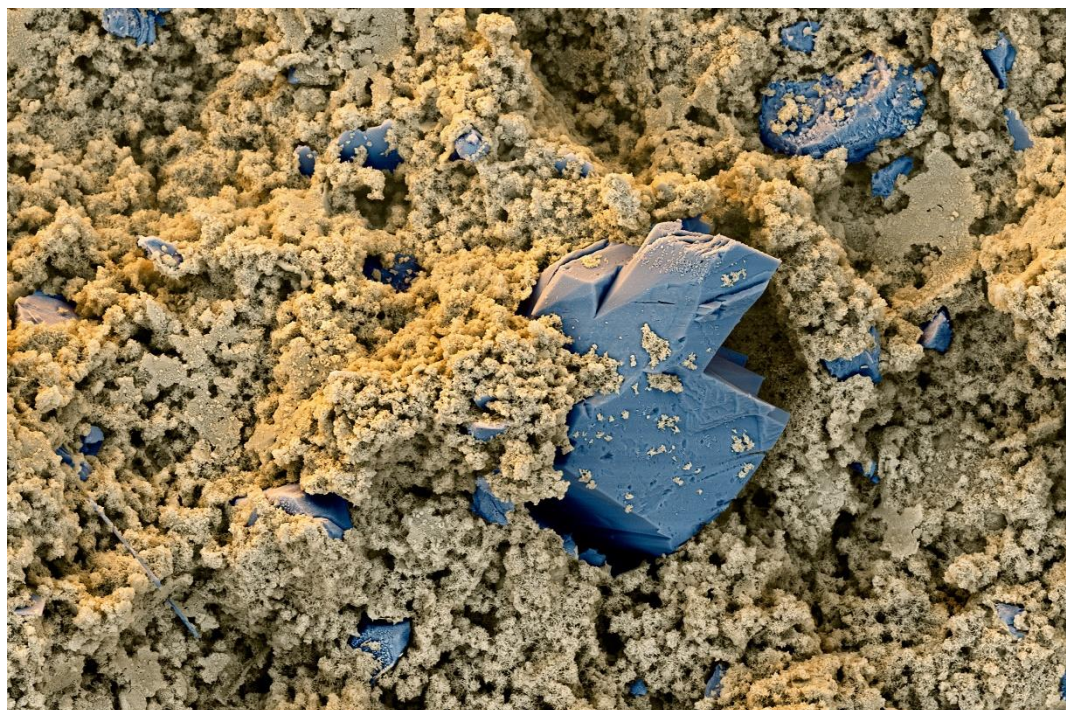


ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Master X-Seed 100

Master Builders Solutions Deutschland GmbH



EPD HUB, HUB-0037

Publishing date 17 May 2022, last updated date 17 May 2022, valid until 17 May 2027

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Master Builders Solutions Deutschland GmbH
Address	Dr-Albert-Frank-Strasse 32, 83308 Trostberg, Germany
Contact details	admixtures-de@mbcc-group.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 options, A5, and modules C1-C4 and D
EPD author	Annika Bantle - Master Builders Solutions Deutschland GmbH
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	E.A, 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 100
Place of production	Trostberg, Germany
Period for data	2021
Averaging in EPD	No averaging

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	0,723
GWP-total, A1-A3 (kgCO ₂ e)	0,726
Secondary material, inputs (%)	0,268
Secondary material, outputs (%)	0
Total energy use, A1-A3 (kWh)	2,09
Total water use, A1-A3 (m ³ e)	0,147

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

The Master Builders Solutions brand brings all of our expertise together to create chemical solutions for new construction, maintenance, repair and renovation of structures. Master Builders Solutions is built on the experience gained from more than a century in the construction industry. The know-how and experience of a global community of construction experts form the core of Master Builders Solutions. We combine the right elements from our portfolio to solve your specific construction challenges. We collaborate across areas of expertise and regions and draw on the experience gained from countless construction projects worldwide. We leverage global technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make you more successful and drive sustainable construction. The comprehensive portfolio under the Master Builders Solutions brand encompasses concrete admixtures, cement additives, solutions for underground construction, waterproofing solutions, sealants, concrete repair & protection solutions, performance grouts, performance flooring and solutions for on- and offshore wind energy.

PRODUCT DESCRIPTION

Master X-Seed admixtures are hardening accelerators that boost the hydration process of early age cement. Master X-Seed 100 is added to concrete in order to accelerate the strength development of the concrete mix across all temperature ranges. Master X-Seed consists of synthetically produced crystalline particles suspended in aqueous solution.

Master X-Seed is introduced in small amounts (0.5-5 % by mass of the cement content) to concrete in order to accelerate the hardening process. Master X-Seed is optimized for all kind of concretes, especially for structural precast elements and ready-mix concrete.

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	32	Netherlands
Fossil materials	9	Germany
Bio-based materials	-	-
Water	59	Germany

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	x	MND	MND	MND	MND	MND	MND	MND	x	x	MNR	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.

The production of the hardening accelerators involves batch mixing of the various ingredients. The raw materials are added into a batch reactor and transported after mixing to a filling station. The process follows standards described in /EN 934-6:2001/ Admixture for concrete, mortar and grout.

Master X-Seed hardening accelerators are delivered as aqueous solutions in intermediate bulk containers (IBC) with 1140 kg product. For larger applications the product is delivered in bulk by tank trucks.

The IBCs consist of plastic containers (typically HDPE) surrounded by a metal cage (typically steel) supported by an integrated plastic pallet (typically HDPE). Empty containers can be reused or recycled.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to the batching plant (A4) are not considered.

During concrete manufacture, hardening accelerators are usually added along with the mixing water. Health and safety measures (eye protection, hand protection, possibly respiratory equipment and body protection) are to be taken and consistently adhered to in accordance with the information on the safety data sheet and conditions on site. This scenario is not considered in the LCA for module A5.

The treatment of packaging waste (IBC) is covered in the A5 module.

PRODUCT USE AND MAINTENANCE (B1-B7)

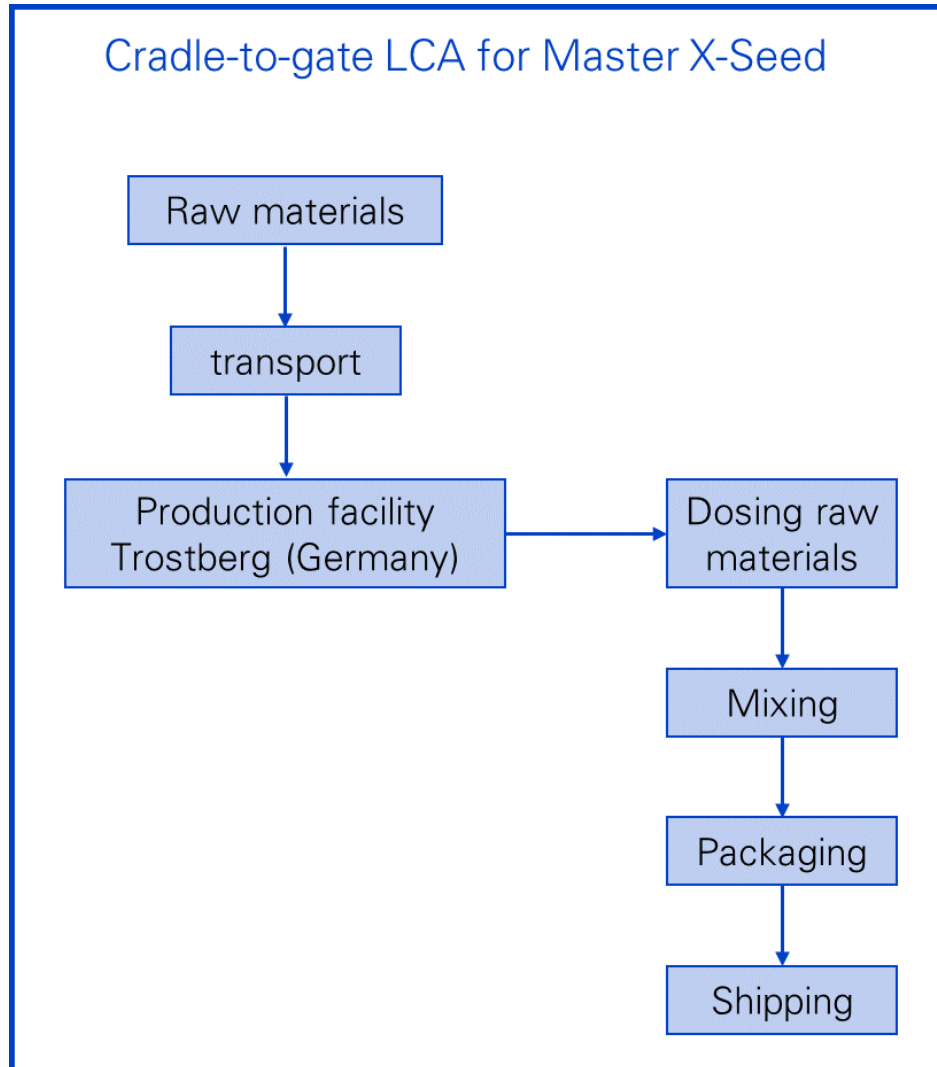
This EPD does not cover the use phase.

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

PRODUCT END OF LIFE (C1-C4, D)

The building deconstruction (demolition process) takes place in C1 module which considers energy for dismantling, particulate matter emissions from dismantling and handling. After the demolition, the admixture is transported to the end-of-life processing (C2 module) where all the impacts related to the transport processes are considered. For precautionary principle and as worst-case scenario, disposal is the only end of life scenario considered. This is modelled by landfill process (module C4) where admixtures end their life cycle.

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.

No cut-off was applied in the LCA calculation. All raw materials used were taken into consideration. Manufacture of machinery, buildings, and other infrastructure was not included in the LCA.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per the reference standard, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

All inputs of materials and utilities for production of Master X-Seed 100 were considered.

Transport: it was assumed that all raw materials are transported 500 km by truck to the distribution centre.

Packaging: typical intermediate bulk containers (IBC) were assumed, consisting of 20 kg steel cages, 21 kg HDPE integrated pallet and 15 kg HDPE "bottle" (the holding volume) containing a total of 1140 kg of Master X-Seed product. Furthermore, it was assumed that the bottle is not reused; for the steel cage and integrated HDPE pallet 10 use cycles were assumed.

The production of Master X-Seed does not involve any co-products. Therefore, no allocation was necessary.

Allocation used in environmental data sources is aligned with the above.

AVERAGES AND VARIABILITY

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 and One Click LCA databases were used as sources of environmental data.

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	kg CO ₂ e	6,3E-1	6,05E-2	3,51E-2	7,26E-1	MND	1,67E-3	MND	MND	MND	MND	MND	MND	MND	4E-3	4,55E-3	MNR	5,28E-3	-6,51E-3
GWP – fossil	kg CO ₂ e	6,28E-1	6,04E-2	3,41E-2	7,23E-1	MND	1,68E-3	MND	MND	MND	MND	MND	MND	MND	4E-3	4,54E-3	MNR	5,27E-3	-6,78E-3
GWP – biogenic	kg CO ₂ e	1,69E-3	4,39E-5	9,99E-4	2,73E-3	MND	-7,54E-6	MND	MND	MND	MND	MND	MND	MND	1,11E-6	3,3E-6	MNR	1,04E-5	2,67E-4
GWP – LULUC	kg CO ₂ e	2,71E-4	1,82E-5	1,71E-5	3,06E-4	MND	9,79E-7	MND	MND	MND	MND	MND	MND	MND	3,38E-7	1,37E-6	MNR	1,56E-6	5,26E-7
Ozone depletion pot.	kg CFC-11e	7,22E-8	1,42E-8	5,57E-9	9,2E-8	MND	1,24E-10	MND	MND	MND	MND	MND	MND	MND	8,64E-10	1,07E-9	MNR	2,17E-9	-3,41E-11
Acidification potential	mol H ⁺ e	2,9E-3	2,54E-4	1,02E-4	3,26E-3	MND	4,92E-6	MND	MND	MND	MND	MND	MND	MND	4,18E-5	1,91E-5	MNR	5E-5	-2,36E-5
EP-freshwater ³⁾	kg Pe	1,18E-5	4,92E-7	2,23E-6	1,45E-5	MND	2,84E-8	MND	MND	MND	MND	MND	MND	MND	1,62E-8	3,7E-8	MNR	6,36E-8	-3,76E-8
EP-marine	kg Ne	5,95E-4	7,65E-5	1,77E-5	6,89E-4	MND	1,35E-6	MND	MND	MND	MND	MND	MND	MND	1,85E-5	5,75E-6	MNR	1,72E-5	-3,65E-6
EP-terrestrial	mol Ne	8,06E-3	8,45E-4	2,21E-4	9,13E-3	MND	1,48E-5	MND	MND	MND	MND	MND	MND	MND	2,03E-4	6,35E-5	MNR	1,9E-4	-4,16E-5
POCP (“smog”)	kg NMVOCe	1,32E-3	2,72E-4	6,91E-5	1,66E-3	MND	4,78E-6	MND	MND	MND	MND	MND	MND	MND	5,57E-5	2,04E-5	MNR	5,51E-5	-2,58E-5
ADP-minerals & metals	kg Sbe	1,36E-5	1,03E-6	6,11E-8	1,47E-5	MND	2,11E-8	MND	MND	MND	MND	MND	MND	MND	6,11E-9	7,75E-8	MNR	4,81E-8	-4,35E-8
ADP-fossil resources	MJ	6,08E0	9,4E-1	7,11E-1	7,73E0	MND	1,66E-2	MND	MND	MND	MND	MND	MND	MND	5,51E-2	7,07E-2	MNR	1,47E-1	-2,86E-1
Water use ²⁾	m ³ e depr.	2,27E-1	3,5E-3	7,58E-3	2,38E-1	MND	3,53E-4	MND	MND	MND	MND	MND	MND	MND	1,03E-4	2,63E-4	MNR	6,81E-3	-5,73E-3

ADDITIONAL (OPTIONAL) 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	1,46E-7	5,47E-9	7,74E-10	1,53E-7	MND	8,44E-11	MND	MND	MND	MND	MND	MND	MND	5,08E-9	4,11E-10	MNR	9,72E-10	-1,85E-10
Ionizing radiation ⁵⁾	kBq U235e	1,18E-2	4,11E-3	7,38E-3	2,32E-2	MND	5,03E-5	MND	MND	MND	MND	MND	MND	MND	2,36E-4	3,09E-4	MNR	6,04E-4	1,7E-5
Ecotoxicity (freshwater)	CTUe	1,2E1	7,19E-1	2,54E-1	1,3E1	MND	1,79E-2	MND	MND	MND	MND	MND	MND	MND	3,23E-2	5,4E-2	MNR	9,29E-2	-1,6E-2
Human toxicity, cancer	CTUh	2,18E-10	1,84E-11	1,16E-11	2,48E-10	MND	1,77E-12	MND	MND	MND	MND	MND	MND	MND	1,16E-12	1,38E-12	MNR	2,2E-12	3,31E-16
Human tox. non-cancer	CTUh	6,26E-9	8,51E-10	2,97E-10	7,41E-9	MND	2,53E-11	MND	MND	MND	MND	MND	MND	MND	2,85E-11	6,4E-11	MNR	6,79E-11	9,08E-11
SQP	-	5,24E-1	1,42E0	1,38E-2	1,96E0	MND	1,01E-2	MND	MND	MND	MND	MND	MND	MND	1,41E-3	1,07E-1	MNR	2,5E-1	8,37E-3

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	MJ	4,62E-1	1,18E-2	3E-2	5,04E-1	MND	8,28E-4	MND	MND	MND	MND	MND	MND	MND	2,98E-4	8,9E-4	MNR	1,19E-3	-6,62E-4
Renew. PER as material	MJ	1,02E-2	0E0	0E0	1,02E-2	MND	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	MNR	0E0	0E0
Total use of renew. PER	MJ	4,72E-1	1,18E-2	3E-2	5,14E-1	MND	8,28E-4	MND	MND	MND	MND	MND	MND	MND	2,98E-4	8,9E-4	MNR	1,19E-3	-6,62E-4
Non-re. PER as energy	MJ	5,57E0	9,4E-1	4,96E-1	7,01E0	MND	1,66E-2	MND	MND	MND	MND	MND	MND	MND	5,51E-2	7,07E-2	MNR	1,47E-1	-7,07E-2
Non-re. PER as material	MJ	5,05E-1	0E0	2,15E-1	7,2E-1	MND	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	MNR	0E0	-2,15E-1
Total use of non-re. PER	MJ	6,08E0	9,4E-1	7,11E-1	7,73E0	MND	1,66E-2	MND	MND	MND	MND	MND	MND	MND	5,51E-2	7,07E-2	MNR	1,47E-1	-2,86E-1
Secondary materials	kg	2,32E-3	0E0	3,63E-4	2,68E-3	MND	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	MNR	0E0	4,77E-3
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	MND	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	MNR	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	MND	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	MNR	0E0	0E0
Use of net fresh water	m ³	3,22E-3	1,96E-4	1,44E-1	1,47E-1	MND	4,99E-6	MND	MND	MND	MND	MND	MND	MND	4,86E-6	1,47E-5	MNR	1,61E-4	-1,36E-5

6) 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	2,02E-2	9,14E-4	1,05E-3	2,21E-2	MND	9,01E-5	MND	MND	MND	MND	MND	MND	MND	5,93E-5	6,87E-5	MNR	1,37E-4	-9,87E-5
Non-hazardous waste	kg	5,71E-1	1,01E-1	8,88E-2	7,61E-1	MND	2,4E-3	MND	MND	MND	MND	MND	MND	MND	6,33E-4	7,6E-3	MNR	1E0	-2,42E-4
Radioactive waste	kg	7,25E-5	6,45E-6	1,29E-6	8,02E-5	MND	6,28E-8	MND	MND	MND	MND	MND	MND	MND	3,86E-7	4,85E-7	MNR	9,74E-7	2,08E-8

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	0E0	0E0	0E0	0E0	MND	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	MNR	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	MND	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	MNR	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	MND	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	MNR	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	MND	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	MNR	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ e	4,9E-1	5,99E-2	3,35E-2	5,83E-1	MND	1,64E-3	MND	MND	MND	MND	MND	MND	MND	3,97E-3	4,5E-3	MNR	5,17E-3	-6,03E-3
Ozone depletion Pot.	kg CFC ₁₁ e	9,72E-8	1,13E-8	5,14E-9	1,14E-7	MND	1,03E-10	MND	MND	MND	MND	MND	MND	MND	6,84E-10	8,49E-10	MNR	1,72E-9	-3,39E-11
Acidification	kg SO ₂ e	2,06E-3	1,23E-4	8,51E-5	2,26E-3	MND	3,09E-6	MND	MND	MND	MND	MND	MND	MND	5,91E-6	9,25E-6	MNR	2,08E-5	-2,07E-5
Eutrophication	kg PO ₄ ³ e	5,8E-4	2,48E-5	6,79E-5	6,73E-4	MND	3,49E-6	MND	MND	MND	MND	MND	MND	MND	1,04E-6	1,87E-6	MNR	4,03E-6	1,59E-7
POCP (“smog”)	kg C ₂ H ₄ e	6,25E-5	7,79E-6	5,93E-6	7,63E-5	MND	2,88E-7	MND	MND	MND	MND	MND	MND	MND	6,08E-7	5,86E-7	MNR	1,53E-6	-2,68E-6
ADP-elements	kg Sbe	1,36E-5	1,03E-6	6,11E-8	1,47E-5	MND	2,11E-8	MND	MND	MND	MND	MND	MND	MND	6,11E-9	7,75E-8	MNR	4,81E-8	-4,35E-8
ADP-fossil	MJ	6,08E0	9,4E-1	7,11E-1	7,73E0	MND	1,66E-2	MND	MND	MND	MND	MND	MND	MND	5,51E-2	7,07E-2	MNR	1,47E-1	-2,86E-1

ENVIRONMENTAL IMPACTS – TRACI 2.1. / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ e	4,92E-1	5,98E-2	3,36E-2	5,85E-1	MND	1,64E-3	MND	MND	MND	MND	MND	MND	MND	3,95E-3	4,5E-3	MNR	5,14E-3	-6,08E-3
Ozone Depletion	kg CFC ₁₁ e	7,6E-8	1,51E-8	3,33E-9	9,44E-8	MND	1,35E-10	MND	MND	MND	MND	MND	MND	MND	9,12E-10	1,13E-9	MNR	2,29E-9	-4,02E-11
Acidification	kg SO ₂ e	2,15E-3	2,21E-4	8,44E-5	2,45E-3	MND	4,34E-6	MND	MND	MND	MND	MND	MND	MND	3,84E-5	1,66E-5	MNR	4,43E-5	-1,93E-5
Eutrophication	kg Ne	1,97E-4	3,11E-5	3,27E-5	2,61E-4	MND	5,89E-7	MND	MND	MND	MND	MND	MND	MND	3,38E-6	2,34E-6	MNR	5,31E-6	-6,43E-7
POCP (“smog”)	kg O ₃ e	2,45E-2	4,85E-3	1,12E-3	3,04E-2	MND	8,37E-5	MND	MND	MND	MND	MND	MND	MND	1,18E-3	3,65E-4	MNR	1,09E-3	-2,49E-4
ADP-fossil	MJ	3,8E-1	1,35E-1	8,43E-2	5,99E-1	MND	2,04E-3	MND	MND	MND	MND	MND	MND	MND	8,14E-3	1,01E-2	MNR	2,13E-2	-4,28E-2

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 EPD 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.

Elma Avdyli, as an authorized verifier acting for EPD Hub Limited
17.05.2022

