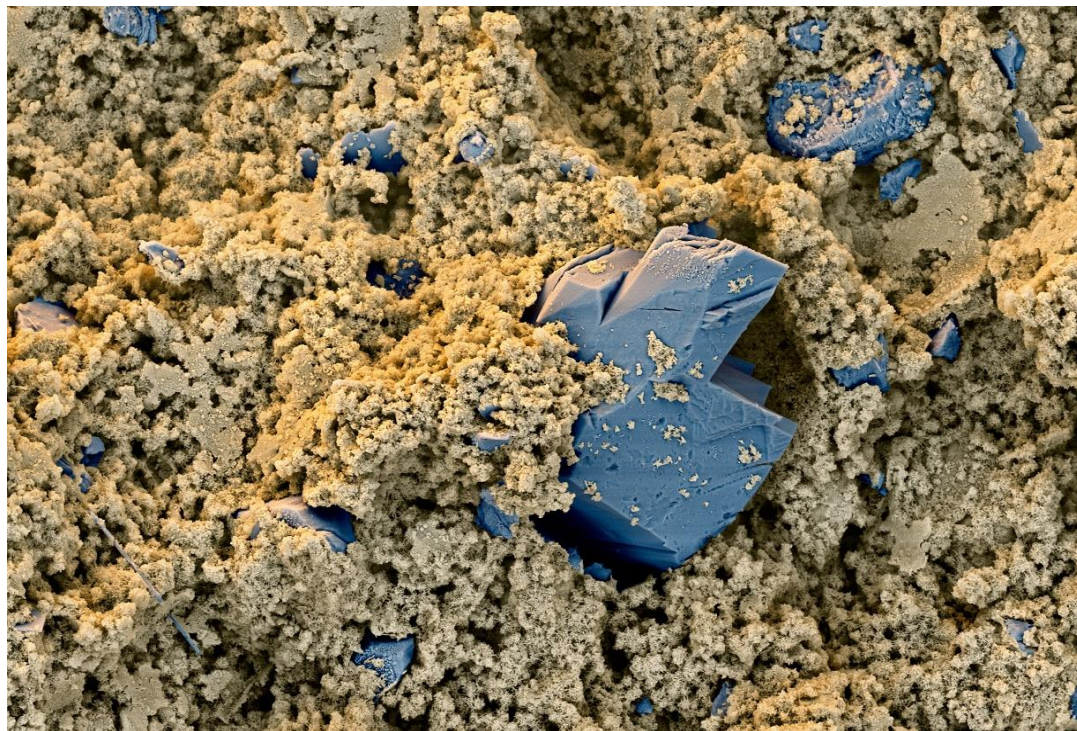


ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Master X-Seed 140

Master Builders Solutions



EPD HUB, HUB-0921

Publishing date 06 December 2023, last updated on 06 December 2023, valid until 06 December 2028.

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Master Builders Solutions
Address	Metallvägen 42, 195 72 Rosersberg, Sweden
Contact details	Sustainability-team@masterbuilders.com
Website	www.master-builders-solutions.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with modules C1-C4 and D
EPD author	Shirin Fataei - Master Builders Solutions
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification
EPD verifier	Haiha Nguyen, as an authorized verifier acting for EPD Hub Limited

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Master X-Seed 140
Place of production	Rosersberg, Sweden
Period for data	2022
Averaging in EPD	No averaging

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	1.02
GWP-total, A1-A3 (kgCO ₂ e)	1.03
Secondary material, inputs (%)	0.361
Secondary material, outputs (%)	52.7
Total energy use, A1-A3 (kWh)	3.49
Total water use, A1-A3 (m ³ e)	0.1

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Master Builders Solutions is one of the leading suppliers of concrete admixtures and underground construction solutions worldwide. With over a century of experience in the construction industry, we leverage cutting-edge technologies, a global community of experts at the core of our business, as well as in-depth knowledge of local building needs to provide innovative and sustainable solutions.

PRODUCT DESCRIPTION

Master X-Seed 140 is an engineered strength-enhancing, chloride free admixture, that promotes the cement hydration and improves the growth of Hydrate crystals. Master X-Seed 140 strongly accelerates hydration at early (24 hours). Master X-Seed 140 helps in supporting a sustainable construction by optimization of the concrete mix design. The strength-enhancing property of Master X-Seed 140 permits a reduction in the total cementitious materials content of a given concrete mixture, while maintaining compressive strength development equivalent to that of reference concrete, with associated benefits in CO₂ emission reduction. For this reason, Master X-Seed 140 is strongly recommended for mass concrete constructions in low temperatures as well concrete elements where low heat of hydration during concrete hardening is required Master X-Seed 140 affects the setting time, which also may affect the slump retention.

Master X-Seed 140 meets EN 934-2 table 7 and ASTM C 494/C 494M requirements for Type S, specific performance admixtures.

Further information can be found at www.master-builders-solutions.com

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	-
Minerals	>82	Norway, Germany, EU
Fossil materials	<18	Germany, EU
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate.

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg
Mass per declared unit	1 kg

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

Concrete admixtures are manufactured by mixing the ingredients (together) in batch mode, and then poured in containers or pumped into the truck tankers.

Master X-Seed 140 hardening accelerators are delivered only in bulk by tank trucks; therefore, no packaging was modelled.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final product delivery to the construction site (A4) and installation phase (A5) are not modelled.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.

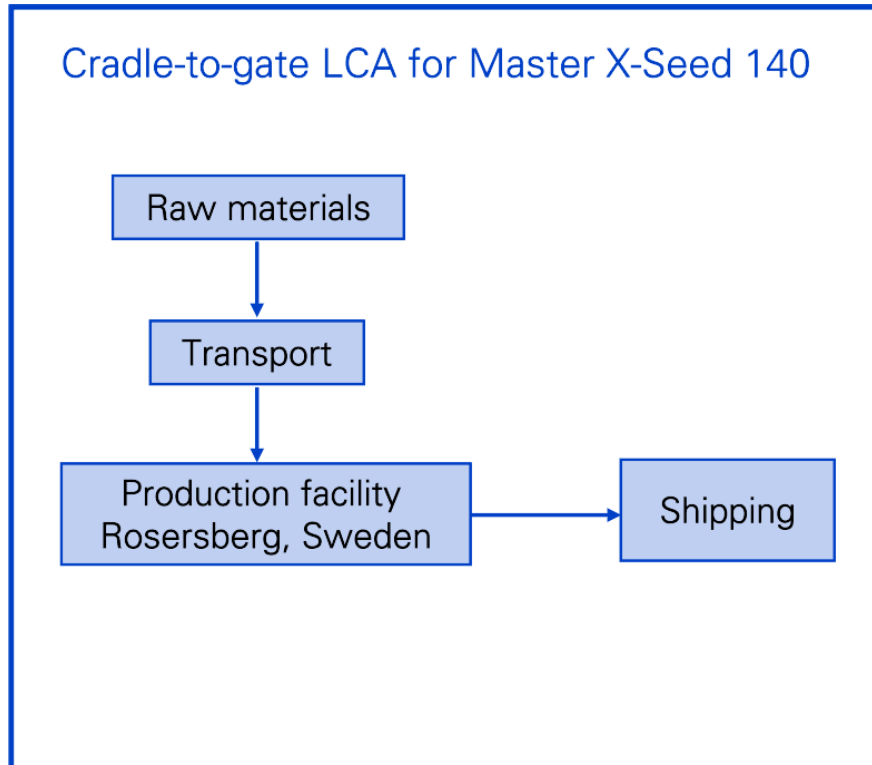
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The admixture becomes an inseparable part of the concrete, and therefore it undergoes a similar end of life scenario. The deconstruction of concrete takes place in C1 module which considers energy for dismantling, particulate matter emissions from dismantling and handling. After the demolition, the debris are transported to the end-of-life processing (C2) where all the impacts related to the transport processes are considered. According to the regional data, 52.7% of the waste concrete is treated to be reused as recycled aggregates (C3) and the rest (47.3%) is treated as inert material for landfill (C4).

The benefits and loads of recycled aggregates (from C3) are modelled and included beyond the system boundary (D).

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	Not applicable
Ancillary materials	Not applicable
Manufacturing energy and waste	Allocated by mass or volume

The following assumptions were made:

- Transport distance for concrete waste at the end-of-life (C2) is considered 100 km as the worst-case scenario.
- Consumed energy for demolition (C1) is 0.07 MJ / kg [Source: [EUR 29123 EN Model for Life Cycle Assessment \(LCA\) of buildings](#)].
- End-of-life waste processing ratio (i.e., 52.7% as recycling concrete and 47.3% as landfill) (C3 and C4) [Source: [Bygg- och rivningsavfall from The Swedish Environmental Protection Agency](#)].

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	-

This EPD is product and factory specific and does not contain average calculations.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent 3.8 and One Click LCA databases were used as sources of environmental data. Further EPDs to Ecoinvent databases are:

- EPD for “Hardening accelerator for concrete, Master X-Seed 100” (EPD number: HUB-0037).

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	8.95E-01	1.30E-01	7.61E-04	1.03E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	6.44E-03	9.39E-03	8.95E-04	1.40E-03	-4.25E-03
GWP – fossil	kg CO ₂ e	8.92E-01	1.30E-01	7.09E-04	1.02E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	6.44E-03	9.38E-03	2.12E-03	2.49E-03	-4.23E-03
GWP – biogenic	kg CO ₂ e	2.32E-03	0.00E+00	0.00E+00	2.32E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	-1.22E-03	-1.10E-03	-1.26E-05
GWP – LULUC	kg CO ₂ e	3.69E-04	4.80E-05	5.26E-05	4.70E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	6.41E-07	3.46E-06	2.11E-07	2.35E-06	-5.83E-06
Ozone depletion pot.	kg CFC ₁₁ e	9.03E-08	2.99E-08	3.29E-11	1.20E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.38E-09	2.16E-09	4.53E-10	1.01E-09	-3.45E-10
Acidification potential	mol H ⁺ e	4.42E-03	5.51E-04	3.59E-06	4.97E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	6.69E-05	3.97E-05	2.20E-05	2.34E-05	-2.74E-05
EP-freshwater ²⁾	kg Pe	8.63E-06	1.07E-06	3.33E-08	9.73E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.13E-08	7.68E-08	7.01E-09	2.61E-08	-2.41E-07
EP-marine	kg Ne	1.35E-03	1.64E-04	8.06E-07	1.51E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.96E-05	1.18E-05	9.74E-06	8.11E-06	-5.94E-06
EP-terrestrial	mol Ne	1.26E-02	1.81E-03	1.00E-05	1.44E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	3.25E-04	1.30E-04	1.07E-04	8.92E-05	-7.73E-05
POCP (“smog”) ³⁾	kg NMVOCe	1.90E-03	5.78E-04	2.29E-06	2.48E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	8.93E-05	4.17E-05	2.94E-05	2.59E-05	-1.99E-05
ADP-minerals & metals ⁴⁾	kg Sbe	1.93E-05	3.05E-07	1.33E-08	1.96E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	3.26E-09	2.20E-08	1.08E-09	5.72E-09	-4.12E-08
ADP-fossil resources	MJ	1.21E+01	1.95E+00	1.01E-01	1.41E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	8.66E-02	1.41E-01	2.85E-02	6.83E-02	-6.12E-02
Water use ⁵⁾	m ³ e depr.	4.29E-01	8.74E-03	3.87E-03	4.41E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	2.33E-04	6.31E-04	7.66E-05	2.17E-04	-8.09E-03

¹⁾ GWP = Global Warming Potential; ²⁾ EP = Eutrophication potential; ³⁾ POCP = Photochemical ozone formation; ⁴⁾ ADP = Abiotic depletion potential

For EP-freshwater, the required characterization method and data are in kg P-eq. Multiply by 3,07 to get PO₄e

^{4,5)} EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health: 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 experience with the indicator

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1.10E-07	1.50E-08	5.26E-11	1.25E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.79E-09	1.08E-09	4.51E-09	4.72E-10	-3.53E-10
Ionizing radiation ⁶⁾	kBq U235e	4.60E-02	9.31E-03	7.27E-03	6.26E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	3.98E-04	6.71E-04	1.31E-04	3.09E-04	-9.11E-04
Ecotoxicity (freshwater)	CTUe	1.47E+01	1.76E+00	3.57E-02	1.65E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	5.20E-02	1.27E-01	1.71E-02	4.46E-02	-7.70E-02
Human toxicity, cancer	CTUh	9.47E-10	4.32E-11	9.24E-13	9.91E-10	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.99E-12	3.11E-12	6.56E-13	1.11E-12	-4.26E-12
Human tox. non-cancer	CTUh	1.10E-08	1.74E-09	1.81E-11	1.27E-08	MND	MND	MND	MND	MND	MND	MND	MND	MND	3.76E-11	1.25E-10	1.24E-11	2.91E-11	-7.88E-11
SQP ⁷⁾	-	2.21E+00	2.25E+00	2.29E-02	4.49E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.13E-02	1.62E-01	3.70E-03	1.46E-01	-5.88E-02

⁶⁾ EN 15804+A2 disclaimer for Ionizing radiation, human health: 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.

⁷⁾ SQP = Land use related impacts/soil quality

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy ⁸⁾	MJ	6.26E-01	2.20E-02	4.18E-02	6.90E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	4.95E-04	1.59E-03	1.63E-04	5.93E-04	-5.50E-03
Renew. PER as material	MJ	6.43E-03	0.00E+00	0.00E+00	6.43E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	-3.39E-03	-3.04E-03	0.00E+00
Total use of renew. PER	MJ	6.33E-01	2.20E-02	4.18E-02	6.97E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	4.95E-04	1.59E-03	-3.22E-03	-2.45E-03	-5.50E-03
Non-re. PER as energy	MJ	9.83E+00	1.95E+00	1.01E-01	1.19E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	8.66E-02	1.41E-01	2.85E-02	6.83E-02	-6.12E-02
Non-re. PER as material	MJ	2.26E+00	0.00E+00	0.00E+00	2.26E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	-1.19E+00	-1.07E+00	0.00E+00
Total use of non-re. PER	MJ	1.21E+01	1.95E+00	1.01E-01	1.41E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	8.66E-02	1.41E-01	-1.16E+00	-1.00E+00	-6.12E-02
Secondary materials	kg	3.61E-03	5.43E-04	7.00E-06	4.16E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	3.39E-05	3.91E-05	1.11E-05	1.44E-05	-6.73E-05
Renew. secondary fuels	MJ	1.79E-05	5.47E-06	2.33E-08	2.34E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.11E-07	3.95E-07	3.64E-08	3.75E-07	-4.82E-07
Non-ren. secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m ³	1.00E-01	2.53E-04	9.73E-05	1.00E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	5.26E-06	1.83E-05	1.73E-06	7.48E-05	-1.95E-04

⁸⁾ PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	2.97E-02	2.59E-03	7.56E-05	3.24E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	1.16E-04	1.87E-04	3.81E-05	0.00E+00	-3.58E-04
Non-hazardous waste	kg	8.68E-01	4.26E-02	1.81E-03	9.12E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	8.14E-04	3.07E-03	2.68E-04	4.73E-01	-1.06E-02
Radioactive waste	kg	6.17E-05	1.31E-05	1.56E-06	7.63E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	6.10E-07	9.43E-07	2.01E-07	0.00E+00	-3.05E-07

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	5.27E-01	0.00E+00	0.00E+00
Materials for energy rec	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG ⁹⁾	kg CO ₂ e	8.92E-01	1.30E-01	7.09E-04	1.02E+00	MND	1.46E-03	MND	MND	MND	MND	MND	MND	MND	6,44E-03	9,38E-03	2,12E-03	2,49E-03	-4.23E-03

⁹⁾ This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH₄ fossil, CH₄ biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO₂ is set to zero.

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the ED Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
06.12.2023

