

# Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

RMC C16/20 P Vibfri CEM II/A-LL 42,5 R (X0, XC1)



The Norwegian EPD Foundation

**Owner of the declaration:**

Heidelberg Materials Beton Danmark A/S

**Product:**

RMC C16/20 P Vibfri CEM II/A-LL 42,5 R (X0, XC1)

**Declared unit:**

1 m<sup>3</sup>

**This declaration is based on Product Category Rules:**

CEN Standard EN 15804:2012+A2:2019 serves as core PCR  
NPCR 020:2021 Part B for Concrete and concrete elements

**Program operator:**

The Norwegian EPD Foundation

**Declaration number:**

NEPD-7198-6595-EN

**Registration number:**

NEPD-7198-6595-EN

**Issue date:**

12.08.2024

**Valid to:**

12.08.2029

**EPD software:**

LCAno EPD generator ID: 482521

## General information

### Product

RMC C16/20 P Vibfri CEM II/A-LL 42,5 R (X0, XC1)

### Program operator:

The Norwegian EPD Foundation  
Post Box 5250 Majorstuen, 0303 Oslo, Norway  
Phone: +47 977 22 020  
web: [www.epd-norge.no](http://www.epd-norge.no)

### Declaration number:

NEPD-7198-6595-EN

### This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR  
NPCR 020:2021 Part B for Concrete and concrete elements

### Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

### Declared unit:

1 m3 RMC C16/20 P Vibfri CEM II/A-LL 42,5 R (X0, XC1)

### Declared unit with option:

A1,A2,A3,A4,C1,C2,C3,C4,D

### Functional unit:

-

### General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

### Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Jane Anderson, Construction LCA Ltd

(no signature required)

### Owner of the declaration:

Heidelberg Materials Beton Danmark A/S  
Contact person: Trine Olesen  
Phone: 70219600  
e-mail: [trine.olesen@heidelbergmaterials.com](mailto:trine.olesen@heidelbergmaterials.com)

### Manufacturer:

Heidelberg Materials Beton Danmark A/S

### Place of production:

Heidelberg Materials Beton Danmark A/S  
, Denmark

### Management system:

DS/EN 206:2013 +A2:2021 & DS/EN 206 DK NA:2023 / ISO  
14001:2015 / ISO 45001:2018

### Organisation no:

29189137

### Issue date:

12.08.2024

### Valid to:

12.08.2029

### Year of study:

2023

### Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

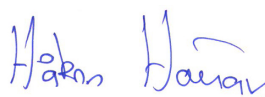
### Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway.

Developer of EPD: Trine Olesen

Reviewer of company-specific input data and EPD: Morten Hjort

### Approved:



Håkon Hauan  
Managing Director of EPD-Norway

## Product

### Product description:

Specific product EPD for concrete with Bas 2 cement, strength class C16/20 MPa

The addition of steel and plastic fibres to the concrete is not covered by this EPD

### Product specification

Ready mixed concrete

Materials	Value	Unit
Ready mixed concrete	2206	kg

### Technical data:

Exposure classes: X0, XC1

Workability type: Slump flow

### Market:

Denmark

### Reference service life, product

100 years

### Reference service life, building or construction works

50 years

## LCA: Calculation rules

### Declared unit:

1 m3 RMC C16/20 P Vibfri CEM II/A-LL 42,5 R (X0, XC1)

### Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

### Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

### Data quality:

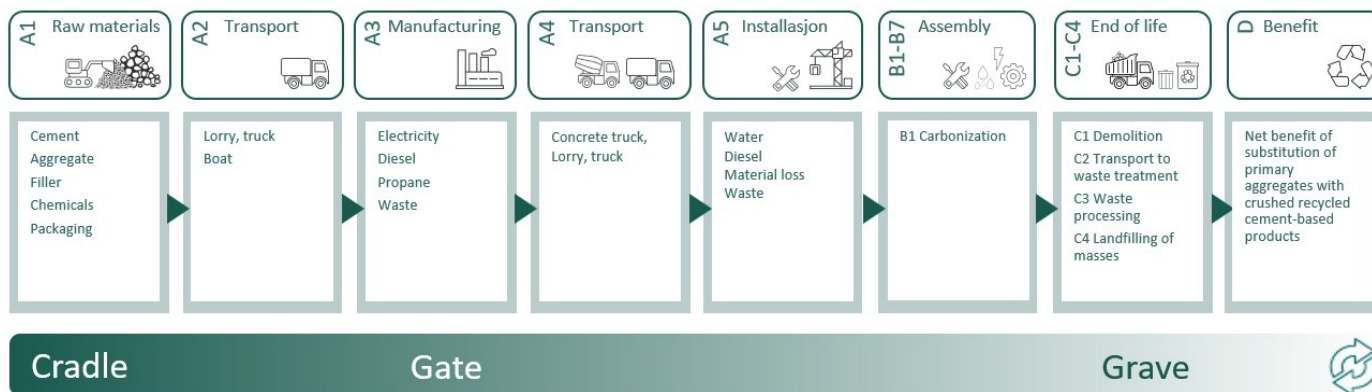
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Aggregate	ecoinvent 3.6	Database	2019
Aggregate	Ref: NEPD-4799-4059-EN	EPD	2020
Aggregate	S-P-05226	EPD	2021
Cement	EPD-HCG-20210157-CAA1-EN	EPD	2021
Chemical	EPD-EFC-20210193-IBG1-EN	EPD	2021
Chemical	EPD-EFC-20210194-IBG1-EN	EPD	2021
Chemical	EPD-EFC-20210198-IBG1-EN	EPD	2021
Chemical	Supplier	Supplier specific	2022
Pigments and Fillers	MD-20026-DA	EPD	2020
Sand	ecoinvent 3.6	Database	2019
Sand	S-P-02081	EPD	2021
Water	ecoinvent 3.6	Database	2019
Water	EF v3.0	Direct Characterization factors.	2021

### System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage	Use stage								End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery- 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	X	X	X	X	X

### System boundary:



### Additional technical information:

[www.heidelbergmaterials.dk](http://www.heidelbergmaterials.dk)

Contact Technical Department














## LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

<b>Transport from production place to user (A4)</b>	<b>Capacity utilisation (incl. return) %</b>	<b>Distance (km)</b>	<b>Fuel/Energy Consumption</b>	<b>Unit</b>	<b>Value (Liter/tonne)</b>
Concrete truck, EURO 6 (km) - Europe	53,3 %	25	0,023	l/tkm	0,58
<b>De-construction demolition (C1)</b>					
	<b>Unit</b>	<b>Value</b>			
Demolition of building per kg of cement-based product, C1 (kg)	kg/DU	2206,00			
<b>Transport to waste processing (C2)</b>					
	<b>Capacity utilisation (incl. return) %</b>	<b>Distance (km)</b>	<b>Fuel/Energy Consumption</b>	<b>Unit</b>	<b>Value (Liter/tonne)</b>
Truck, over 32 tonnes, EURO 6 (km) - Europe	53,3 %	25	0,023	l/tkm	0,58
<b>Waste processing (C3)</b>					
	<b>Unit</b>	<b>Value</b>			
Waste treatment of cement-based product after demolition, C3 (kg)	kg	2134,53			
<b>Disposal (C4)</b>					
	<b>Unit</b>	<b>Value</b>			
Waste, concrete, to landfill (kg)	kg	71,47			
<b>Benefits and loads beyond the system boundaries (D)</b>					
	<b>Unit</b>	<b>Value</b>			
Substitution of primary aggregates, gravel round (kg)	kg	2134,53			

## LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
 GWP-total	kg CO <sub>2</sub> -eq	1,67E+02	9,33E+00	3,93E+00	4,81E+00	8,82E+00	4,81E+00	1,54E+00	3,06E-01	-4,99E+00	
 GWP-fossil	kg CO <sub>2</sub> -eq	1,67E+02	9,33E+00	3,92E+00	4,80E+00	8,82E+00	4,80E+00	1,52E+00	3,06E-01	-4,89E+00	
 GWP-biogenic	kg CO <sub>2</sub> -eq	-9,03E-02	3,11E-03	-8,18E-03	2,06E-03	1,65E-03	2,06E-03	1,31E-02	2,60E-04	-9,75E-02	
 GWP-luluc	kg CO <sub>2</sub> -eq	3,94E-02	2,83E-03	1,69E-02	1,46E-03	6,96E-04	1,46E-03	2,10E-03	6,00E-05	-3,30E-03	
 ODP	kg CFC11 -eq	3,20E-06	2,05E-06	5,97E-07	1,16E-06	1,91E-06	1,16E-06	2,99E-07	1,49E-07	-8,90E-07	
 AP	mol H+ -eq	3,22E-01	1,24E-01	1,72E-02	1,55E-02	9,23E-02	1,55E-02	1,23E-02	2,99E-03	-4,40E-02	
 EP-FreshWater	kg P -eq	1,16E-02	5,46E-05	1,19E-04	3,82E-05	3,21E-05	3,82E-05	9,58E-05	2,28E-06	-1,30E-04	
 EP-Marine	kg N -eq	2,09E-02	2,97E-02	5,08E-03	3,39E-03	4,08E-02	3,39E-03	3,60E-03	1,12E-03	-1,53E-02	
 EP-Terrestrial	mol N -eq	1,11E+00	3,32E-01	5,71E-02	3,78E-02	4,41E-01	3,78E-02	4,14E-02	1,23E-02	-1,79E-01	
 POCP	kg NMVOC -eq	2,97E-01	9,12E-02	1,56E-02	1,48E-02	1,23E-01	1,48E-02	1,11E-02	3,53E-03	-4,73E-02	
 ADP-minerals&metals <sup>1</sup>	kg Sb-eq	6,66E-04	1,15E-04	4,57E-05	8,56E-05	1,35E-05	8,56E-05	1,92E-05	2,71E-06	-4,34E-04	
 ADP-fossil <sup>1</sup>	MJ	4,49E+02	1,36E+02	5,47E+01	7,80E+01	1,21E+02	7,80E+01	4,71E+01	9,88E+00	-8,27E+01	
 WDP <sup>1</sup>	m <sup>3</sup>	3,00E+03	8,17E+01	2,77E+02	5,98E+01	2,58E+01	5,98E+01	5,20E+03	2,08E+01	-3,88E+03	

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 = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption







"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

## Remarks to environmental impacts

**Additional environmental impact indicators**

Indicator		Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
	PM	Disease incidence	4,21E-06	5,61E-07	2,53E-07	4,41E-07	1,12E-05	4,41E-07	1,96E-07	6,36E-08	-9,37E-07
	IRP <sup>2</sup>	kgBq U235 -eq	1,01E+04	5,96E-01	2,25E-01	3,41E-01	5,29E-01	3,41E-01	7,90E-01	4,29E-02	-7,59E-01
	ETP-fw <sup>1</sup>	CTUe	2,28E+02	9,04E+01	5,11E+01	5,70E+01	6,64E+01	5,70E+01	3,34E+01	4,89E+00	-8,51E+01
	HTP-c <sup>1</sup>	CTUh	2,48E-07	0,00E+00	1,47E-09	0,00E+00	2,21E-09	0,00E+00	2,14E-09	1,43E-10	-4,27E-09
	HTP-nc <sup>1</sup>	CTUh	2,21E-06	6,69E-08	4,28E-08	5,52E-08	6,18E-08	5,52E-08	2,99E-08	2,86E-09	-1,05E-07
	SQP <sup>1</sup>	dimensionless	2,77E+02	1,14E+02	4,93E+01	8,94E+01	1,48E+01	8,94E+01	2,66E+01	3,60E+01	1,88E+02











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 = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

1. The results of this environmental impact 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											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
 PERE	MJ	1,03E+02	1,38E+00	1,47E+01	9,81E-01	6,62E-01	9,81E-01	2,42E+01	1,52E-01	-1,94E+01	
 PERM	MJ	1,21E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 PERT	MJ	1,05E+02	1,38E+00	1,47E+01	9,81E-01	6,62E-01	9,81E-01	2,42E+01	1,52E-01	-1,94E+01	
 PENRE	MJ	6,23E+02	1,36E+02	5,48E+01	7,80E+01	1,21E+02	7,80E+01	4,71E+01	9,88E+00	-8,73E+01	
 PENRM	MJ	7,36E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 PENRT	MJ	6,24E+02	1,36E+02	5,48E+01	7,80E+01	1,21E+02	7,80E+01	4,71E+01	9,88E+00	-8,73E+01	
 SM	kg	3,75E+01	0,00E+00	4,10E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 RSF	MJ	1,55E+02	4,94E-02	5,30E-01	3,43E-02	0,00E+00	3,43E-02	0,00E+00	3,14E-03	-3,96E-01	
 NRSF	MJ	2,54E+02	1,86E-01	5,96E-02	1,15E-01	0,00E+00	1,15E-01	0,00E+00	9,03E-03	-4,07E-01	
 FW	m <sup>3</sup>	1,93E+00	1,18E-02	1,28E-01	8,88E-03	6,25E-03	8,88E-03	8,06E-02	1,18E-02	-3,04E+00	

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 materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

\*Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed








End of life - Waste											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
	HWD	kg	1,71E-01	6,44E-03	2,61E-02	4,27E-03	3,58E-03	4,27E-03	4,70E-03	0,00E+00	-1,99E-02
	NHWD	kg	1,01E+03	8,28E+00	9,93E-01	6,78E+00	1,44E-01	6,78E+00	1,49E-01	7,15E+01	-6,04E-01
	RWD	kg	7,24E-04	9,42E-04	2,80E-04	5,33E-04	8,44E-04	5,33E-04	4,98E-04	0,00E+00	-6,56E-04

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

\*Reading example: 9,0 E-03 =  $9,0 \cdot 10^{-3}$  = 0,009"

\*INA Indicator Not Assessed

End of life - Output flow											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
	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	0,00E+00
	MFR	kg	0,00E+00	0,00E+00	8,40E+01	0,00E+00	0,00E+00	0,00E+00	2,13E+03	0,00E+00	0,00E+00
	MER	kg	2,85E-04	0,00E+00	6,78E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	EEE	MJ	0,00E+00	0,00E+00	3,82E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	EET	MJ	0,00E+00	0,00E+00	5,78E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

\*Reading example: 9,0 E-03 =  $9,0 \cdot 10^{-3}$  = 0,009"

\*INA Indicator Not Assessed

Biogenic Carbon Content		
Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	2,80E-02
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>

## Additional requirements

### Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Source	Amount	Unit
Electricity, Denmark (kWh)	ecoinvent 3.6	338,20	g CO <sub>2</sub> -eq/kWh

### Dangerous substances

The product contains no substances given by the REACH Candidate list.

### Indoor environment






## Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products										
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWPIOBC	kg CO <sub>2</sub> -eq	1,67E+02	9,33E+00	4,42E+00	4,81E+00	8,82E+00	4,81E+00	1,52E+00	3,06E-01	-5,23E+00

GWPI-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

## Bibliography

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 ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines.  
 EN 15804:2012+A2:2019 Environmental product declaration - Core rules for the product category of construction products.  
 ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.  
 ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.  
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 Vold et al., (2022) EPD generator for concrete and concrete elements  
 Background information for EPD generator application and LCA data, LCA.no report number: 06.22  
 NPCR Part A: Construction products and services. Ver. 2.0. April 2021, EPD-Norge.  
 NPCR 020 Part B for concrete and concrete elements, Ver. 3.0, 20.09.2021, EPD Norway.

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	ECO Platform ECO Portal	web: <a href="http://www.eco-platform.org">www.eco-platform.org</a> web: ECO Portal