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ECO PLATFORM EPD EN 15804 VERIFIED

Owner: Centrum Pæle A/S
No.: MD-21005-EN
Issued: 10-03-2021
Valid for: 10-03-2026

3rd PARTY **VERIFIED**

EPD

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

Owner of the Declaration
Centrum Pæle A/S
CVR: 27242561

Programme
EPD Denmark
www.epddanmark.dk

☐ Industry EPD
☒ Product EPD

Declared product
1 pile joint consisting of 2 coupling parties for the extension of foundation piles.

Number of declared data sets/product variations: 7
CPG-Box-2-235-0, with side length 23.5 cm and 2 locks
CPG-Box-4-250-0, with side length 25 cm and 4 locks
CPG-Box-4-270-0, with side length 27 cm and 4 locks
CPG-Box-4-300-0, with side length 30 cm and 4 locks
CPG-Box-4-350-0, with side length 35 cm and 4 locks
CPG-Box-4-400-0, with side length 40 cm and 4 locks
CPG-Box-4-450-0, with side length 45 cm and 4 locks

Number of additions: 3
Add or remove 1 locking device
Upgrade to Type 1
Upgrade to Type 2

Production location
Centrum Pæle's production location in Vejle.

Use of the product
Extension of foundation piles in concrete.

Declared/functional unit
Declared unit is 1 pile joint unit.

Reference year
2020

Issued
10-03-2021

Valid until:
10-03-2026

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
☒Cradle-to-gate with options
☐Cradle-to-grave

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:

Ninkie Bendtsen, Niras A/S

Henrik Fred Larsen
EPD Denmark

Life cycle stages and modules (MNR = module not relevant, MND = module not declared)																
Product			Construction process		Use							End of life				Outside 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	MND	MND	MND	MND	MND	MND	MND	MND	MNR	MNR	MNR	MNR	MNR

Product information

Product description

The main materials of the product are listed in the table below. These represent 100% (w/w) of the declared product.

Material	CPG-Box-2-235-0	CPG-Box-4-250-0	CPG-Box-4-270-0	CPG-Box-4-300-0	CPG-Box-4-350-0	CPG-Box-4-400-0	CPG-Box-4-450-0
Steel plate	34%	22%	24%	27%	33%	37%	41%
Steel locking elements	23%	27%	26%	25%	23%	22%	20%
Rebar	43%	51%	49%	47%	44%	41%	38%
Plastic, HDPE	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Lubricating oil	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%
Weight	18.5 kg	31.5 kg	32.4 kg	33.7 kg	36.3 kg	39.0 kg	41.9 kg

Additions to pile joints use the materials listed in the table below. Please note that the material in 'Lock+/-1' must be deducted if locking elements are removed.

Material	Lock +/- 1	Type 1	Type 2
Steel plate	8.40E-02kg	2.40E-02kg	8.00E-02kg
Steel locking elements	2.10E+00kg	0.00E+00kg	4.32E-01kg
Rebar	4.00E+00kg	0.00E+00kg	0.00E+00kg
Plastic, HDPE	1.00E-02kg	0.00E+00kg	0.00E+00kg
Lubricating oil	1.50E-02kg	0.00E+00kg	0.00E+00kg
Weight	6.21E+00kg	2.40E-02kg	5.12E-01kg

Representativeness

The declared unit is 1 coupling unit for the extension of foundation piles in concrete.

Data for the underlying LCA are based on annual averages for the production of couplings in the year 2020 Background data is based on the GaBi database version 2020.2. Most data is less than 5 years old, and all data is less than 10 years old in accordance with EN15804:2012+A2:2019.

Content of dangerous substances

The product does not contain substances from the REACH Candidate List, the "Candidate List of Substances of Very High Concern for Authorisation", in concentrations which exceeds 0.1%. (http://echa.europa.eu/candidate-list-table).

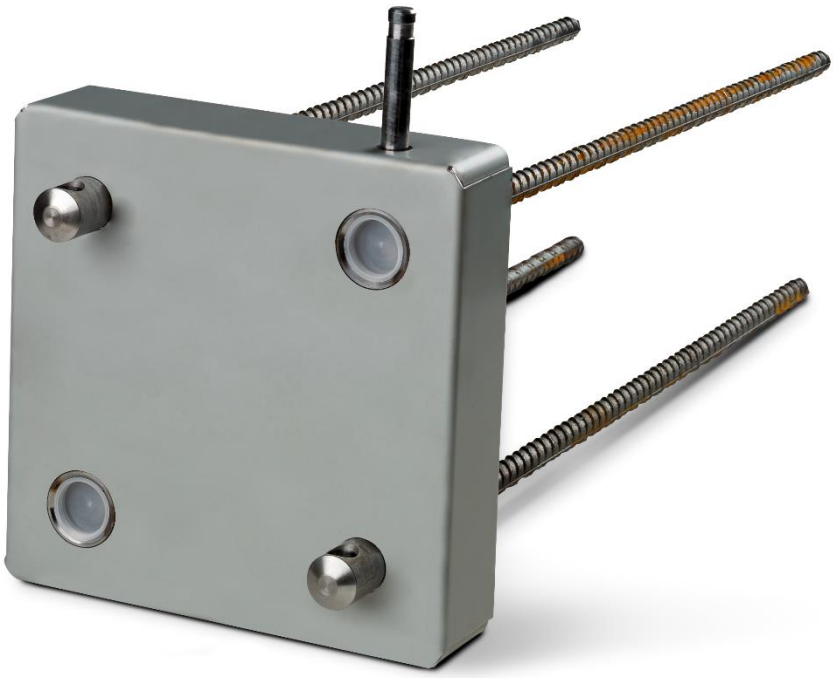
Essential properties (CE)

The CPG coupling has been tested and approved according to the pile standard EN 12794 as a Class A coupling, which means that it can be used even for hard ramming without the foundation piles losing their properties. Performance declarations on each coupling unit can be found here: https://www.centrumpaele.dk/koblinger.aspx

Life expectancy (RSL)

The life expectancy is the same as the foundation piles where couplings are mounted. The service life is therefore counted as 100 years (RSL) within the time being determined in accordance with Article 100(1) of the Basic Regulation. Annex AA in "DS/EN 16757:2017 – "Sustainability in construction – environmental product declarations – Product category rules for concrete and concrete elements".

Photo of product



LCA background

Declared unit

LCI and LCIA results in this EPD relate to the declared 1 coupling unit, indicated in the table below, with the conversion factor to 1 kg.

Name	CPG-Box-2-235-0	CPG-Box-4-250-0	CPG-Box-4-270-0	CPG-Box-4-300-0	CPG-Box-4-350-0	CPG-Box-4-400-0	CPG-Box-4-450-0
Declared unit	1 pcs.	1 pcs.	1 pcs.	1 pcs.	1 pcs.	1 pcs.	1 pcs.
Mass. kg	18.47	31.47	32.43	33.75	36.35	39.03	41.87
Conversion factor to 1 kg	0.0541	0.0318	0.0308	0.0296	0.0275	0.0256	0.0239

Additions to the base models are given in the table below, indicating weight and conversion to 1 kg.

Name	Lock +/- 1	Type 1	Type 2
Declared unit	1 pcs.	1 pcs.	1 pcs.
Mass, kg	6.21	0.02	0.51
Conversion factor to 1 kg	0.1610	41.67	1.953

Functional unit

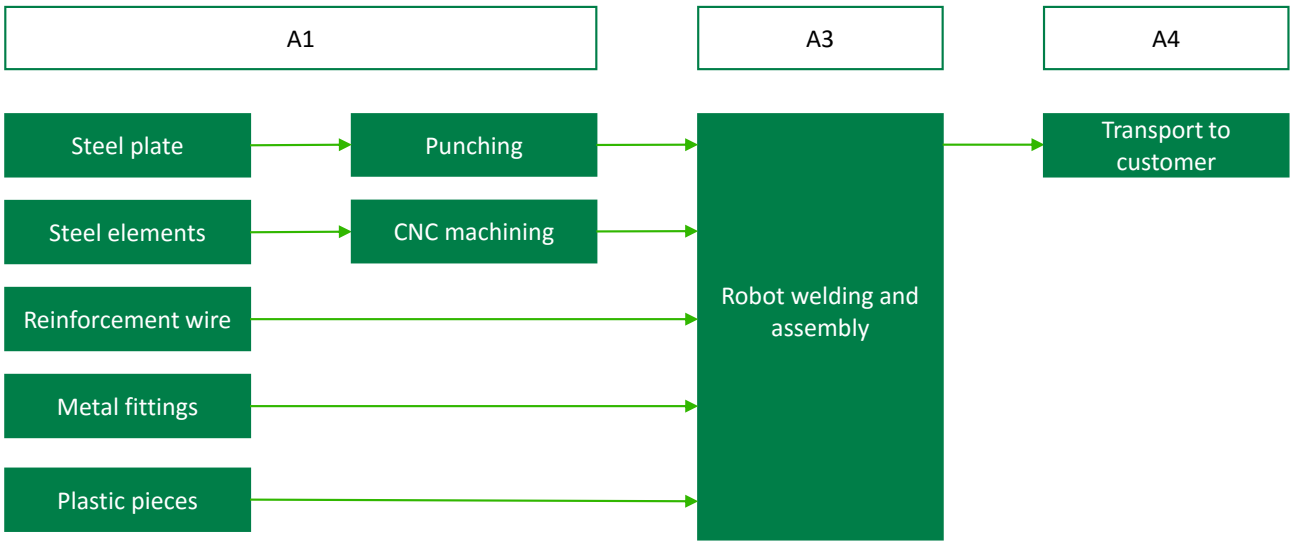
Not defined.

PCR

This environmental product declaration is based on the requirements of EN 15804:2012+A2:2019 and the product-specific PCR: "DS/EN 16757:2017 – "Sustainability in construction and construction – environmental product declarations – Product category rules for concrete and concrete elements".

Flow diagram

The flow diagram below covers raw materials (A1), production (A3) and outbound transport (A4) at Centrum Pæle in Vejle. Inbound and internal transport (A2) takes place at the arrows.



System boundaries

The EPD is based on cradle-to-gate with options, module C1-C4 and module D. Options consist of including module A4.

All relevant processes from the modules covered are included.

The use phases (B2-B7) are of no relevance to the EPD as no contribution occurs as long as the product is installed in a given building/ construction according to applicable instructions and standards.

The general rules for omitting inputs and outputs in the LCA follow the provisions of EN 15804:2012+A2:2019, 6.3.5, where the total omission of input flow per module may not exceed 5% of energy consumption and mass and a maximum of 1% per unit process.

Key assumptions are described for each life cycle stage below.

The product phase (A1-A3):
The product phase includes the provision of all raw materials, products and energy, transport to production, internal transport and waste treatment up to end-of-waste or final disposal.

The LCA results are indicated in aggregated form of the product phase, which means that modules A1, A2 and A3 are considered as a single module A1-A3.

The steel plate and locking elements parts are machined at the subcontractor.

At Centrum Pæle, steel plates are bent in the desired shape and the entire product is welded together. The production at Centrum is performed with automated welding robot.

If pile joints are delivered embedded in a concrete foundation pile supplied by Centrum Pæle, the rock shoe is placed directly in the mold before casting; otherwise, the product is packed on wooden pallets.

Construction process phase (A4-A5):
The construction process phase includes transport from the factory gate to the construction site (by truck).

The pile joint unit is embedded in the concrete pile from the factory and assembled without environmental impact.

Use phase (B1-B7):
Once couplings mounted on foundation piles are installed in buildings or installations, according to applicable instructions and standards, maintenance, repairs, replacements or renovations will not be required under normal conditions of use. Likewise, there is no energy or water consumption associated with the product during the use phase.

End of life (C1-C4) and potential for recycling, recycling and energy recovery (D):
The C and D modules are rated MNR as it is considered that there is no excavation of foundation piles in concrete with associated elements such as joints and rock shoes. All materials are inert in buried condition, and it will be associated with high energy consumption to excavate the elements. In addition, it is rare for built-up areas to be returned to natural condition, as these areas are usually redeveloped. When rebuilding, foundation piles can be included in the new construction if they are not damaged during demolition and data on the piles is known.

In this EPD, the piles are not considered recycled. Foundation piles left in the ground are specifically mentioned as examples in the PCR EN 16757:2017, chapter 6.3.8.4.2: "The EPD may specify a scenario whether no deconstruction/demolition or disposal takes place (e.g. disused underground foundation piles left without being exhumed)".

LCA results

For the calculation of LCIA results, the characterization model CML 2001 is used with GaBi 10.0 with database version 2020.0 for classifying and characterizing input and output flows.

Module A4 is indicated per kg of product per 100 km of transport. The results should therefore be multiplied by the weight of the product, as well as the distance relative to 100 km. Thus, for a product of 10 kg transported 200 km, all results must be multiplied by 10 x 2 = 20.

The results are given first for the main products and then for additions. Results for additions should be added to the results for the main products. For example, the addition of 2 sets of additional locking devices should be added 2 times the results for "Lock +/-1".

LCA results, main products

ENVIRONMENTAL IMPACTS PER PRODUCT (pcs.)											
Parameter	**Unit**	**CPG-Box-2-235-0**	**CPG-Box-4-250-0**	**CPG-Box-4-270-0**	**CPG-Box-4-300-0**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	4.27E+01	6.72E+01	7.04E+01	7.47E+01	6.64E-03	0	0	0	0	0
GWP-fossil	[kg CO_2 eq.]	4.26E+01	6.71E+01	7.03E+01	7.46E+01	6.60E-03	0	0	0	0	0
GWP-bio	[kg CO_2 eq.]	2.45E-02	6.02E-02	6.21E-02	6.47E-02	-1.11E-05	0	0	0	0	0
GWP-luluc	[kg CO_2 eq.]	3.33E-02	5.60E-02	5.77E-02	6.01E-02	5.33E-05	0	0	0	0	0
ODP	[kg CFC 11 eq.]	3.65E-13	5.04E-13	5.14E-13	5.28E-13	1.21E-18	0	0	0	0	0
AP	[mole H^+ eq.]	1.11E-01	1.74E-01	1.82E-01	1.94E-01	7.48E-06	0	0	0	0	0
EP-fw	[kg PO_4 eq.]	5.33E-05	8.79E-05	9.10E-05	9.52E-05	2.01E-08	0	0	0	0	0
EP-mar	[kg N eq.]	2.46E-02	3.86E-02	4.04E-02	4.29E-02	2.27E-06	0	0	0	0	0
EP-ter	[mole N eq.]	2.65E-01	4.16E-01	4.35E-01	4.62E-01	2.70E-05	0	0	0	0	0
POCP	[kg NMVOC eq.]	8.20E-02	1.29E-01	1.35E-01	1.43E-01	6.16E-06	0	0	0	0	0
ADP-mm[1]	[kg Sb eq.]	4.24E-06	7.05E-06	7.28E-06	7.60E-06	5.32E-10	0	0	0	0	0
ADP-fos[1]	[MJ]	4.31E+02	6.91E+02	7.20E+02	7.60E+02	8.78E-02	0	0	0	0	0
WDP[1]	[m^3]	1.46E+00	2.73E+00	2.76E+00	2.80E+00	6.42E-05	0	0	0	0	0
Caption	GWP Total = Global Warming Potential - Total; GWP Fossil = Global Warming Potential - Fossil Fuels; GWP-bio = 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 use										
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.										

ENVIRONMENTAL IMPACTS PER PRODUCT (pcs.)										
Parameter	**Unit**	**CPG-Box-4-350-0**	**CPG-Box-4-400-0**	**CPG-Box-4-450-0**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	8.32E+01	9.19E+01	1.01E+02	6.64E-03	0	0	0	0	0
GWP-fossil	[kg CO_2 eq.]	8.30E+01	9.18E+01	1.01E+02	6.60E-03	0	0	0	0	0
GWP-bio	[kg CO_2 eq.]	6.99E-02	7.52E-02	8.08E-02	-1.11E-05	0	0	0	0	0
GWP-luluc	[kg CO_2 eq.]	6.48E-02	6.96E-02	7.47E-02	5.33E-05	0	0	0	0	0
ODP	[kg CFC 11 eq.]	5.55E-13	5.82E-13	6.12E-13	1.21E-18	0	0	0	0	0
AP	[mole H^+ eq.]	2.16E-01	2.39E-01	2.64E-01	7.48E-06	0	0	0	0	0
EP-fw	[kg PO_4 eq.]	1.03E-04	1.12E-04	1.21E-04	2.01E-08	0	0	0	0	0
EP-mar	[kg N eq.]	4.78E-02	5.29E-02	5.82E-02	2.27E-06	0	0	0	0	0
EP-ter	[mole N eq.]	5.15E-01	5.69E-01	6.27E-01	2.70E-05	0	0	0	0	0
POCP	[kg NMVOC eq.]	1.60E-01	1.76E-01	1.94E-01	6.16E-06	0	0	0	0	0
ADP-mm[1]	[kg Sb eq.]	8.23E-06	8.88E-06	9.57E-06	5.32E-10	0	0	0	0	0
ADP-fos[1]	[MJ]	8.40E+02	9.21E+02	1.01E+03	8.78E-02	0	0	0	0	0
WDP[1]	[m^3]	2.89E+00	2.98E+00	3.08E+00	6.42E-05	0	0	0	0	0
Caption	GWP Total = Global Warming Potential - Total; GWP Fossil = Global Warming Potential - Fossil Fuels; GWP-bio = 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 use									
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 PRODUCT (pcs.)										
Parameter	**Unit**	**CPG-Box-2-235-0**	**CPG-Box-4-250-0**	**CPG-Box-4-270-0**	**CPG-Box-4-300-0**	**Transport per kg per 100 km**	**All types and dimensions**			
		A1-A3	**A1-A3**	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	1.37E-06	2.14E-06	2.24E-06	2.38E-06	5.02E-11	0	0	0	0	0
IRP[2]	[kBq U235 eq.]	2.85E+00	4.81E+00	4.96E+00	5.17E+00	2.40E-05	0	0	0	0	0
ETP-fw[1]	[CTUe]	1.26E+02	2.06E+02	2.14E+02	2.25E+02	6.57E-02	0	0	0	0	0
HTP-c[1]	[CTUh]	4.55E-08	6.96E-08	7.33E-08	7.85E-08	1.36E-12	0	0	0	0	0
HTP-nc[1]	[CTUh]	5.79E-07	9.48E-07	9.84E-07	1.03E-06	6.88E-11	0	0	0	0	0
SQP[1]	-	7.63E+01	1.29E+02	1.33E+02	1.38E+02	3.08E-02	0	0	0	0	0
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)									
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 contingent 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.									

ADDITIONAL ENVIRONMENTAL IMPACTS PER PRODUCT (pcs.)										
Parameter	**Unit**	**CPG-Box-4-350-0**	**CPG-Box-4-400-0**	**CPG-Box-4-450-0**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	2.66E-06	2.95E-06	3.26E-06	5.02E-11	0	0	0	0	0
IRP[2]	[kBq U235 eq.]	5.58E+00	6.00E+00	6.45E+00	2.40E-05	0	0	0	0	0
ETP-fw[1]	[CTUe]	2.46E+02	2.68E+02	2.92E+02	6.57E-02	0	0	0	0	0
HTP-c[1]	[CTUh]	8.86E-08	9.91E-08	1.10E-07	1.36E-12	0	0	0	0	0
HTP-nc[1]	[CTUh]	1.13E-06	1.23E-06	1.34E-06	6.88E-11	0	0	0	0	0
SQP[1]	-	1.47E+02	1.57E+02	1.67E+02	3.08E-02	0	0	0	0	0
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)									
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 contingent 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 CONSUMPTION PER PRODUCT (pcs.)										
Parameter	**Unit**	**CPG-Box-2-235-0**	**CPG-Box-4-250-0**	**CPG-Box-4-270-0**	**CPG-Box-4-300-0**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	8.88E+01	1.51E+02	1.55E+02	1.60E+02	5.08E-03	0	0	0	0	0
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
PERT	[MJ]	8.88E+01	1.51E+02	1.55E+02	1.60E+02	5.08E-03	0	0	0	0	0
PENRE	[MJ]	4.33E+02	6.94E+02	7.23E+02	7.64E+02	8.82E-02	0	0	0	0	0
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
PENRT	[MJ]	4.33E+02	6.94E+02	7.23E+02	7.64E+02	8.82E-02	0	0	0	0	0
SM	[kg]	1.16E+01	2.16E+01	2.19E+01	2.23E+01	0.00E+00	0	0	0	0	0
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
FW	[m^3]	1.21E-01	2.02E-01	2.09E-01	2.18E-01	5.92E-06	0	0	0	0	0
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										

RESOURCE CONSUMPTION BY PRODUCT (pcs.)										
Parameter	**Unit**	**CPG-Box-4-350-0**	**CPG-Box-4-400-0**	**CPG-Box-4-450-0**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	1.71E+02	1.82E+02	1.94E+02	5.08E-03	0	0	0	0	0
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
PERT	[MJ]	1.71E+02	1.82E+02	1.94E+02	5.08E-03	0	0	0	0	0
PENRE	[MJ]	8.44E+02	9.26E+02	1.01E+03	8.82E-02	0	0	0	0	0
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
PENRT	[MJ]	8.44E+02	9.26E+02	1.01E+03	8.82E-02	0	0	0	0	0
SM	[kg]	2.30E+01	2.37E+01	2.45E+01	0.00E+00	0	0	0	0	0
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
FW	[m^3]	2.36E-01	2.54E-01	2.74E-01	5.92E-06	0	0	0	0	0
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									

WASTE CATEGORIES AND OUTPUT FLOWS PER PRODUCT (pcs.)										
Parameter	**Unit**	**CPG-Box-2-235-0**	**CPG-Box-4-250-0**	**CPG-Box-4-270-0**	**CPG-Box-4-300-0**	**Transport per kg per 100 km**	**All types and dimensions**			
		A1-A3	**A1-A3**	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	9.98E-07	1.76E-06	1.80E-06	1.84E-06	4.08E-09	0	0	0	0	0
NHWD	[kg]	4.98E-01	7.82E-01	8.18E-01	8.68E-01	1.40E-05	0	0	0	0	0
RWD	[kg]	1.84E-02	3.11E-02	3.21E-02	3.35E-02	1.63E-07	0	0	0	0	0
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
MMR	[kg]	4.98E+00	7.88E+00	8.25E+00	8.75E+00	0.00E+00	0	0	0	0	0
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
Caption	HWD = Hazardous waste disposal; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MMR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy										

WASTE CATEGORIES AND OUTPUT FLOWS PER PRODUCT (pcs.)										
Parameter	**Unit**	**CPG-Box-4-350-0**	**CPG-Box-4-400-0**	**CPG-Box-4-450-0**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	1.94E-06	2.04E-06	2.14E-06	4.08E-09	0	0	0	0	0
NHWD	[kg]	9.66E-01	1.07E+00	1.17E+00	1.40E-05	0	0	0	0	0
RWD	[kg]	3.61E-02	3.89E-02	4.18E-02	1.63E-07	0	0	0	0	0
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
MMR	[kg]	9.73E+00	1.07E+01	1.18E+01	0.00E+00	0	0	0	0	0
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
Caption	HWD = Hazardous waste disposal; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MMR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy									

BIOGENT CARBON/CARBON PER PRODUCT (pcs.)		
Parameter	**Unit**	**In factory sports**
Biogent carbon content of the product	[kg C]	0
Biogent carbon content in accompanying packaging	[kg C]	4.61E-03
Note	1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2	

LCA results, additions

ENVIRONMENTAL IMPACTS PER PRODUCT (pcs.)										
Parameter	**Unit**	**Lock +/- 1**	**Type 1**	**Type 2**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	[kg CO_2 eq.]	1.13E+01	8.30E-02	2.09E+00	6.65E-03	0	0	0	0	0
GWP-fossil	[kg CO_2 eq.]	1.13E+01	1.01E-01	2.11E+00	6.61E-03	0	0	0	0	0
GWP-bio	[kg CO_2 eq.]	-7.26E-04	-1.80E-02	-1.83E-02	-1.11E-05	0	0	0	0	0
GWP-luluc	[kg CO_2 eq.]	1.09E-02	1.29E-04	1.80E-03	5.34E-05	0	0	0	0	0
ODP	[kg CFC 11 eq.]	2.31E-13	1.64E-13	1.73E-13	1.21E-18	0	0	0	0	0
AP	[mole H^+ eq.]	2.91E-02	2.58E-04	5.37E-03	7.49E-06	0	0	0	0	0
EP-fw	[kg PO_4 eq.]	1.67E-05	3.83E-07	2.87E-06	2.01E-08	0	0	0	0	0
EP-mar	[kg N eq.]	6.49E-03	6.50E-05	1.20E-03	2.27E-06	0	0	0	0	0
EP-ter	[mole N eq.]	6.99E-02	6.83E-04	1.29E-02	2.70E-05	0	0	0	0	0
POCP	[kg NMVOC eq.]	2.18E-02	2.07E-04	3.94E-03	6.17E-06	0	0	0	0	0
ADP-mm[1]	[kg Sb eq.]	1.34E-06	1.19E-08	2.03E-07	5.33E-10	0	0	0	0	0
ADP-fos[1]	[MJ]	1.22E+02	1.29E+00	2.05E+01	8.80E-02	0	0	0	0	0
WDP[1]	[m^3]	6.25E-01	4.05E-03	3.15E-02	6.43E-05	0	0	0	0	0
Caption	GWP Total = Global Warming Potential - Total; GWP Fossil = Global Warming Potential - Fossil Fuels; GWP-bio = 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 use									
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 PRODUCT (pcs.)										
Parameter	**Unit**	**Lock +/- 1**	**Type 1**	**Type 2**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PM	[Disease incidence]	3.55E-07	3.34E-09	6.64E-08	5.03E-11	0	0	0	0	0
IRP[2]	[kBq U235 eq.]	9.39E-01	4.86E-03	1.02E-01	2.40E-05	0	0	0	0	0
ETP-fw[1]	[CTUe]	3.79E+01	4.33E-01	6.01E+00	6.58E-02	0	0	0	0	0
HTP-c[1]	[CTUh]	1.09E-08	1.01E-10	2.36E-09	1.36E-12	0	0	0	0	0
HTP-nc[1]	[CTUh]	1.74E-07	1.24E-09	2.40E-08	6.90E-11	0	0	0	0	0
SQP[1]	-	2.61E+01	7.25E-01	4.52E+00	3.09E-02	0	0	0	0	0
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)									
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.									
	[2] This impact category deals mainly with the contingent 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 CONSUMPTION BY PRODUCT (pcs.)										
Parameter	**Unit**	**Lock +/- 1**	**Type 1**	**Type 2**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	[MJ]	3.03E+01	3.97E-01	4.85E+00	5.09E-03	0	0	0	0	0
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
PERT	[MJ]	3.03E+01	3.97E-01	4.85E+00	5.09E-03	0	0	0	0	0
PENRE	[MJ]	1.22E+02	1.30E+00	2.06E+01	8.84E-02	0	0	0	0	0
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
PENRT	[MJ]	1.22E+02	1.30E+00	2.06E+01	8.84E-02	0	0	0	0	0
SM	[kg]	4.95E+00	1.70E-02	1.75E-01	0.00E+00	0	0	0	0	0
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
FW	[m^3]	3.88E-02	3.52E-04	5.22E-03	5.93E-06	0	0	0	0	0
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									

WASTE CATEGORIES AND OUTPUT FLOWS BY PRODUCT										
Parameter	**Unit**	**Lock +/- 1**	**Type 1**	**Type 2**	**Transport per kg per 100 km**	**All types and dimensions**				
		A1-A3	**A1-A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	[kg]	3.77E-07	6.17E-09	6.07E-08	4.09E-09	0	0	0	0	0
NHWD	[kg]	1.32E-01	1.44E-03	2.73E-02	1.40E-05	0	0	0	0	0
RWD	[kg]	6.04E-03	3.20E-05	6.90E-04	1.63E-07	0	0	0	0	0
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
MMR	[kg]	1.34E+00	9.27E-03	3.00E-01	0.00E+00	0	0	0	0	0
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0
Caption	HWD = Hazardous waste disposal; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MMR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy									

Additional information

Technical information on underlying scenarios

On-site transport (A4)

Name	Value	Unit
Fuel quantity and type (alternatively: type of transport)	Diesel	-
Transport types	*Truck trailer, Euro 6, 28 - 34t gross weight / 22t payload capacity*	
Transport distance	100	km
Capacity utilisation (including empty return journey)	61	%
Gross mass of transported product	18,5 – 39,0	kg/pcs.
Capacity utilisation, volume factor	1	-

Packaging for disposal (A5)

Packaging	**Weight**	**Unit**
Polypropylene film	0,0042	kg
Polyester straps	0,0015	kg
Cardboard	0,01152	kg

Reference service life

Name		Unit
Reference Service Life - Lifetime RSL	100	Year
Declared product characteristics (at port) etc.	https://www.centrumpaele.dk/koblinger.aspx	-
Instructions for use (if given by the manufacturer)	https://www.centrumpaele.dk/statiske-beregninger.aspx	-
Presumed quality of installation work, according to Manufacturer's instructions	https://www.centrumpaele.dk/statiske-beregninger.aspx	-
Outdoor environment (outdoor use) – e.g. weather resistance, wind, pollution, UV, etc.	https://www.centrumpaele.dk/koblinger.aspx	-
Indoor environment (indoor use), e.g. temperature, humidity, etc.	*Not applicable*	-
Conditions of use - e.g. mechanical influences, frequency of use, etc.	https://betonhaandbogen.dk/forside	-
Maintain (frequency, type, quality, parts replacement)	*Not applicable*	-

End of life/Disposal (C1-C4)

Name	Value	Unit
Sorted construction waste	0	kg
Mixed construction waste	0	kg
For reuse	0	kg
For recycling	0	kg
For energy recovery	0	kg
For landfill	0	kg
Prerequisites for end-of-life scenarios	-	-

Recycling, recycling and/or recycling potential (D)

Name	Value	Unit
Displaced material	0	kg
Recycling potential	0	kg

Indoor air

Not applicable.

Soil and water

The EPD does not indicate anything about the release of hazardous substances to soil and water, as the horizontal standards for measuring the release of regulated hazardous substances from construction products using harmonised testing methods under the provisions of the respective Technical Committees for European Product Standards are not available.

References

Publisher	www.epddanmark.dk
Program operator	Danish Technological Institute Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA software /background data	Thinkstep GaBi 10.0 Database version 2020.2 www.gabi-software.com
3rd Party Verifier	Ninkie Bendtsen NIRAS A/S Sortemosevej 19 DK-3450 Allerød www.niras.dk

General program instructions
Version 2.0
www.epddanmark.dk

EN 15804
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
DS/EN 16757:2017. Sustainability of construction works – Environmental product declarations – Product Category Rules for concrete and concrete elements.

EN 15942
EN 15942 DS/EN 15942:2011. Sustainability of construction works – Environmental product declarations – Communication format business-to-business.

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

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

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