# ENVIRONMENTAL PRODUCT DECLARATION

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

**Ready Mixed Concrete 06R33A (F´c 350 Kg/cm²)**

Cementos Moctezuma

**EPD HUB, HUB-0420**

Publishing date 07 May 2023, last updated date 07 May 2023, valid until 07 May 2028

Created with One Click LCA

# GENERAL INFORMATION

## MANUFACTURER

| | |
|---|---|
| Manufacturer | Cementos Moctezuma |
| Address | 134 PH Lomas de Chapultepec Primera Sección, Miguel Hidalgo Ciudad de México, México. |
| Contact details | carmona.carlos@cmoctezuma.com.mx |
| Website | www.cmoctezuma.com.mx |

## EPD STANDARDS, SCOPE AND VERIFICATION

| | |
|---|---|
| Program operator | EPD Hub, hub@epdhub.com |
| Reference standard | ISO 21930:2017 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, A4-A5, and modules C1-C4, D |
| EPD author | Jorge Esqueda Querol - Master Builders Solutions Mexico |
| EPD verification | Independent verification of this EPD and data, according to ISO 14025:<br>☐ Internal certification ☑ External verification |
| EPD verifier | Silvia Vilcekova 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 | 06R33A |
| Product reference | F´c 350 Kg/cm2 |
| Place of production | Edo Mex, Mexico |
| Period for data | 2022 |
| Averaging in EPD | No averaging |
| Variation in GWP-fossil for A1-A3 | - |

## ENVIRONMENTAL DATA SUMMARY

| | |
|---|---|
| **Declared unit** | 1 cubic meter |
| **Declared unit mass** | 2356 kg |
| **GWP-fossil, A1-A3 (kgCO2e)** | 3.58E2 |
| **GWP-total, A1-A3 (kgCO2e)** | 3.4E2 |
| **Secondary material, inputs (%)** | 0.0208 |
| **Secondary material, outputs (%)** | 0.0 |
| **Total energy use, A1-A3 (kWh)** | 560.0 |
| **Total water use, A1-A3 (m3e)** | 2.36 |

# PRODUCT AND MANUFACTURER

## ABOUT THE MANUFACTURER

For over 75 years, at Cementos Moctezuma we have sold and responsibly marketed Portland cement and premixed concrete, with the primary purpose of supplying the construction industry with optimum quality products under two commercial brands: Cementos Moctezuma ®
and Concretos Moctezuma ®, which have gone above and beyond Mexican and international standards.

## PRODUCT DESCRIPTION

The product is aligned with UN CPC Group 375 - Concrete  is a composite material that consists of a binding medium (cement paste, hydraulic cement, and water, and possibly one or more admixtures) embedded with fine aggregate (typically sand) and coarse aggregate (typically gravel) to form a hard-solid mass. While the most widely used hydraulic cement is Portland cement, other hydraulic cements include blended cements and cementitious material such as ground granulated blast furnace slag (GGBFS). Pozzolans, both natural and artificial (e.g., fly ash and silica fume) are often used as a cementitious ingredient of concrete (adapted from the definition by Mather and Ozyildriim).

The constituent proportions of Ready Mixed Concrete 06R33A are 372 kg cement, 726 kg of sand, 1052 kg of gravel 6 L of admix and 200 L of water.

The specified compressive strengths 350 kg/cm2 at 28 days with a 14 cm slump.

Further information can be found at www.cmoctezuma.com.mx

## PRODUCT RAW MATERIAL MAIN COMPOSITION

| Raw material category | Amount, mass- % | Material origin |
|---|---|---|
| Metals | 0 | - |
| Minerals | 95-100% | Mexico |
| Fossil materials | 0-5% | Mexico |
| Bio-based materials | 0 | - |

## 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 cubic meter |
| Mass per declared unit | 2356 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 | x | MND | MND | MND | MND | MND | MND | MND | MND | x | x | MNR | x | MNR | | |
| 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 environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as 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 product is made of sand and aggregates (extracted from natural rock formations and reduced to usable sizes by mechanical crushing in the local quarry in Mexico, with sand 62 km distance and aggregates 24 km distance), cement (manufactured locally in Mexico, with 327 km distance), chemical admixtures (manufactured in Mexico City) and water (sourced from local treatment plant in Mexico through tap). The ingredients are transported from its source to the production facility and stored in the silo, bins and tanks.

In the concrete plant, each raw material is automatically weighed and feeds a mechanical mixer, which operates following the recipe of the concrete entered in its master system, for which it extracts the required weights of cement, aggregates, water and admixtures from the silos. The aggregates are the raw material of greater volume and therefore they are continuously fed to their storage silos by means of the operation of a front loader that carries them from their respective storage bay to a conveyor belt that feeds each silo. The humidity of aggregates is periodically controlled to adjust the amount of water incorporated into the mixture.

## TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. Fuel type and consumption of vehicle used for transport, ready-mix truck, aggregates, or cement truck. Distance between the ready-mix plant and the construction site is assumed as 50 Km (declared average).

Assembly is not covered in this EPD (A5).

## 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)

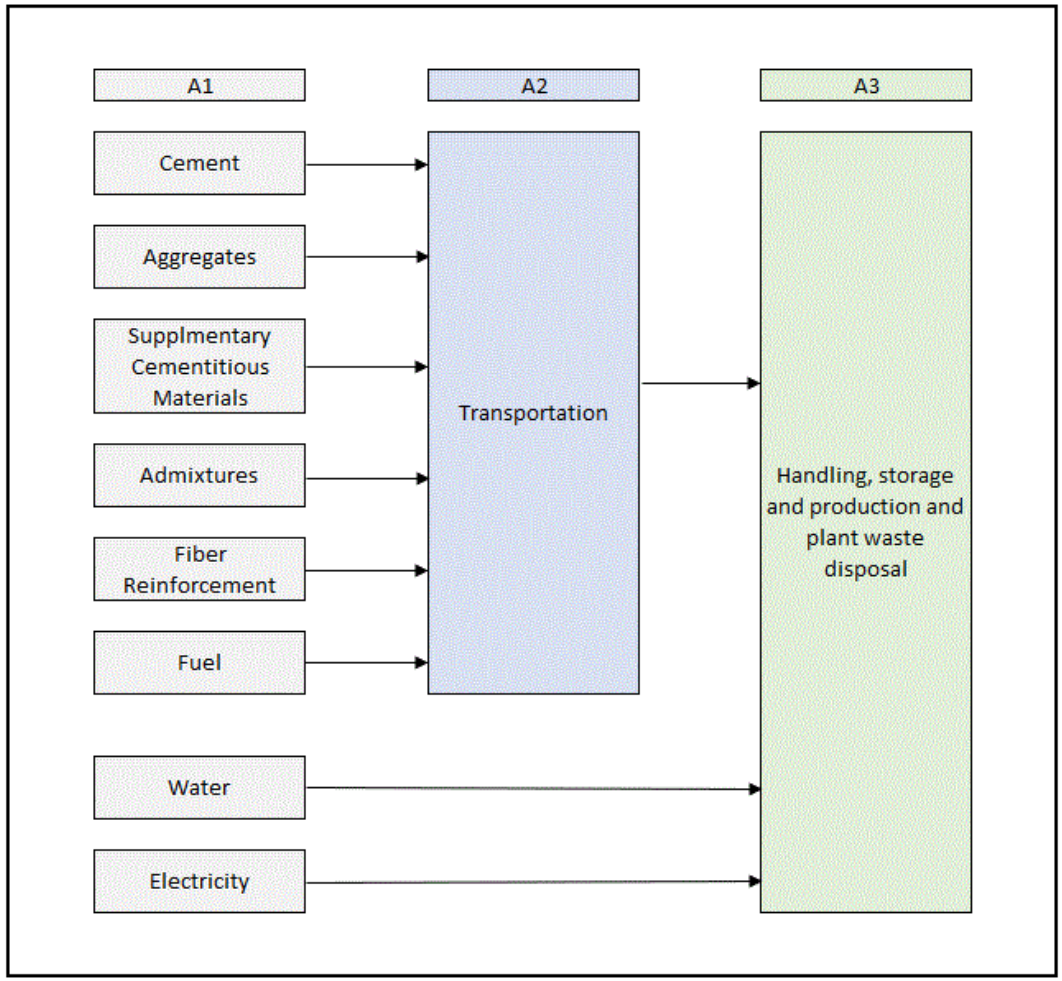
At the end-of-life, the components made of concrete will be deconstructed and collected as separate construction waste. In reinforced concrete elements, the concrete and the reinforcing steel are separated before further processing. Building machines, operating on diesel fuel are used for demolition of buildings. Energy consumption of a demolition process is on the average 0.07 MJ/kg of concrete based on EUR 29123 EN Model for Life Cycle Assessment (LCA) of buildings (C1).

The crushed concrete pieces are transported with trucks (heavier than 32 tons) to the nearest construction waste treatment facility. In this EPD, a 50 km distance between construction sites and the waste treatment facilities is considered (C2).

Although concrete can be generally recycled and reused (C3), recycling is not a typical practice in Mexico. Therefore, module C3 is marked as MNR (module not relevant). Instead, 100% of the concrete waste would end up as landfill in Edo Mex, Mexico (C4).

Since the material is not recycled or reused in this EPD, module D is marked as MNR. There are no loads and benefits to be modelled beyond the system boundaries.

# 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 | No allocation |
| Ancillary materials | Allocated by mass or volume |
| Manufacturing energy and waste | Allocated by mass or volume |

## AVERAGES AND VARIABILITY

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

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[1)] | kg $CO_2e$ | 3.39E2 | 0E0 | 5.83E-1 | 3.4E2 | 1.09E1 | MND | MND | MND | MND | MND | MND | MND | MND | 1.52E1 | 0E0 | MNR | 1.2E1 | MNR |
| GWP – fossil | kg $CO_2e$ | 3.39E2 | 1.83E1 | 6.15E-1 | 3.58E2 | 1.11E1 | MND | MND | MND | MND | MND | MND | MND | MND | 1.52E1 | 0E0 | MNR | -7.49E0 | MNR |
| GWP – biogenic | kg $CO_2e$ | 4.84E-1 | 0E0 | -3.28E-2 | 4.52E-1 | 0E0 | MND | MND | MND | MND | MND | MND | MND | MND | 0E0 | 0E0 | MNR | -4.51E-1 | MNR |
| GWP – LULUC | kg $CO_2e$ | 1.39E-1 | 6.62E-3 | 2.14E-4 | 1.46E-1 | 4.08E-3 | MND | MND | MND | MND | MND | MND | MND | MND | 1.51E-3 | 0E0 | MNR | 1.17E-2 | MNR |
| Ozone depletion pot. | kg $CFC_{-11}e$ | 1.27E-5 | 4.33E-6 | 9.69E-8 | 1.71E-5 | 2.54E-6 | MND | MND | MND | MND | MND | MND | MND | MND | 3.24E-6 | 0E0 | MNR | 5.02E-6 | MNR |
| Acidification potential | mol $H^+e$ | 9.86E-1 | 7.67E-2 | 3.3E-3 | 1.07E0 | 4.68E-2 | MND | MND | MND | MND | MND | MND | MND | MND | 1.58E-1 | 0E0 | MNR | 1.17E-1 | MNR |
| EP-freshwater[2)] | kg Pe | 4.61E-3 | 1.32E-4 | 1.83E-5 | 4.76E-3 | 9.05E-5 | MND | MND | MND | MND | MND | MND | MND | MND | 5.02E-5 | 0E0 | MNR | 1.3E-4 | MNR |
| EP-marine | kg Ne | 2.64E-1 | 2.31E-2 | 8.01E-4 | 2.88E-1 | 1.39E-2 | MND | MND | MND | MND | MND | MND | MND | MND | 6.97E-2 | 0E0 | MNR | 4.04E-2 | MNR |
| EP-terrestrial | mol Ne | 3.07E0 | 2.55E-1 | 7.99E-3 | 3.34E0 | 1.53E-1 | MND | MND | MND | MND | MND | MND | MND | MND | 7.65E-1 | 0E0 | MNR | 4.44E-1 | MNR |
| POCP ("smog")[3)] | kg NMVOCe | 7.8E-1 | 8.18E-2 | 2.4E-3 | 8.64E-1 | 4.91E-2 | MND | MND | MND | MND | MND | MND | MND | MND | 2.1E-1 | 0E0 | MNR | 1.29E-1 | MNR |
| ADP-minerals & metals[4)] | kg Sbe | 2.08E-3 | 4.29E-5 | 1.34E-6 | 2.12E-3 | 2.59E-5 | MND | MND | MND | MND | MND | MND | MND | MND | 7.69E-6 | 0E0 | MNR | 2.85E-5 | MNR |
| ADP-fossil resources | MJ | 1.65E3 | 2.79E2 | 1.01E1 | 1.94E3 | 1.66E2 | MND | MND | MND | MND | MND | MND | MND | MND | 2.04E2 | 0E0 | MNR | 3.4E2 | MNR |
| Water use[5)] | $m^3e$ depr. | 4.54E1 | 1.28E0 | 1.77E-1 | 4.68E1 | 7.43E-1 | MND | MND | MND | MND | MND | MND | MND | MND | 5.48E-1 | 0E0 | MNR | 1.08E0 | MNR |

## 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 | 1.1E2 | 3.48E0 | 5.64E-1 | 1.14E2 | 1.87E0 | MND | MND | MND | MND | MND | MND | MND | MND | 1.17E0 | 0E0 | MNR | 2.95E0 | MNR |
| Renew. PER as material | MJ | 0E0 | 0E0 | 0E0 | 0E0 | 0E0 | MND | MND | MND | MND | MND | MND | MND | MND | 0E0 | 0E0 | MNR | 0E0 | MNR |
| Total use of renew. PER | MJ | 1.1E2 | 3.48E0 | 5.64E-1 | 1.14E2 | 1.87E0 | MND | MND | MND | MND | MND | MND | MND | MND | 1.17E0 | 0E0 | MNR | 2.95E0 | MNR |
| Non-re. PER as energy | MJ | 1.61E3 | 2.79E2 | 1.01E1 | 1.9E3 | 1.66E2 | MND | MND | MND | MND | MND | MND | MND | MND | 2.04E2 | 0E0 | MNR | 3.4E2 | MNR |
| Non-re. PER as material | MJ | 3.62E1 | 0E0 | 0E0 | 3.62E1 | 0E0 | MND | MND | MND | MND | MND | MND | MND | MND | 0E0 | 0E0 | MNR | -3.59E1 | MNR |
| Total use of non-re. PER | MJ | 1.65E3 | 2.79E2 | 1.01E1 | 1.94E3 | 1.66E2 | MND | MND | MND | MND | MND | MND | MND | MND | 2.04E2 | 0E0 | MNR | 3.04E2 | MNR |
| Secondary materials | kg | 4.1E-1 | 7.82E-2 | 2.6E-3 | 4.91E-1 | 4.61E-2 | MND | MND | MND | MND | MND | MND | MND | MND | 7.98E-2 | 0E0 | MNR | 7.15E-2 | MNR |
| Renew. secondary fuels | MJ | 8.29E-3 | 7.16E-4 | 2.2E-5 | 9.03E-3 | 4.65E-4 | MND | MND | MND | MND | MND | MND | MND | MND | 2.61E-4 | 0E0 | MNR | 1.87E-3 | MNR |
| Non-ren. secondary fuels | MJ | 0E0 | 0E0 | 0E0 | 0E0 | 0E0 | MND | MND | MND | MND | MND | MND | MND | MND | 0E0 | 0E0 | MNR | 0E0 | MNR |
| Use of net fresh water | $m^3$ | 2.31E0 | 3.67E-2 | 6.99E-3 | 2.36 | 2.15E-2 | MND | MND | MND | MND | MND | MND | MND | MND | 1.24E-2 | 0E0 | MNR | 3.72E-1 | MNR |

*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 | 6.9E0 | 3.18E-1 | 1.61E-2 | 7.23E0 | 2.2E-1 | MND | MND | MND | MND | MND | MND | MND | MND | 2.73E-1 | 0E0 | MNR | 0E0 | MNR |
| Non-hazardous waste | kg | 1.91E2 | 5.43E0 | 1.96E1 | 2.16E2 | 3.62E0 | MND | MND | MND | MND | MND | MND | MND | MND | 1.92E0 | 0E0 | MNR | 2.36E3 | MNR |
| Radioactive waste | kg | 6.14E-3 | 1.91E-3 | 2.65E-5 | 8.07E-3 | 1.11E-3 | MND | MND | MND | MND | MND | MND | MND | MND | 1.44E-3 | 0E0 | MNR | 0E0 | MNR |

## 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 | 0E0 | MND | MND | MND | MND | MND | MND | MND | MND | 0E0 | 0E0 | MNR | 0E0 | MNR |
| Materials for recycling | kg | 0E0 | 0E0 | 4.46E1 | 4.46E1 | 0E0 | MND | MND | MND | MND | MND | MND | MND | MND | 0E0 | 0E0 | MNR | 0E0 | MNR |
| Materials for energy rec | kg | 0E0 | 0E0 | 0E0 | 0E0 | 0E0 | MND | MND | MND | MND | MND | MND | MND | MND | 0E0 | 0E0 | MNR | 0E0 | MNR |
| Exported energy | MJ | 0E0 | 0E0 | 0E0 | 0E0 | 0E0 | MND | MND | MND | MND | MND | MND | MND | MND | 0E0 | 0E0 | MNR | 0E0 | MNR |

## 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 $CO_2e$ | 3.36E2 | 1.81E1 | 5.92E-1 | 3.54E2 | 1.09E1 | 0E0 | MND | MND | MND | MND | MND | MND | MND | 1.5E1 | 0E0 | MNR | 1.22E1 | MNR |
| Ozone depletion Pot. | kg $CFC\text{-}11e$ | 1.04E-5 | 3.43E-6 | 8.16E-8 | 1.39E-5 | 2.01E-6 | 0E0 | MND | MND | MND | MND | MND | MND | MND | 2.57E-6 | 0E0 | MNR | 3.97E-6 | MNR |
| Acidification | kg $SO_2e$ | 7.37E-1 | 5.94E-2 | 2.63E-3 | 7.99E-1 | 3.64E-2 | 0E0 | MND | MND | MND | MND | MND | MND | MND | 1.12E-1 | 0E0 | MNR | 8.81E-2 | MNR |
| Eutrophication | kg $PO_4^3e$ | 2.37E-1 | 1.34E-2 | 8.18E-4 | 2.51E-1 | 8.28E-3 | 0E0 | MND | MND | MND | MND | MND | MND | MND | 2.61E-2 | 0E0 | MNR | 1.9E-2 | MNR |
| POCP (“smog”) | kg $C_2H_4e$ | 3.06E-2 | 2.33E-3 | 1.09E-4 | 3.3E-2 | 1.42E-3 | 0E0 | MND | MND | MND | MND | MND | MND | MND | 2.46E-3 | 0E0 | MNR | 3.7E-3 | MNR |
| ADP-elements | kg Sbe | 1.42E-3 | 4.17E-5 | 1.21E-6 | 1.46E-3 | 2.51E-5 | 0E0 | MND | MND | MND | MND | MND | MND | MND | 7.57E-6 | 0E0 | MNR | 2.81E-5 | MNR |
| ADP-fossil | MJ | 1.65E3 | 2.79E2 | 9.85E0 | 1.94E3 | 1.66E2 | 0E0 | MND | MND | MND | MND | MND | MND | MND | 2.04E2 | 0E0 | MNR | 3.4E2 | MNR |

# 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.

Silvia Vilčeková, as an authorized verifier acting for EPD Hub Limited

07.05.2023