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ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804+A2

SCHWENK Beton Mainfranken GmbH & Co.KG
Werk Würzburg Hafen / Sortennummer N53582201702

SCHWENK Baustoff leben

Owner of the declaration
SCHWENK Beton Mainfranken GmbH & Co.KG
Südliche Hafenstraße 6A
97080 Würzburg
Germany

Product
Werk Würzburg Hafen / Sortennummer N53582201702

Declared product / Functional unit
1 m³

This declaration is based on Product Category Rules
EN 15804:2012 + A2:2019,
NPCR 020 Part B for Concrete and Concrete Elements ,
EN 16757:2022 ,
NPCR Part A:2021

Program operator:
EPD Global
Majorstuen P.O. Box 5250
N-0303 Oslo
Norway

Declaration number
NEPD-10745-10745-2

Registration number
NEPD-10745-10745-2

Issue date
15.12.2025

Valid to
14.12.2030

EPD Software
Emidat Platform v1.0.0

General Information

Product
Werk Würzburg Hafen / Sortennummer N53582201702

Program Operator
EPD Global
Majorstuen P.O. Box 5250
N-0303 Oslo
Norway
Phone: +47 23 08 80 00
Email: post@epd-norge.no

Declaration Number
NEPD-10745-10745-2

This declaration is based on Product Category Rules
EN 15804:2012 + A2:2019,
NPCR 020 Part B for Concrete and Concrete Elements ,
EN 16757:2022 ,
NPCR Part A:2021

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

Functional unit
1 m^3 with a reference service life of 50 years

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 Global'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 Global, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD Global's General Programme Instructions for further information on EPD tools.

Verification of EPD tool
Charlotte Merlin, FORCE Technology
(no signature required)

Owner of the declaration
SCHWENK Beton Mainfranken GmbH & Co.KG

Contact person
info@schwenk.com

Phone
+49 731 9341 0

Email
info@schwenk.com

Manufacturer
SCHWENK Beton Mainfranken GmbH & Co.KG
Südliche Hafenstraße 6A
97080 Würzburg, Germany

Place of production
Würzburg, Germany

Management system
ISO 50001

Organisation no
3065

Issue date
15.12.2025

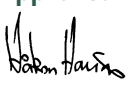
Valid to
14.12.2030

Year of study
2024

Comparability
EPDs of construction products may not be comparable if they do not comply with EN 15804 and are not seen in a building context. 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 (including primary and secondary data).

Development and verification of EPD
The declaration was created using the Emidat EPD tool v1.0, developed by Emidat GmbH. The EPD tool has been approved by EPD Global.

Developer of EPD: Thomas Arndt
Reviewer of company-specific input data and EPD: Dr. Klaus Raiber

Approved

Håkon Hauan, The Norwegian EPD Foundation

Product

Product description

Festigkeitsklasse: C 30/37

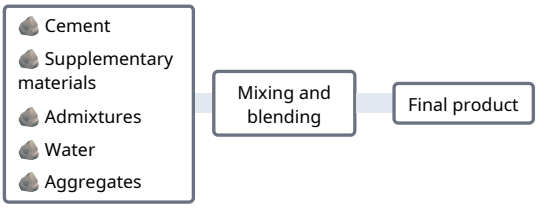
Konsistenzklasse: F3

Festigkeitsentwicklung: langsam

Größtkorn: 32mm

Expositionsklassen: XC4, XD1, XS1, XF1, XA1

Verwendung/Eigenschaften: Stahlbeton, GWP-Beton, WU-Richtlinie, Prüfalter 56d



The most common man-made substance in the world is concrete. Regardless of the magnitude of the construction, it is a necessary component of roads, buildings, bridges, dams, pavements, pipelines, sewers, and other structures. It is made up of naturally occurring aggregates with varying granulometries (sand, fine gravel, and gravel) joined by hydrated cement paste. To improve particular qualities of the fresh or hardened concrete, such as workability, durability, or early and final strength, chemical admixtures can also be used. After manufacture, concrete is workable enough to be transported, poured, pumped, put in place, and compacted at the project site, where it gradually solidifies and gains strength.

Product specification

Name of ingredient	Share of total weight	Country of origin
Admixtures	0 - 2 %	Germany
Aggregates	50 - 80 %	Germany
Cement	10 - 25 %	Germany
Supplementary materials	2 - 10 %	Czech Republic
Water	2 - 10 %	Germany

Technical data

	Unit	Value
Gross Density	kg / m³	2333
Compressive Strength (Cylinder)	N / mm²	30
Compressive Strength (Cube)	N / mm²	37

Market

Germany

Recipients

B2B

LCA: Calculation rules

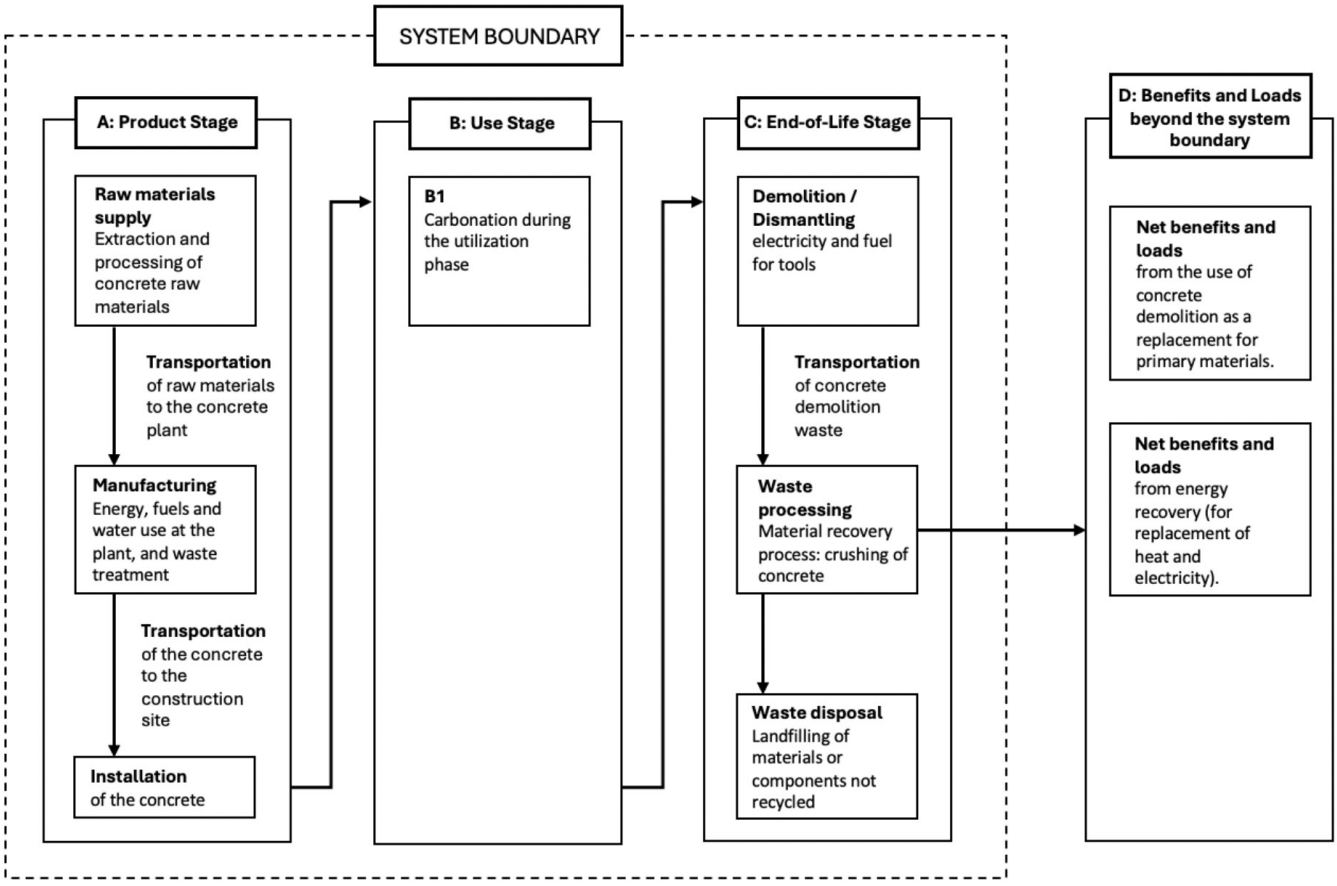
Functional unit

1 m^3

Reference service life

50 years

System boundary



Data quality

The foreground data are based on extensive and detailed data collection at the production site of the manufacturer, covering key processes such as raw material sourcing, formulation, and manufacturing. These foreground data are fully linked with corresponding datasets from the background database (ecoinvent 3.10) or with EN15804+A2-compliant EPDs, ensuring consistency, reliability, and maintaining alignment with the latest industry standards.
The overall data representativeness is rated as good with an overall score of 4.00/5, in accordance with EN 15804+A2 Annex E guidance on data quality assessment, considering geographical, technical, and temporal representativeness.

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

	Production			Installation		Use stage							End-of-Life				Next product system
	Raw material supply	Transport	Manufacturing	Transport	Installation Process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Demolition	Transport	Waste Processing	Disposal	Benefits and loads beyond the system boundary
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	x	x	x	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Geography			DE	DE	DE	DE	MND	MND	MND	MND	MND	MND	DE	DE	DE	DE	DE

For the geographies modeled in A1 and A2, refer to *Product specification*.

Type of EPD: Cradle to grave and module D

Stage of Material Production and Construction

Module A1: Extraction and processing of raw materials

Module A2: Transportation of raw materials to the plant

Module A3: Concrete production at the plant and waste treatment

Module A4: Transportation to the construction site

Module A5: Includes processes associated with concrete installation (e.g., pumping on the construction site), as well as the production, transportation, and treatment of unused concrete

Use Stage

Module B1: Carbonation during the utilization phase

Disposal Stage

Module C1: Demolition/Dismantling

Module C2: Transportation of concrete demolition waste for processing

Module C3: Sorting of waste components and recycling of concrete

Module C4: Disposal of concrete

Credits and burdens outside the system boundaries

Module D: Credits and burdens from the use of demolished concrete as a replacement for primary materials

Cut-off criteria

Environmental impacts of the following processes are considered to be negligible: Production and use of formwork and falsework for the installation of concrete , Materials used for the curing of concrete (e.g. plastics, aluminum) .

Allocation

Foreground inventory data (energy and fuels, ancillary materials, emissions and waste) was collected at the production-process level. Using the total output of the production process in 2024, these flows are allocated to the reference product based on volume.

Fly ash is a byproduct of coal combustion, mainly from coal-fired power plants. An economic allocation factor was calculated, based on market prices for fly ash and for electricity production from coal.

LCA: Scenarios and additional technical information

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

Transport to the building site (A4)	Value	Unit
Transported mass	2333.00	kg
Gross density of products transported	2333.00	kg / m³
Truck: Distance	20.00	km
Truck: Energy demand	1.58	MJ / t*km
Truck: Activity	transport, freight, lorry >32 metric ton, EURO6	-
Truck: Capacity utilization	53.30	%

Installation into the building (A5)	Value	Unit
Installation loss	1.50	%
Formwork	-	kg
Falsework	-	kg
Distance to waste landfill facility (for installation losses)	50.00	km
Amount of electricity to pour 1 m³ of concrete	3.00	kWh
Amount of diesel to pour 1 m³ of concrete	60.00	MJ
Water	0.29	m³
Wastewater treatment	0.29	m³

Formwork and Falsework each contribute less than 1% of the total product CO_2 emissions, and are therefore neglected under cut-off rules. (Kaethner, Burridge, 2012). Other sources: Concrete waste: Adams & Hobbs (2023). Electricity, Diesel: Ecoinvent benchmark average.

Use of the installed product (B1)	Value	Unit
Reference use period	50.00	years
Application	Building, inside, with paint or wallpaper	
Degree of carbonatation (Dc)	0.40	-
Cement absorption factor	0.10	kg CO_2 / kg Cement
k-factor	4.60	mm / √year
Correction factor	1.05	-
Surface area of concrete	5.00	m²

Calculation of carbonatation according to EN 16757. k-factor results from the concrete's compressive strength and its application. The cement absorption factor (maximum theoretical CO2 uptake) depends on the average clinker content in cement. The correction factor results from cement substitutes in the recipe.

Demolition (C1)	Value	Unit
Diesel required to demolish 1 kg of concrete	0.06	MJ / kg
PM 10 emissions during the demolishment of 1 kg of concrete	6.00e-05	kg / kg
PM 2.5 emissions during the demolishment of 1 kg of concrete	1.70e-05	kg / kg

Transport to the waste facility (C2)	Value	Unit
Mass to landfill	163.31	kg
Mass to recycling	2169.69	kg
Distance to recycling	50.00	km
Distance to landfill	50.00	km
Truck: Activity	transport, freight, lorry >32 metric ton, EURO6	-
Truck: Capacity utilization	53.30	%
Truck: Distance	50.00	km
Truck: Energy demand	1.58	MJ / t*km

Waste processing (C3)	Value	Unit
Material for recycling	2169.69	kg
Recycling rate	93.00	%

Carbonation during waste processing is not considered. Recycling rate reflects the modeled geography.

Disposal (C4)	Value	Unit
Material for landfill	163.31	kg

Reuse, recovery and/or recycling potentials (D)	Value	Unit
Amount of secondary material that the system takes in	60.00	kg
Substitution of gravel	2113.90	kg

Calculation of benefits and loads per EN 15804+A2.

LCA: Results

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
GWP-total	kg CO_2-eq.	1.15e+02 (9.32e+01)*	4.84e+00	9.78e+00	-2.15e+00	1.43e+01	1.21e+01	1.33e+01	1.02e+00	-4.33e+00
GWP-fossil	kg CO_2-eq.	1.06e+02 (9.24e+01)*	4.83e+00	9.49e+00	-2.15e+00	1.43e+01	1.21e+01	1.33e+01	1.02e+00	-4.20e+00
GWP-biogenic	kg CO_2-eq.	9.51e+00 (8.13e-01)*	2.42e-03	2.84e-01	0.00e+00	1.43e-03	6.06e-03	0.00e+00	0.00e+00	-1.33e-01
GWP-luluc	kg CO_2-eq.	5.11e-02	1.72e-03	4.36e-03	0.00e+00	1.24e-03	4.29e-03	1.16e-03	5.30e-04	-4.73e-04
ODP	kg CFC-11-Eq	5.07e-07	1.01e-07	1.26e-07	0.00e+00	2.19e-07	2.52e-07	2.04e-07	2.95e-08	-5.92e-08
AP	mol H+-Eq	3.27e-01	1.14e-02	6.48e-02	0.00e+00	1.29e-01	2.85e-02	1.20e-01	7.23e-03	-3.63e-02
EP-freshwater	kg P-Eq	2.68e-02	3.40e-04	2.75e-03	0.00e+00	4.16e-04	8.50e-04	3.88e-04	8.47e-05	-1.85e-04
EP-marine	kg N-Eq	8.03e-02	2.99e-03	3.33e-02	0.00e+00	5.98e-02	7.48e-03	5.57e-02	2.76e-03	-1.44e-02
EP-terrestrial	mol N-Eq	8.86e-01	3.24e-02	3.05e-01	0.00e+00	6.55e-01	8.09e-02	6.10e-01	3.01e-02	-1.68e-01
POCP	kg NMVOC-Eq	2.69e-01	1.98e-02	9.21e-02	0.00e+00	1.95e-01	4.95e-02	1.82e-01	1.08e-02	-4.80e-02
ADPE	kg Sb-Eq	8.45e-04	1.38e-05	1.93e-05	0.00e+00	5.13e-06	3.45e-05	4.77e-06	1.62e-06	-4.30e-05
ADPF	MJ, net calorific value	9.40e+02	7.25e+01	1.24e+02	0.00e+00	1.87e+02	1.81e+02	1.74e+02	2.50e+01	-6.13e+01
WDP	m^3 world Eq deprived	2.80e+01	3.64e-01	9.94e-01	0.00e+00	4.58e-01	9.11e-01	4.26e-01	7.00e-02	-2.96e+00

GWP-total: Global Warming Potential - total**GWP-fossil**: Global warming potential - fossil**GWP-biogenic**: Global Warming Potential - biogenic**GWP-luluc**: Global Warming Potential - luluc**ODP**: Depletion potential of the stratospheric ozone layer**AP**: Acidification potential, Accumulated Exceedance**EP-freshwater**: Eutrophication potential - freshwater**EP-marine**: Eutrophication potential - marine**EP-terrestrial**: Eutrophication potential - terrestrial**POCP**: Photochemical Ozone Creation Potential**ADPE**: Abiotic depletion potential - non-fossil resources**ADPF**: Abiotic depletion potential - fossil resources**WDP**: Water (user) deprivation potential

* The first value is the gross value, it includes the impacts from all manufacturing activities. Gross values are more commonly used in Northern Europe. The value in brackets is the net value, it excludes the impact from the incineration of waste-derived fuels, and is more common in Central Europe and Germany.

Additional indicators

Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
PM	disease incidence	ND	4.71e-07	ND	0.00e+00	2.08e-05	1.18e-06	1.95e-05	1.65e-07	-9.95e-07
IRP	kBq U235-Eq	ND	8.81e-02	ND	0.00e+00	8.37e-02	2.20e-01	7.79e-02	1.60e-02	-7.07e-01
ETP-fw	CTUe	ND	1.72e+01	ND	0.00e+00	2.65e+01	4.30e+01	2.47e+01	3.42e+00	-3.03e+01
HTP-c	CTUh	ND	3.09e-08	ND	0.00e+00	5.59e-08	7.73e-08	5.20e-08	4.61e-09	-6.84e-08
HTP-nc	CTUh	ND	4.78e-08	ND	0.00e+00	2.54e-08	1.20e-07	2.36e-08	4.50e-09	-3.98e-08
SQP	dimensionless	ND	7.29e+01	ND	0.00e+00	1.31e+01	1.82e+02	1.22e+01	4.93e+01	-1.38e+02

PM: Potential incidence of disease due to PM emissions**IRP**: Potential Human exposure efficiency relative to U235**ETP-fw**: Potential Comparative Toxic Unit for ecosystems**HTP-c**: Potential Comparative Toxic Unit for humans - cancer effects**HTP-nc**: Potential Comparative Toxic Unit for humans - non-cancer effects**SQP**: Potential Soil quality index

IRP: 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.
ETP-fw, **HTP-c**, **HTP-nc** and **SQP**: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with these indicators.

Use of resources

Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
PERE	MJ	1.67e+02	1.15e+00	8.39e+00	0.00e+00	1.14e+00	2.88e+00	1.06e+00	2.32e-01	-2.00e+01
PERM	MJ	6.99e-01	0.00e+00	1.05e-02	0.00e+00	0.00e+00	0.00e+00	-6.50e-01	0.00e+00	0.00e+00
PERT	MJ	1.68e+02	1.15e+00	8.40e+00	0.00e+00	1.14e+00	2.88e+00	4.14e-01	2.32e-01	-2.00e+01
PENRE	MJ	9.24e+02	7.25e+01	1.24e+02	0.00e+00	1.87e+02	1.81e+02	1.74e+02	2.50e+01	-6.13e+01
PENRM	MJ	1.64e+01	0.00e+00	2.46e-01	0.00e+00	0.00e+00	0.00e+00	-1.53e+01	0.00e+00	0.00e+00
PENRT	MJ	9.40e+02	7.25e+01	1.24e+02	0.00e+00	1.87e+02	1.81e+02	1.59e+02	2.50e+01	-6.13e+01
SM	kg	2.76e+02	0.00e+00	4.14e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.11e+03
RSF	MJ	1.25e+02	0.00e+00	1.87e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
NRSF	MJ	2.10e+02	0.00e+00	3.15e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
FW	m^3	2.06e+00	1.05e-02	5.25e-02	0.00e+00	1.21e-02	2.64e-02	1.13e-02	2.60e-02	-3.00e+00

PERE: Primary energy resources - renewable: use as energy carrier**PERM**: Primary energy resources - renewable: used as raw materials**PERT**: Primary energy resources - renewable: total**PENRE**: Primary energy resources - non-renewable: use as energy carrier**PENRM**: Primary energy resources - non-renewable: used as raw materials**PENRT**: Primary energy resources - non-renewable: total**SM**: Use of secondary material**RSF**: Renewable secondary fuels**NRSF**: Non-renewable secondary fuels**FW**: Net use of fresh water

Waste flows

Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
HWD	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
NHWD	kg	0.00e+00	0.00e+00	3.50e+01	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.63e+02	0.00e+00
RWD	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

HWD: Hazardous waste disposed**NHWD**: Non hazardous waste disposed**RWD**: Radioactive waste disposed

Output flows

Indicator	Unit	A1-A3	A4	A5	B1	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	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.17e+03	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	0.00e+00
EEE	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	0.00e+00
EET	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	0.00e+00

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

Name	Value	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in accompanying packaging	0	kg C

Additional requirements

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

Electricity consumption in the manufacturing phase is composed from the source below. This EPD follows the market-based approach.

Electricity	Quantity [kWh]	Emission Factor [kg CO_2e/kWh]
electricity, high voltage, residual mix (DE)	2.68	0.84

Dangerous substances

The product contains no hazardous substances given by the REACH Candidate List or the Norwegian Priority List.

Additional environmental information

Additional environmental impact indicators required in NPCR Part A for construction products

Indicator	Unit	A1-A3	A4	A5	B1	C1	C2	C3	C4	D
GWP-IOBC	kg CO_2-eq.	ND	4.83e+00	ND	-2.15e+00	1.43e+01	1.21e+01	1.33e+01	1.02e+00	-4.21e+00

GWP-IOBC: Global Warming Potential - Instantaneous oxidation of biogenic carbon

Bibliography

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epd-global Powered by EPD-Norway	**Program Operator**	Phone	+47 23 08 80 00
	EPD Global		
	P.O. Box 5250 Majorstuen, N-0303 Oslo	Email	post@epd-norge.no
	Norway	Web	www.epd-global.no
epd-global Powered by EPD-Norway	**Publisher**	Phone	+47 23 08 80 00
	EPD Global		
	P.O. Box 5250 Majorstuen, N-0303 Oslo	Email	post@epd-norge.no
	Norway	Web	www.epd-global.no
SCHWENK Baustoff leben	**Owner of the declaration**	Phone	+49 731 9341 0
	SCHWENK Beton Mainfranken GmbH & Co.KG		
	Südliche Hafenstraße 6A, 97080 Würzburg	Email	info@schwenk.com
	Germany	Web	none
SCHWENK Baustoff leben	**Author of the life cycle assesment**	Phone	+49 731 9341 0
	SCHWENK Beton Mainfranken GmbH & Co.KG		
	Südliche Hafenstraße 6A, 97080 Würzburg	Email	info@schwenk.com
	Germany	Web	none
ECO PLATFORM EPD VERIFIED	ECO Platform ECO Portal	Web Web	www.eco-platform.org ECO Portal
EMIDAT	**Developer of EPD generator**	Phone	+49 176 56 96 77 91
	Emidat GmbH		
	Sandstraße 33, 80335 München	Email	epd@emidat.com
	Germany	Web	www.emidat.com