04	0,00E+00	7,50E+00	2,09E+02	0,00E+00
HTP-c ¹	[CTUh]	1,18E-06	1,18E-06	0,00E+00	2,35E-10	3,91E-09	0,00E+00
HTP-nc ¹	[CTUh]	6,93E-06	6,93E-06	0,00E+00	7,96E-09	6,99E-08	0,00E+00
SQP ¹	-	5,24E+03	5,24E+03	0,00E+00	8,32E+00	7,06E+01	0,00E+00
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	A1-3	C1	C2	C3	C4	D
PERE	[MJ]	7,18E+02	0,00E+00	1,35E-01	2,61E+02	0,00E+00	-4,63E+02
PERM	[MJ]	3,72E+02	0,00E+00	0,00E+00	-2,59E+02	0,00E+00	2,59E+02
PERT	[MJ]	1,09E+03	0,00E+00	1,35E-01	2,45E+00	0,00E+00	-2,04E+02
PENRE	[MJ]	4,68E+03	0,00E+00	1,01E+01	3,45E+01	0,00E+00	-1,28E+03
PENRM	[MJ]	7,18E+00	0,00E+00	0,00E+00	-7,56E+00	0,00E+00	7,56E+00
PENRT	[MJ]	4,68E+03	0,00E+00	1,01E+01	2,70E+01	0,00E+00	-1,27E+03
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]	2,96E+00	0,00E+00	1,13E-03	1,34E-02	0,00E+00	-7,86E-01
Caption	<p>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</p> <p>The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10² or 195, while 1,12E-11 is the same as 1,12*10⁻¹¹ or 0,0000000000112.</p>						

WASTE CATEGORIES AND OUTPUT FLOWS PER DECLARED UNIT							
Parameter	Unit	A1-3	C1	C2	C3	C4	D
HWD	[kg]	7,28E-02	0,00E+00	2,41E-05	6,29E-05	0,00E+00	-9,58E-03
NHWD	[kg]	9,57E+01	0,00E+00	6,54E-01	2,05E+00	0,00E+00	-4,99E+01
RWD	[kg]	1,02E-02	0,00E+00	6,40E-05	1,60E-04	0,00E+00	-2,07E-03

CRU	[kg]	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	7,91E+01	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]	3,53E+00	3,53E+00	0,00E+00	0,00E+00	1,10E+01	0,00E+00
EET	[MJ]	1,06E+01	1,06E+01	0,00E+00	0,00E+00	3,29E+01	0,00E+00
Caption	<p>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</p> <p>The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10² or 195, while 1,12E-11 is the same as 1,12*10⁻¹¹ or 0,0000000000112.</p>						

BIOGENIC CARBON CONTENT PER DECLARED UNIT		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	6,002
Biogenic carbon content in accompanying packaging	[kg C]	2,8
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

Additional information

LCA interpretation

Since the product consists of 77% metal most of the impacts are made in the raw material phase A1 which accounts for 349 kg CO₂eq. The production of steel being the main single negative impact associated with production and manufacturing.

The amount of biogenic carbon taken up in A1 from the packaging material is emitted in A5 installation of the product. This consist of 10,33 kg CO₂ as declared in the table above.

Technical information on scenarios

It is assumed that 80-90% of the staircase will be transported 40 km to a waste facility where the various types of materials will be sorted, treated, and recycled according to current law. The last 10-20% of the staircases will be transported directly to incineration or a dumpsite.

Recycled in fractions

Scenario information	Value	Unit
Steel waste for recycling	67,63	kg
Wood waste for recycling (80%)	10,91	kg
Aluminium waste for recycling	0,58	kg

Waste for municipal incineration

Scenario information	Value	Unit
Wood waste (20%)	2,665	kg

Waste for sanitary landfill

Scenario information	Value	Unit
Wood waste (2%)	0,054	kg
Plastic waste (2%)	0,14	kg

Transport to treatment facility

Scenario information	Value	Unit
Transport by truck to sorting station	10	km
Transport by truck to recycling/incineration facility	50	km
Amount of material in total	81,45	kg

Re-use, recovery and recycling potential (D)

Scenario information/Materiel	Value	Unit
Avoided aluminium production	0,551	kg
Avoided steel production	52,23	kg
Avoided heat production	33,22	MJ
Avoided electricity production	3,07	kWh
Avoided particleboard production	0,01402	M ³



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 <small>Template version 2023.1</small>
Programme operator	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	 STRANDET 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 Ecochain Mobius <i>EN 15804+A2 Method (Ecoinvent v 3.8 Cut-Off)</i>
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"