

Owner: Mira Byggeprodukter A/S
No.: MD-22125-EN
Issued: 17-03-2023
Valid to: 17-03-2028

3rd PARTY VERIFIED

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



Owner of declaration

Mira Byggeprodukter A/S, Egegårdsvej
2, DK-4621 Gadstrup CVR-Nr. DK-
39581914



Issued:
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Valid to:
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Program

EPD Danmark
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- Industry EPD
- Product EPD

Declared product(s)

3110 unifix
3130 superfix
3250 gigafix floor
3230 superrapidfix
z-fix excellent

Number of declared datasets/product variations: 5

Production site

The MIRA products included in this study are manufactured in two production sites; one located in Estonia, and another located in Denmark. The locations of the production sites are:

- Estonia: Segu 8, Saue, 76505 Harju maakond, Estonia
- Denmark: Egegårdsvej 2, 4621 Gadstrup, Denmark

Product(s) use

Mira products are used as cement-based, plastic-reinforced, quick-setting white tile mortar for floor and wall functions, inside and outside, in wet and dry rooms.

Declared / functional unit

This EPD refers to the declared unit of 1 kg tile mortar product with a density of 1180 - 1500 kg/m³.

Year of production site data (A3)

2021

EPD version

The first issue.

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
<input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Third party verifier: <hr style="width: 80%; margin: 0 auto;"/> Ninkie Bendtsen

 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 main product components are shown in Table 1. Values are given as intervals covering the five products. Specific recipes are used, and the composition of input materials is 100 % in mass -% of declared products.

Table 1: Material composition of products

Product	Material / component	Weight-% of declared product
z-fix	Cement	47,73
	Sand	14,32
	Calcium carbonate	11,93
	Additives	26,02
3110	Cement	37,94
	Sand	51,96
	Calcium carbonate	5,77
	Additives	4,33
3130	Cement	37,94
	Sand	51,96
	Calcium carbonate	5,77
	Additives	4,33
3230	Cement	34,88
	Sand	50,57
	Calcium carbonate	10,46
	Additives	4,09
3250	Cement	39,55
	Sand	46,15
	Calcium carbonate	6,59
	Additives	7,71

Product packaging:

The composition of the sales- and transport packaging of the product is shown in Table 2 below.

Table 2: Material composition of Sales and Transport Packaging for the final Mira product

Material	Weight-% of packaging
Paper	58,6
PE	41,4
Total	100

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of 1 kg of product on the production sites located in Estonia and Denmark. Product specific data are based on average values collected in the year 2021. Background data are based on SimaPro 9.3 with database of EcoInvent 3.8 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

The product do not contain hazardous substance listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorization" in a percentage higher than 0.1% of the weight of the product.

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

Essential characteristics

The products are designed, produced and CE marked according to EN 12004 (Adhesives for tiles. Requirements, evaluation of conformity, classification and designation).

They are classified as seen in Table 3 according to EN 12004:2007+A1:2012 for interior and exterior bonding of ceramic tiles, porcelain, natural stone and mosaics on floors and walls.

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

<https://mira.eu.com/>

Table 3: Technical specifications of Mira tile mortars products

	z-fix excellent	3110 unifix	3130 superfix	3230 superrapidfix	3250 gigafix floor
Standard	EN 12004-2007+A1:2012	EN 12004-2007+A1:2012	EN 12004	EN 12004	EN 12004
Density	1180 kg/m ³	1450 kg/m ³	1400 kg/m ³	1450 kg/m ³	1500 kg/m ³
Reaction to fire	E	E	E	E	E
Product class acc. to EN 12004	C1TE S2	C2TE S1	C2TE S2	C2FT S1	C2E S2
Open time	≥ 0,5 N/mm ² after 30 min	≥ 0,5 N/mm ² after 30 min	≥ 0,5 N/mm ² after 30 min	-	≥ 0,5 N/mm ² after 30 min
Slip	≥ 0,5 N/mm	< 0,5 mm	≤ 0,5 mm	≤ 0,5 mm	-
Tensile adhesion strength after:					
Water immersion:	≥ 0,5 N/mm ²	≥ 1 N/mm ²	≥ 1 N/mm ²	≥ 1 N/mm ²	≥ 1 N/mm ²
Heat ageing:	≥ 0,5 N/mm ²	≥ 1 N/mm ²	≥ 1 N/mm ²	≥ 1 N/mm ²	≥ 1 N/mm ²
Freeze thaw cycle:	≥ 0,5 N/mm ²	≥ 1 N/mm ²	≥ 1 N/mm ²	≥ 1 N/mm ²	≥ 1 N/mm ²
Deformability	< 5 mm	≥ 2,5 to < 5 mm	≥ 5 mm	≥ 2,5 to < 5 mm	≥ 5 mm

Reference Service Life (RSL)

The B1-B7 stage is not relevant as it is not applicable. Thus, this EPD does not include a Reference Service Life and the environmental impacts related to this stage have not been studied. Air, soil, and water impacts during the use phase have not been studied.

Picture of product(s)



Figure 1: Picture of products

LCA background

Declared unit

Declared unit is taken as the input of materials in order to produce 1 kg of product.

The LCI and LCIA results in this EPD relate to 1 kg of product from Mira for the types: 3110 unifix, 3130 superfix, 3250 gigafix floor, 3230 superrapidfix, and z-fix excellent.

Table 4: Declared unit

Name	Value	Unit
Declared unit	1	kg
Density	3110 unifix: 1450 kg/m ³ 3130 superfix: 1400 kg/m ³ 3250 gigafix floor: 1500 kg/m ³ 3230 superrapidfix: 1450 kg/m ³ z-fix excellent: 1180 kg/m ³	kg/m ³
Conversion factor to 1 kg	1	-

Functional unit

Not declared.

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804:2012+A2.

Guarantee of Origin – certificates

Foreground system:

The product is produced using country average mix for production in the sites of Estonia and Denmark respectively.

Background system:

Upstream processes are modelled using an average country mix. Downstream processes are modelled using a European mix since the product is shipped throughout Europe.

Flow diagram

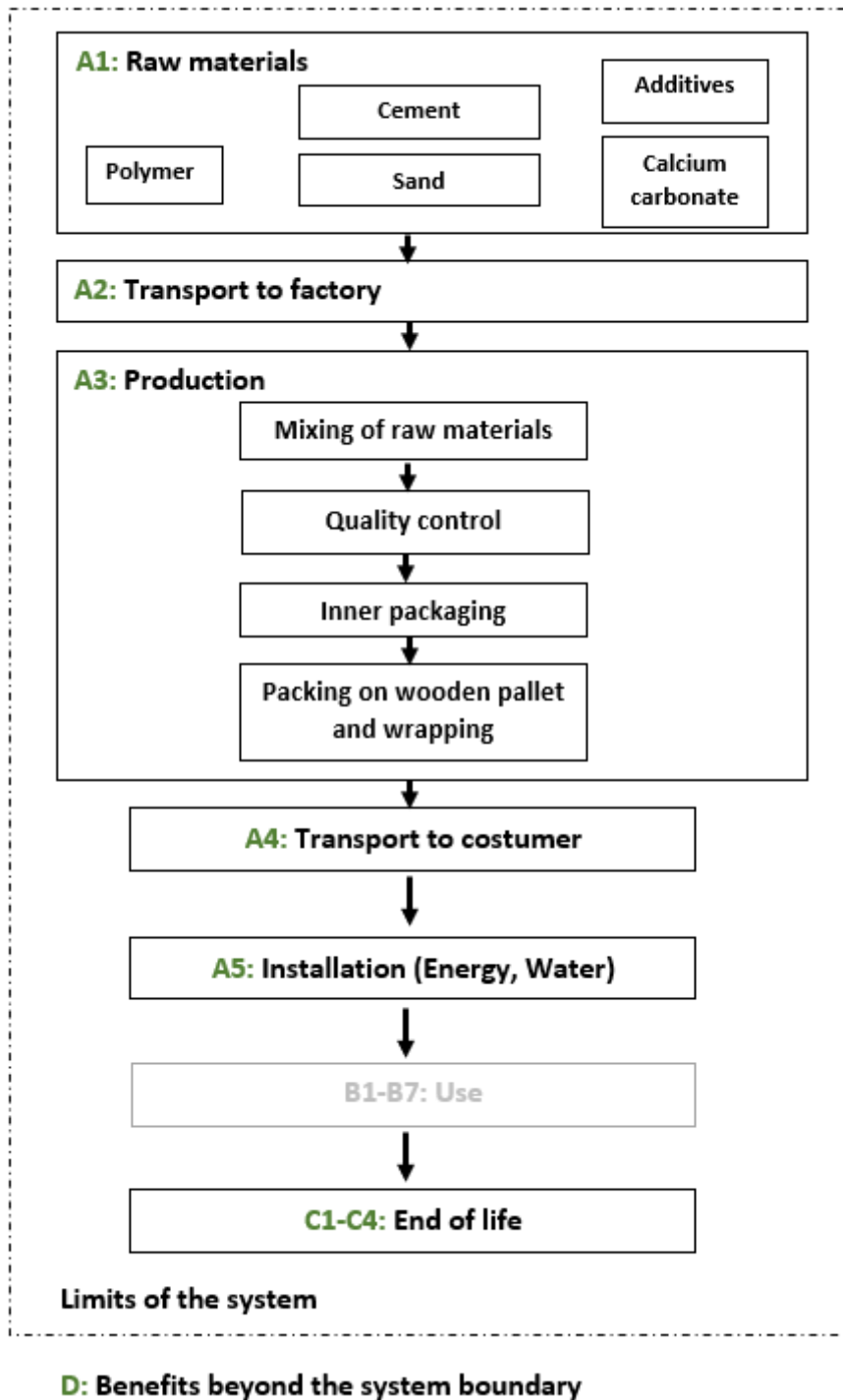


Figure 2: Flow diagram of product system with modules A1-D

The Flow diagram (Figure 2) conforms with the requirements of the modular approach and shows all phases. All phases are described below. Use phase B1-B7 is not declared in this EPD.

System boundary

This EPD is based on a cradle-to-gate with options modules A4-A5 and C1-C4, in which 100 weight-% has been accounted for.

The general rules for cut-off of inputs and outputs follow 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 system boundaries of this EPD include Module A1, A2, A3, A4, A5, C1, C2, C3, C4, and Module D.

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.

A1: The extraction, supply, and transport of raw materials and their packaging to MIRA A/S is included here. Raw materials are purchased from European suppliers.

All semifinished products are represented as primary materials. Components from polymers, cement additives, and calcium carbonate are preproduced from suppliers. The materials that are used to pack all raw materials are cardboard, paper, wood, and plastic big bags. Cement and sand materials are delivered in bulk form due to the considerable amounts transported. Thus, no packaging is considered for these materials.

A2: The raw materials are transported to the manufacturing sites at Gadstrup, Denmark, and Saue, Estonia. The modelling includes road and/or maritime transportation of each raw material from 2021.

A3: The production of packaging materials is taken into account at this stage. The processing of any waste arising from this stage is also included. The main raw material is sand, cement, and calcium carbonate. These materials constitute 80-90 % of the total product. Cement is received in different types: white cement, aluminate cement, and Portland cement. The remaining 10-20 % of the products consists of additives.

The rest of the components are mainly different kinds of additives of inorganic nature but in a much smaller amount.

Construction process stage (A4-A5) includes:

A4: The product is sold directly to customers or stores where the product is sold to others. The distance is calculated by finding the distance between the production site and the customer on the European market for each product. For products produced in Estonia the costumers are primarily located in Estonia, Finland, Latvia, Sweden and Germany. For all products produced in Denmark, the costumers are primarily located in Denmark, Sweden, Norway, Poland, and a portion of the production is send to the production facility in Estonia. These distances are then averaged to produce a representative value.

A5: The installation of the product into the building requires water and energy for blending the raw materials. Mixing electricity consumption is calculated as 0,216 MJ/kg. This is equivalent to the use of a 1200-Watt handheld mixer for 3 minutes, see Table 30 Information related to module A4 - weighted average of Danish and Estonia factory.

Scenario information	Value	Unit
Fuel type	Diesel (for road transport), Marine Diesel Oil (for sea transport)	-
Vehicle type	Euro 5 (for road transport) and freight, sea, tanker for liquid goods other than petroleum and liquefied natural gas with average load capacity (for sea transport)	-
Average transport distance for each product	z-fix excellent: 481,83 km (by road) + 0 km (by ship) 3110 unifix: 461,41 km (by road) + 10,37 km (by ship) 3130 superfix: 601,03 km (by road) + 4,86 km (by ship) 3230 superrapidfix: 615,89 km (by road) + 0 km (by ship) 3250 gigafix floor: 500 km (by road) + 0 km (by ship)	km
Capacity utilization (including empty runs)	85 % for trucks	%
Gross density of products transported	930 kg/m ³ (with lorry)	kg/m ³
Capacity utilization volume factor	1	-

Table .

Apart from the waste of sales and transport packaging for the final Mira product (paper, plastics), 2 % of the product goes to waste deposited in landfill. All these materials for packaging the final product go directly to the incineration station, with the potential benefits reported in module D. The distance to waste treatment is by default estimated to be 50 km by a lorry.

Use stage (B1-B7) includes:

B1 to B7 are not declared as they are not applicable: the product does not need maintenance or replacement during its RSL. Thus, this EPD does not include the product use and maintenance stage (B1-B7) and the environmental impacts related to this stage have not been studied.

End of Life (C1-C4) includes:

The end-of-life stage analyses the impacts related to the disposal of tile mortars on a surface when that surface reaches the end of its service life, see Table . The consumption of energy and natural resources is considered negligible for disassembling end-of-life products. Therefore, the impact of demolition is considered zero in Module (C1). Module (C2) includes the transport of the tile mortar waste to the closest disposal facilities. All end-of-life product is sent to the closest disposal facilities, estimating a transportation distance equal to 50 km

via road transport by a Euro 5 lorry of 16-32 metric ton. Module (C3) is considered zero, as no further waste processing for reuse, recovery or recycling takes place in this analysis.

Module (C4) is the disposal of end-of-life tile mortar including physical pre-treatment. In this case, the landfill is considered the final disposal method.

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

Module D includes energy recovery due to incineration of materials with energy recovery in modules A5, see Table.

The packaging is intended to be incinerated at the end-of-life stage in module A5, whereas an energy recovery (75 % heat, 25 % electricity) and energy efficiency (80 % for heat, 25 % for electricity) from the incineration process is accounted for in module D.

LCA results

Results per declared unit

z-fix excellent

Table 5: Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP- total	kg CO ₂ -eq.	4,28E-01	1,33E-01	4,07E-02	0,00E+00	6,61E-03	0,00E+00	5,28E-03	-1,31E-02
GWP-fossil	kg CO ₂ -eq.	4,28E-01	1,33E-01	3,51E-02	0,00E+00	6,60E-03	0,00E+00	5,27E-03	-1,30E-02
GWP-biogenic	kg CO ₂ -eq.	-2,42E-04	1,35E-04	5,50E-03	0,00E+00	6,04E-06	0,00E+00	5,22E-06	-7,71E-05
GWP-luluc	kg CO ₂ -eq.	2,32E-04	7,94E-05	3,18E-05	0,00E+00	4,22E-06	0,00E+00	4,97E-06	-5,90E-06
ODP	kg CFC 11 -eq.	2,60E-08	2,90E-08	1,54E-09	0,00E+00	2,04E-09	0,00E+00	2,13E-09	-1,76E-09
AP	mol H ⁺ -eq.	1,78E-03	5,18E-04	1,34E-04	0,00E+00	4,26E-05	0,00E+00	4,95E-05	-2,32E-05
EP-freshwater	kg P-eq.	7,70E-05	1,24E-05	1,28E-05	0,00E+00	5,05E-07	0,00E+00	4,82E-07	-2,46E-06
EP-marine	kg N-eq.	3,55E-04	1,54E-03	2,72E-03	0,00E+00	9,66E-03	0,00E+00	1,05E-02	-5,09E-06
EP-terrestrial	mol N-eq.	3,90E-03	1,32E-06	2,54E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,08E-05
POCP	kg NMVOC-eq.	1,15E-03	4,84E-04	7,26E-05	0,00E+00	4,57E-05	0,00E+00	5,48E-05	-1,60E-05
ADPE	kg Sb-eq.	2,02E-06	8,26E-07	1,77E-07	0,00E+00	1,94E-08	0,00E+00	1,20E-08	-2,54E-08
ADPF	MJ	3,25E-03	3,76E-03	4,28E-03	0,00E+00	1,38E-01	0,00E+00	1,47E-01	-2,29E-01
WDP	m ³	6,29E-04	7,28E-04	1,02E-03	0,00E+00	3,88E-03	0,00E+00	6,62E-03	-8,53E-04
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 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	The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.								

Table 6: Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease Incidence	2,06E-08	9,65E-09	9,61E-10	0,00E+00	3,15E-10	0,00E+00	4,35E-10	-7,29E-11
IRP	kBq U235 eq	3,27E-02	2,03E-02	7,23E-03	0,00E+00	2,84E-04	0,00E+00	2,86E-04	-1,45E-03
ETP-fw	CTUe	4,40E+00	4,42E-01	3,43E-01	0,00E+00	1,54E-03	0,00E+00	-7,82E-04	-4,26E-02
HTP-c	CTUh	1,57E-10	8,68E-11	1,08E-11	0,00E+00	1,40E-12	0,00E+00	9,25E-13	-1,82E-12
HTP-nc	CTUh	4,52E-09	2,15E-09	3,34E-10	0,00E+00	4,53E-11	0,00E+00	2,35E-11	-4,19E-11
SQP	-	2,65E+00	1,50E-01	1,10E-01	0,00E+00	3,82E-04	0,00E+00	2,56E-04	-1,18E-02
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.								

Table 7: Parameters describing resource use

RESOURCE USE PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,05E+00	0,00E+00	1,37E-01	0,00E+00	1,77E-03	0,00E+00	1,25E-03	-4,70E-03
PERM	MJ	2,47E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,30E+00	0,00E+00	1,37E-01	0,00E+00	1,77E-03	0,00E+00	1,25E-03	-4,70E-03
PENRE	MJ	1,17E+01	2,92E+00	1,09E+00	0,00E+00	1,33E-01	0,00E+00	1,56E-01	-1,11E-01
PENRM	MJ	2,84E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	5,59E+00	2,10E+00	4,79E-01	0,00E+00	5,86E-02	0,00E+00	1,56E-01	-1,11E-01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	2,89E-01	1,06E-02	3,59E-02	0,00E+00	3,78E-04	0,00E+00	6,63E-03	-3,73E-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.								

Table 8: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	1,13E-05	7,59E-06	6,95E-07	0,00E+00	3,28E-07	0,00E+00	2,22E-07	-1,19E-07
NHWD	kg	1,16E-01	8,99E-02	3,81E-03	0,00E+00	6,46E-03	0,00E+00	1,00E+00	-1,58E-04
RWD	kg	4,15E-05	1,81E-05	4,90E-06	0,00E+00	8,50E-07	0,00E+00	9,64E-07	-2,06E-07
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

MFR	kg	5,69E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	1,78E-02	0,00E+00	2,14E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	1,71E-01	0,00E+00	2,06E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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>								

Table 9: Biogenic carbon content at factory gate

BIOGENIC CARBON CONTENT PER 1 KG		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,0038
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

3110 unifix

Table 10: Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP- total	kg CO ₂ -eq.	5,28E-01	2,35E-01	7,42E-02	0,00E+00	8,32E-03	0,00E+00	5,28E-03	-1,31E-02
GWP-fossil	kg CO ₂ -eq.	5,34E-01	2,35E-01	6,12E-02	0,00E+00	8,31E-03	0,00E+00	5,27E-03	-1,30E-02
GWP-biogenic	kg CO ₂ -eq.	-7,21E-03	2,39E-04	1,29E-02	0,00E+00	7,08E-06	0,00E+00	5,22E-06	-7,71E-05
GWP-luluc	kg CO ₂ -eq.	3,21E-04	1,40E-04	6,64E-05	0,00E+00	3,26E-06	0,00E+00	4,97E-06	-5,90E-06
ODP	kg CFC 11 -eq.	3,57E-08	5,13E-08	2,14E-09	0,00E+00	1,92E-09	0,00E+00	2,13E-09	-1,76E-09
AP	mol H ⁺ -eq.	1,86E-03	9,18E-04	1,98E-04	0,00E+00	3,37E-05	0,00E+00	4,95E-05	-2,32E-05
EP-freshwater	kg P-eq.	8,25E-05	2,18E-05	2,63E-05	0,00E+00	5,35E-07	0,00E+00	4,82E-07	-2,46E-06
EP-marine	kg N-eq.	4,27E-04	1,97E-03	3,89E-05	0,00E+00	8,55E-03	0,00E+00	1,05E-02	-5,09E-06
EP-terrestrial	mol N-eq.	4,69E-03	3,00E-06	3,78E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,08E-05
POCP	kg NMVOC-eq.	1,39E-03	8,57E-04	1,05E-04	0,00E+00	3,40E-05	0,00E+00	5,48E-05	-1,60E-05
ADPE	kg Sb-eq.	1,79E-06	1,46E-06	2,84E-07	0,00E+00	2,89E-08	0,00E+00	1,20E-08	-2,54E-08
ADPF	MJ	5,95E+00	3,50E+00	7,07E-01	0,00E+00	1,26E-01	0,00E+00	2,99E-03	1,34E-03
WDP	m ³	1,54E-01	1,36E-02	2,47E-02	0,00E+00	3,76E-04	0,00E+00	3,58E-04	1,23E-04
Caption	<p>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 use</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>								
Disclaimer	<p>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 experience with the indicator.</p>								

Table 11: Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease Incidence	1,68E-08	1,49E-08	8,91E-10	0,00E+00	7,17E-10	0,00E+00	9,97E-10	-7,29E-11
IRP	kBq U235 eq	4,13E-02	1,95E-02	1,51E-02	0,00E+00	6,46E-04	0,00E+00	6,53E-04	-1,45E-03
ETP-fw	CTUe	4,84E+00	7,58E-05	5,03E-01	0,00E+00	5,46E-04	0,00E+00	8,79E-04	-4,26E-02
HTP-c	CTUh	1,93E-10	1,29E-10	1,65E-11	0,00E+00	3,18E-12	0,00E+00	2,36E-12	-1,82E-12
HTP-nc	CTUh	4,81E-09	3,04E-09	5,50E-10	0,00E+00	1,03E-10	0,00E+00	6,15E-11	-4,19E-11
SQP	-	4,16E+00	2,22E-04	1,59E-01	0,00E+00	8,70E-04	0,00E+00	1,05E-03	-1,18E-02
Caption	<p>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)</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>								
Disclaimers	<p>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.</p> <p>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.</p>								

Table 12: Parameters describing resource use

RESOURCE USE PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	5,71E-01	0,00E+00	1,15E-01	0,00E+00	1,77E-03	0,00E+00	1,25E-03	-1,07E-02
PERM	MJ	2,47E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	8,18E-01	0,00E+00	1,15E-01	0,00E+00	1,77E-03	0,00E+00	1,25E-03	-1,07E-02
PENRE	MJ	6,27E+00	2,53E+00	7,49E-01	0,00E+00	1,33E-01	0,00E+00	1,56E-01	-2,51E-01
PENRM	MJ	1,11E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	7,38E+00	2,53E+00	7,49E-01	0,00E+00	1,33E-01	0,00E+00	1,56E-01	-2,51E-01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,43E-01	9,20E-03	2,34E-02	0,00E+00	3,78E-04	0,00E+00	6,63E-03	-8,41E-04
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>								

Table 13: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	5,02E-06	9,66E-06	5,05E-07	0,00E+00	3,28E-07	0,00E+00	2,22E-07	-2,70E-07
NHWD	kg	4,87E-02	1,14E-01	2,75E-03	0,00E+00	6,46E-03	0,00E+00	1,00E+00	-2,48E-04
RWD	kg	2,12E-05	2,31E-05	4,29E-06	0,00E+00	8,50E-07	0,00E+00	9,64E-07	-4,66E-07
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	3,99E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	1,25E-02	0,00E+00	2,14E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	1,20E-01	0,00E+00	2,06E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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>								

Table 14: Biogenic carbon content at factory gate

BIOGENIC CARBON CONTENT PER 1 KG		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,0038
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

3130 Superfix

Table 15: Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP- total	kg CO ₂ -eq.	5,19E-01	3,06E-01	7,49E-02	0,00E+00	8,32E-03	0,00E+00	5,28E-03	-1,31E-02
GWP-fossil	kg CO ₂ -eq.	5,26E-01	3,06E-01	6,19E-02	0,00E+00	8,31E-03	0,00E+00	5,27E-03	-1,30E-02
GWP-biogenic	kg CO ₂ -eq.	-7,60E-03	3,11E-04	1,29E-02	0,00E+00	7,08E-06	0,00E+00	5,22E-06	-7,71E-05
GWP-luluc	kg CO ₂ -eq.	2,78E-04	1,83E-04	6,47E-05	0,00E+00	3,26E-06	0,00E+00	4,97E-06	-5,90E-06
ODP	kg CFC 11 -eq.	3,18E-08	6,66E-08	2,20E-09	0,00E+00	1,92E-09	0,00E+00	2,13E-09	-1,76E-09
AP	mol H ⁺ -eq.	1,75E-03	1,19E-03	2,02E-04	0,00E+00	3,37E-05	0,00E+00	4,95E-05	-2,32E-05
EP-freshwater	kg P-eq.	8,64E-05	2,84E-05	2,66E-05	0,00E+00	5,35E-07	0,00E+00	4,82E-07	-2,46E-06
EP-marine	kg N-eq.	4,03E-04	1,97E-03	3,93E-05	0,00E+00	8,55E-03	0,00E+00	1,05E-02	-5,09E-06
EP-terrestrial	mol N-eq.	4,41E-03	3,00E-06	3,81E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,08E-05
POCP	kg NMVOC-eq.	1,36E-03	1,11E-03	1,09E-04	0,00E+00	3,40E-05	0,00E+00	5,48E-05	-1,60E-05
ADPE	kg Sb-eq.	2,09E-06	1,90E-06	3,02E-07	0,00E+00	2,89E-08	0,00E+00	1,20E-08	-2,54E-08
ADPF	MJ	7,87E-03	1,92E-04	1,18E-03	6,27E-03	6,27E-03	7,23E-03	8,24E-03	8,92E-03
WDP	m ³	1,95E-04	5,26E-05	5,95E-05	4,38E-04	4,38E-04	5,96E-04	1,96E-03	9,05E-04
Caption	<p>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 = 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</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>								
Disclaimer	<p>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 experience with the indicator.</p>								

Table 16: Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease Incidence	1,55E-08	1,93E-08	9,32E-10	0,00E+00	7,17E-10	0,00E+00	9,97E-10	-7,29E-11
IRP	kBq U235 eq	3,76E-02	2,53E-02	1,50E-02	0,00E+00	6,46E-04	0,00E+00	6,53E-04	-1,45E-03
ETP-fw	CTUe	4,73E+00	7,58E-05	5,11E-01	0,00E+00	5,46E-04	0,00E+00	8,79E-04	-4,26E-02
HTP-c	CTUh	1,73E-10	1,68E-10	1,73E-11	0,00E+00	3,18E-12	0,00E+00	2,36E-12	-1,82E-12
HTP-nc	CTUh	4,80E-09	3,96E-09	5,60E-10	0,00E+00	1,03E-10	0,00E+00	6,15E-11	-4,19E-11
SQP	-	3,88E+00	2,22E-04	1,53E-01	0,00E+00	8,70E-04	0,00E+00	1,05E-03	-1,18E-02
Caption	<p>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)</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>								
Disclaimers	<p>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 experience with the indicator.</p> <p>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.</p>								

Table 17: Parameters describing resource use

RESOURCE USE PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	5,53E-01	0,00E+00	1,16E-01	0,00E+00	1,77E-03	0,00E+00	1,25E-03	-1,07E-02
PERM	MJ	2,68E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	8,21E-01	0,00E+00	1,16E-01	0,00E+00	1,77E-03	0,00E+00	1,25E-03	-1,07E-02
PENRE	MJ	5,72E+00	4,82E+00	8,19E-01	0,00E+00	1,33E-01	0,00E+00	1,56E-01	-2,51E-01
PENRM	MJ	1,77E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	7,49E+00	4,82E+00	8,19E-01	0,00E+00	1,33E-01	0,00E+00	1,56E-01	-2,51E-01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,74E-01	1,76E-02	3,00E-02	0,00E+00	3,78E-04	0,00E+00	6,63E-03	-8,41E-04
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>								

Table 18: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	4,85E-06	1,26E-05	5,16E-07	0,00E+00	3,28E-07	0,00E+00	2,22E-07	-2,70E-07
NHWD	kg	4,37E-02	1,49E-01	2,80E-03	0,00E+00	6,46E-03	0,00E+00	1,00E+00	-2,48E-04
RWD	kg	1,93E-05	3,00E-05	4,32E-06	0,00E+00	8,50E-07	0,00E+00	9,64E-07	-4,66E-07
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	3,99E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	1,25E-02	0,00E+00	2,14E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	1,20E-01	0,00E+00	2,06E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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>								

Table 19: Biogenic carbon content at factory gate

BIOGENIC CARBON CONTENT PER 1 KG		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,0038
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

3230 super rapidfix

Table 20: Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP- total	kg CO ₂ -eq.	4,01E-01	3,15E-01	6,96E-02	0,00E+00	8,32E-03	0,00E+00	5,28E-03	-1,31E-02
GWP-fossil	kg CO ₂ -eq.	4,13E-01	3,14E-01	5,67E-02	0,00E+00	8,31E-03	0,00E+00	5,27E-03	-1,30E-02
GWP-biogenic	kg CO ₂ -eq.	-1,25E-02	3,19E-04	1,28E-02	0,00E+00	7,08E-06	0,00E+00	5,22E-06	-7,71E-05
GWP-luluc	kg CO ₂ -eq.	2,12E-04	1,88E-04	6,08E-05	0,00E+00	3,26E-06	0,00E+00	4,97E-06	-5,90E-06
ODP	kg CFC 11 -eq.	2,56E-08	6,85E-08	2,03E-09	0,00E+00	1,92E-09	0,00E+00	2,13E-09	-1,76E-09
AP	mol H ⁺ -eq.	1,88E-03	1,22E-03	1,88E-04	0,00E+00	3,37E-05	0,00E+00	4,95E-05	-2,32E-05
EP-freshwater	kg P-eq.	7,72E-05	2,92E-05	2,60E-05	0,00E+00	5,35E-07	0,00E+00	4,82E-07	-2,46E-06
EP-marine	kg N-eq.	4,46E-04	1,97E-03	3,61E-05	0,00E+00	8,55E-03	0,00E+00	1,05E-02	-5,09E-06
EP-terrestrial	mol N-eq.	4,89E-03	3,00E-06	3,45E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,08E-05
POCP	kg NMVOC-eq.	1,40E-03	1,14E-03	9,68E-05	0,00E+00	3,40E-05	0,00E+00	5,48E-05	-1,60E-05
ADPE	kg Sb-eq.	1,69E-06	1,95E-06	2,85E-07	0,00E+00	2,89E-08	0,00E+00	1,20E-08	-2,54E-08
ADPF	MJ	5,10E+00	4,67E+00	6,90E-01	0,00E+00	1,26E-01	0,00E+00	1,47E-01	-2,29E-01
WDP	m ³	1,84E-01	1,81E-02	2,63E-02	0,00E+00	3,76E-04	0,00E+00	6,62E-03	-8,53E-04
Caption	<p>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 = 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</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>								
Disclaimer	<p>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 experience with the indicator.</p>								

Table 21: Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease Incidence	2,98E-08	1,19E-09	9,61E-10	0,00E+00	7,17E-10	0,00E+00	9,97E-10	-7,29E-11
IRP	kBq U235 eq	5,69E-02	3,41E-04	1,52E-02	0,00E+00	6,46E-04	0,00E+00	6,53E-04	-1,45E-03
ETP-fw	CTUe	6,42E+00	2,22E-04	5,05E-01	0,00E+00	5,46E-04	0,00E+00	8,79E-04	-4,26E-02
HTP-c	CTUh	3,30E-10	7,89E-02	1,59E-11	0,00E+00	3,18E-12	0,00E+00	2,36E-12	-1,82E-12
HTP-nc	CTUh	5,67E-09	1,18E-09	5,34E-10	0,00E+00	1,03E-10	0,00E+00	6,15E-11	-4,19E-11
SQP	-	6,40E+00	5,33E-03	2,02E-01	0,00E+00	8,70E-04	0,00E+00	1,05E-03	-1,18E-02
Caption	<p>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)</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>								
Disclaimers	<p>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 experience with the indicator.</p> <p>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.</p>								

Table 22: Parameters describing resource use

RESOURCE USE PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	6,22E-01	1,46E+00	1,17E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERM	MJ	3,15E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	9,38E-01	1,46E+00	1,17E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRE	MJ	6,95E+00	0,00E+00	7,37E-01	0,00E+00	1,33E-01	0,00E+00	1,56E-01	0,00E+00
PENRM	MJ	1,28E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	8,23E+00	0,00E+00	7,37E-01	0,00E+00	1,33E-01	0,00E+00	1,56E-01	0,00E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,59E-01	6,26E-03	2,41E-02	0,00E+00	3,78E-04	0,00E+00	6,63E-03	-8,41E-04
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>								

Table 23: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	3,91E-06	1,29E-05	4,84E-07	0,00E+00	3,28E-07	0,00E+00	2,22E-07	-2,70E-07
NHWD	kg	2,81E-02	1,53E-01	2,63E-03	0,00E+00	6,46E-03	0,00E+00	1,00E+00	-2,48E-04
RWD	kg	1,35E-05	3,08E-05	4,09E-06	0,00E+00	8,50E-07	0,00E+00	9,64E-07	-4,66E-07
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	3,70E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	1,64E-02	0,00E+00	2,14E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	1,58E-01	0,00E+00	2,06E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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>								

Table 24: Biogenic carbon content at factory gate

BIOGENIC CARBON CONTENT PER 1 KG		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,0038
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

3250 gigafix floor

Table 25: Core environmental impact indicators

ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP- total	kg CO ₂ -eq.	5,61E-01	2,55E-01	7,83E-02	0,00E+00	8,32E-03	0,00E+00	5,28E-03	-1,31E-02
GWP-fossil	kg CO ₂ -eq.	5,67E-01	2,55E-01	6,52E-02	0,00E+00	8,31E-03	0,00E+00	5,27E-03	-1,30E-02
GWP-biogenic	kg CO ₂ -eq.	-5,76E-03	2,59E-04	1,30E-02	0,00E+00	7,08E-06	0,00E+00	5,22E-06	-7,71E-05
GWP- luluc	kg CO ₂ -eq.	2,28E-04	1,52E-04	6,25E-05	0,00E+00	3,26E-06	0,00E+00	4,97E-06	-5,90E-06
ODP	kg CFC 11 -eq.	2,79E-08	5,56E-08	2,28E-09	0,00E+00	1,92E-09	0,00E+00	2,13E-09	-1,76E-09
AP	mol H ⁺ -eq.	1,73E-03	9,93E-04	2,11E-04	0,00E+00	3,37E-05	0,00E+00	4,95E-05	-2,32E-05
EP-freshwater	kg P-eq.	9,24E-05	2,37E-05	2,68E-05	0,00E+00	5,35E-07	0,00E+00	4,82E-07	-2,46E-06
EP-marine	kg N-eq.	4,11E-04	1,97E-03	4,13E-05	0,00E+00	8,55E-03	0,00E+00	1,05E-02	-5,09E-06
EP-terrestrial	mol N-eq.	4,50E-03	3,00E-06	4,03E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,08E-05
POCP	kg NMVOC-eq.	1,40E-03	9,28E-04	1,17E-04	0,00E+00	3,40E-05	0,00E+00	5,48E-05	-1,60E-05
ADPE	kg Sb-eq.	2,26E-06	1,58E-06	3,13E-07	0,00E+00	2,89E-08	0,00E+00	1,20E-08	-2,54E-08
ADPF	MJ	7,61E+00	3,79E+00	8,23E-01	0,00E+00	1,26E-01	0,00E+00	1,47E-01	-2,29E-01
WDP	m ³	2,13E-01	1,47E-02	2,47E-02	0,00E+00	3,76E-04	0,00E+00	6,62E-03	-8,53E-04
Caption	<p>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 use</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>								
Disclaimer	<p>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 experience with the indicator.</p>								

Table 26: Additional environmental impact indicators

ADDITIONAL ENVIRONMENTAL IMPACTS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease Incidence	1,43E-08	1,61E-08	9,80E-10	0,00E+00	7,17E-10	0,00E+00	9,97E-10	-7,29E-11
IRP	kBq U235 eq	4,10E-02	2,11E-02	1,53E-02	0,00E+00	6,46E-04	0,00E+00	6,53E-04	-1,45E-03
ETP-fw	CTUe	4,91E+00	7,58E-05	5,32E-01	0,00E+00	5,46E-04	0,00E+00	8,79E-04	-4,26E-02
HTP-c	CTUh	1,65E-10	1,40E-10	1,81E-11	0,00E+00	3,18E-12	0,00E+00	2,36E-12	-1,82E-12
HTP-nc	CTUh	4,93E-09	3,30E-09	5,73E-10	0,00E+00	1,03E-10	0,00E+00	6,15E-11	-4,19E-11
SQP	-	3,46E+00	2,22E-04	1,35E-01	0,00E+00	8,70E-04	0,00E+00	1,05E-03	-1,18E-02
Caption	<p>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)</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>								
Disclaimers	<p>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.</p> <p>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.</p>								

Table 27: Parameters describing resource use

RESOURCE USE PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	5,15E-01	0,00E+00	1,15E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERM	MJ	3,05E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	8,20E-01	0,00E+00	1,15E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRE	MJ	6,21E+00	4,02E+00	8,70E-01	0,00E+00	1,33E-01	0,00E+00	1,56E-01	0,00E+00
PENRM	MJ	1,92E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	8,14E+00	4,02E+00	8,70E-01	0,00E+00	1,33E-01	0,00E+00	1,56E-01	0,00E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	2,08E-01	1,47E-02	2,40E-02	0,00E+00	3,78E-04	0,00E+00	6,63E-03	-8,41E-04
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 0,00000000000112.</p>								

Table 28: End-of-life (waste categories and output flows)

WASTE CATEGORIES AND OUTPUT FLOWS PER 1 KG									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	4,47E-06	1,05E-05	5,21E-07	0,00E+00	3,28E-07	0,00E+00	2,22E-07	-2,70E-07
NHWD	kg	3,65E-02	1,24E-01	2,83E-03	0,00E+00	6,46E-03	0,00E+00	1,00E+00	-2,48E-04
RWD	kg	1,74E-05	2,50E-05	4,34E-06	0,00E+00	8,50E-07	0,00E+00	9,64E-07	-4,66E-07
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	4,42E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	1,44E-02	0,00E+00	2,14E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	1,38E-01	0,00E+00	2,06E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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 0,00000000000112.</p>								

Table 29: Biogenic carbon content at factory gate

BIOGENIC CARBON CONTENT PER 1 KG		
Parameter	Unit	At the factory gate
Biogenic carbon content in a product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0,0038
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂	

Additional information

LCA interpretation

The majority of the impacts are associated with the production phase (A1-A3). The most significant contribution to the production phase impacts is the upstream production of raw materials as the main driver. The majority of life cycle energy consumption takes place during the production phase (A1-A3). Besides the cement also the dispersion powder influences the results significantly, although this is only used up to 5 %. The highest contribution of raw materials comes from cement and ethylene.

Technical information on scenarios

Table 30 Information related to module A4 - weighted average of Danish and Estonia factory.

Scenario information	Value	Unit
Fuel type	Diesel (for road transport), Marine Diesel Oil (for sea transport)	-
Vehicle type	Euro 5 (for road transport) and freight, sea, tanker for liquid goods other than petroleum and liquefied natural gas with average load capacity (for sea transport)	-
Average transport distance for each product	z-fix excellent: 481,83 km (by road) + 0 km (by ship) 3110 unifix: 461,41 km (by road) + 10,37 km (by ship) 3130 superfix: 601,03 km (by road) + 4,86 km (by ship) 3230 superrapidfix: 615,89 km (by road) + 0 km (by ship) 3250 gigafix floor: 500 km (by road) + 0 km (by ship)	km
Capacity utilization (including empty runs)	85 % for trucks	%
Gross density of products transported	930 kg/m ³ (with lorry)	kg/m ³
Capacity utilization volume factor	1	-

Table 31: Installation of the product in the building (A5)

Scenario information	Value					Unit
	z-fix excellent	3110 unifix	3130 superfix	3230 superrapidfix	3250 gigafix floor	
Ancillary materials	-	-	-	-	-	kg
Water use	0,00041	0,00028	0,00042	0,00028	0,00021	m ³
Other resource use	-	-	-	-	-	kg
Energy type and consumption	0,06	0,06	0,06	0,06	0,06	kWh
Waste materials for incineration	Packaging, paper	0,0077	0,0077	0,0077	0,0077	kg
	Packaging, plastic	0,0054	0,0054	0,0054	0,0054	
Product for landfill	0,05	0,05	0,05	0,05	0,05	kg
Output materials for incineration	0,013	0,013	0,013	0,013	0,013	kg
Output materials for landfill	0,05	0,05	0,05	0,05	0,05	kg
Direct emissions to air, soil, or water	-	-	-	-	-	kg

Use (B1-B7)

Modules not declared.

Table 32: End of life (C1-C4)

Scenario information	Value	Unit
Collected separately	-	kg
Collected with mixed waste	-	kg
For reuse	-	kg
For recycling	-	kg
For energy recovery	-	kg
For final disposal	1	kg
Assumptions for scenario development	Sent to landfill	As appropriate

Table 33: Re-use, recovery and recycling potential (D)

Scenario information/Materiel	Value					Unit
	z-fix excellent	3110 unifix	3130 superfix	3230 superrapidfix	3250 gigafix floor	
Electricity recovery	2,14E-02	2,14E-02	2,14E-02	2,14E-02	2,14E-02	MJ
Thermal energy recovery	2,06E-01	2,06E-01	2,06E-01	2,06E-01	2,06E-01	MJ
Materials recovery	0	0	0	0	0	kg

Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.

References

Publisher	 www.epddanmark.dk
Program operator	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	Odyssefs Papagiannidis Bureau Veritas, HSE Danmark Oldenborggade 25-31 7000 Fredericia Denmark Julie M. Vejsgaard Larsen Bureau Veritas, HSE Danmark Oldenborggade 25-31 7000 Fredericia Denmark
LCA software / background data	SimaPro 9.3/ Ecoinvent 3.8 Generic data are primarily based on life cycle inventory data from SimaPro 9.3 Professional Database 2020 and Ecoinvent version 3.8
3rd party verifier	Ninkie Bendtsen Niras A/S Sortemosevej 19 3450 Allerød Denmark www.niras.dk

General program 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"

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"