



ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021 for:

MAPEQUICK CBS SYSTEM 3 HEM SS (Nordic & Baltic market)



Global Program Operator

Publisher: The Norwegian EPD Foundation
Registration number: NEPD-9-17-MRA

An EPD should provide current information and may be updated if conditions change. The stated validity is, therefore, subject to the continued registration and publication at www.environdec.com."

Programme: The International EPD® System; www.environdec.com	Programme operator: EPD International AB	EPD registration number: S-P-12487	Publication date: 2024-02-29	Valid until: 2029-02-28	Geographical scope: Global
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1 COMPANY DESCRIPTION / GOAL & SCOPE

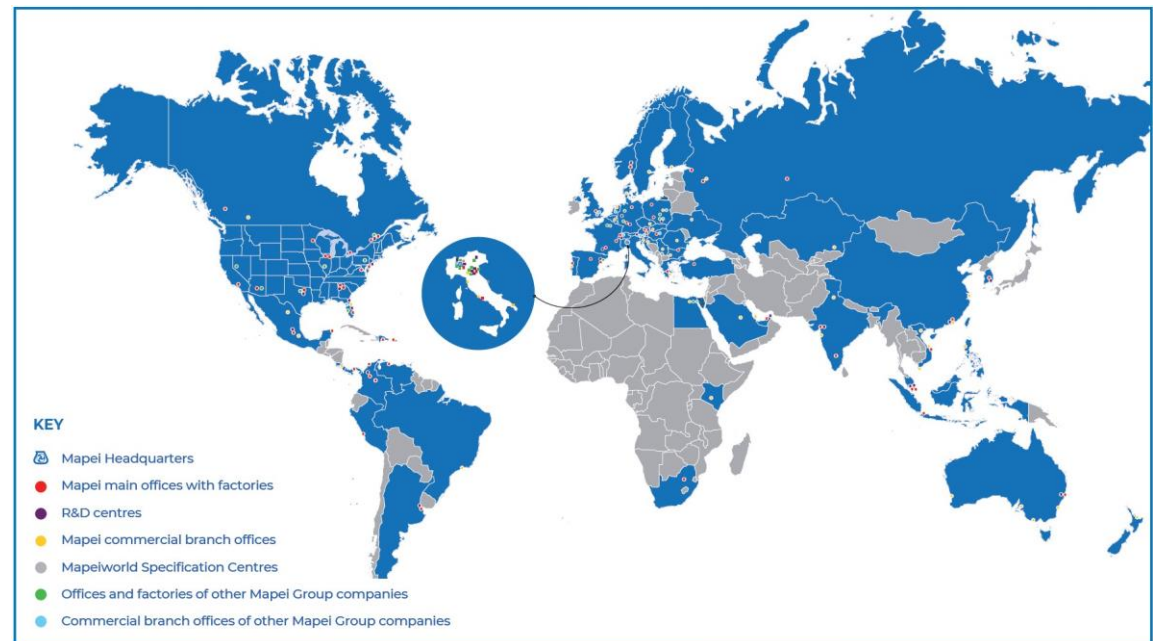
Founded in 1937 in Milan, Italy, Mapei produces adhesives and complementary products for laying all types of floor, wall and coating materials, and also specializes in other chemical products used in the building industry, such as waterproofing products, specialty mortars, admixtures for concrete, cement additives, products for underground constructions and for the restoration of concrete and historical buildings. There are currently 100 subsidiaries in the Mapei Group, with a total of 86 production facilities located around the world in 36 different countries and in 5 different continents. Mapei also has 32 central laboratories. Most locations are ISO 9001 and ISO 14001 or EMAS-certified.

Mapei invests 12% in its company's total work-force and 5% of its turnover in Research & Development; in particular, 70% of its R&D efforts are directed to develop eco-sustainable and environmentally friendly products, which give important contribution to all major green rating systems for eco-sustainable buildings such as LEED and BREEAM. Furthermore, Mapei has developed a sales and technical service network with offices all over the world and offers an efficient Technical Assistance Service that is valued by architects, engineers, contractors and owners.

Mapei Nordic production site is located in Sagstua, Norway. The production site consists of 5 factories: two factories for powder-based products, two factories for liquid admixtures and one factory for thermosetting plastic-based products. The total size of the buildings is 24.000 sqm. The energy in these factories is provided from water electricity, geothermal heating and remaining approximately 10 % heated by bio-oil. Mapei Nordic focuses both on energy and on logistic optimisation, as for example the systematic Lean based improvement work.

With 60 – 80 trailers per day, and 1650 transport lines, requires Mapei to work actively on optimizing our logistic process.

The goal of the study is to provide necessary data and documentation to produce an EPD according to the requirements of PCR Environdec (Version 1.3.1, 2023-07-08) under EN 15804:2012+A2:2019/AC:2021 and to have more comprehension about the environmental impacts related to **Mapequick CBS System 3 HEM SS** manufactured in Mapei AS located in Sagstua (NO), including packaging of the finished products. Target audiences of the study are customers and other parties with an interest in the environmental impacts of **Mapequick CBS System 3 HEM SS**. This analysis shall not support comparative assertions intended to be disclosed to the public.



2 PRODUCT DESCRIPTION

Mapequick CBS System 3 HEM SS is a liquid activator admixture specifically designed to be used in cementitious mixes for injection. Due to its formulation **Mapequick CBS System 3 HEM SS** is suitable to be used when high values of Static Elastic Modulus are required to be obtained with cement-based mixes at hardened state.

Mapequick CBS System 3 HEM SS is available in in bulk and in 1380kg IBC containers.

For more information see the TDS (Technical Data Sheet) on Mapei AS website (www.mapei.com/NO).

3 CONTENT DECLARATION

The main components and ancillary materials of the products included in this EPD are the following:

Table 1: Composition referred to 1 kg of product packaged in bulk.

Materials	Percentage (%) by mass	Post-consumer recycled material weight-%	Biogenic Material, weight-% and kgC/kg
Activator	100%	0	0 resp. 0

The product does not contain a concentration higher than 0,1% (by unit weight) of either carcinogenic substances or substances of very high concern (SVHC) on the REACH Candidate List published by the European Chemicals Agency.

4 DECLARED UNIT AND REFERENCE SERVICE LIFE

The declared unit is 1 kg of finished product in bulk.

Due to the selected system boundary, the reference service life of the products is not specified.

5 SYSTEM BOUNDARIES AND ADDITIONAL TECHNICAL INFORMATION

The approach is “cradle to gate” (A1–A3) with optional module A4:

- A1, A2, A3 (Product stage): extraction and processing of raw materials and packaging (A1), transportation up to the factory gate (A2), manufacturing of the finished product (A3).
- A4 (Construction process stage): transport of the finished product to final customers

Table 2: System boundaries

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage	
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Modules declared	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
Geography	NO	NO, EU	NO	EU	-	-	-	-	-	-	-	-	-	-	-	-	-	
Specific data	> 90 %					-	-	-	-	-	-	-	-	-	-	-	-	
Variation – products	0 %					-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0 %					-	-	-	-	-	-	-	-	-	-	-	-	-

MND: Module Not Declare

A brief description of production process is the following:

The production process starts from raw materials, that are purchased from external and intercompany suppliers and stored in the plant. Bulk raw materials are stored in specific silos and added automatically in the production mixer, according to the formula of the product. Other raw materials, supplied in bags, big bags or tanks, are stored in the warehouse and added automatically or manually in the mixer. The production is a discontinuous process, in which all the components are mechanically mixed in batches. The semi-finished product is then packaged, put on wooden pallets and stored in the finished products warehouse. The quality of final products is controlled before the sale.

Table 3: Transport to the building site (A4)

Scenario information	Value	Unit
Means of transport: truck-trailer euro 6, gross weight 34-40 t, payload capacity 27 t		
Diesel consumption	0,002	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	85	%
Gross density of products transported	~ 1380	kg/m ³
Capacity utilisation volume factor	1	-

** This is a conservative scenario with regard to the type of truck and distance. If the finished product is delivered by an electric truck, please consider a specific GWP coming from the truck manufacturer (if available)*

6 CUT-OFF RULES AND ALLOCATION

Criteria for the exclusion of inputs and outputs (cut-off rules) in the LCA, information modules and any additional information are intended to support an efficient calculation procedure. They are not applied in order to hide data. Cut-off criteria, where applied, are described in Table 4.

Input flows are covered for the whole formula.

Table 4: Cut-off criteria

Process excluded from study	Cut-off criteria	Quantified contribution from process
A3: production (auxiliary materials)	Less than 10^{-5} kg/kg of finished product	Sensitivity study demonstrates a relative contribution lower than 0,5%

For the allocation procedure and principles consider the following table (Table 5):

Table 5: Allocation procedure and principles

Module	Allocation Principle
A1	All data are referred to 1 kg of product A1: electricity is allocated to the specific production line
A3	All data are referred to 1 kg of packaged product A3-wastes: all data are allocated to the whole production plant

7 ENVIRONMENTAL PERFORMANCE AND INTERPRETATION



GWP

Climate change

GWPtotal - Global Warming Potential refers to the emission/presence of GHGs (greenhouse gases) in the atmosphere (mainly CO₂, N₂O, CH₄) which contribute to the increase in the temperature of the planet.

GWP-total considers:

- GWP-fossil
- GWP-biogenic
- GWP-luluc (land use and land use change)



POCP

Photochemical ozone formation

The Photochemical Ozone Creation Potential is the ozone formation in low atmosphere. This is quite common in the cities where a great amount of pollutants (like VOC and NO_x) are emitted every day (industrial emissions and vehicles). It is mainly diffused during the summertime.



ODP

Ozone Depletion

Ozone Depletion Potential refers to the degradation of the stratospheric layer of the ozone involved in blocking the UV component of sunrays. Depletion is due to particularly reactive components that originate from chlorofluorocarbon (CFC) or chlorofluoromethane (CFM).



**ADP
minerals&met
als**

Depletion of abiotic resources – minerals and metals

Abiotic Depletion Potential elements refers to the depletion of the mineral resources.



AP

Acidification

Acidification Potential refers to the emission of specific acidifying substances (i.e. NO_x, SO_x) in the air. These substances decrease the pH of the rainfall with predictable damages to the ecosystem.



ADP-fossil

Depletion of abiotic resources – fossil fuel

Abiotic Depletion Potential fossil fuel refers to the depletion of the fossil fuel resources.



EP

Eutrophication

Eutrophication Potential refers to the nutrient enrichment, which determines unbalance in ecosystems and causes the death of the fauna and decreased biodiversity in flora.

It considers:

- EP-freshwater: aquatic freshwater
- EP-marine: aquatic marine
- EP-terrestrial



WDP

Water use

It expresses the potential deprivation of water, that consists in not having the water needs satisfied.

The following tables show the environmental impacts for the products considered according to the requirements of EN15804:2012+A2:2019/AC:2021.

The results are referred to the declared unit (see § 4). The additional environmental indicators are not declared. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

We discourage the use of the outcomes from modules A1-A3 without considering the results obtained from modules C.

NOTE: in the whole document, the comma “,” is the decimal separator, while the point “.” is the thousands separator.

Mapequick CBS System 3 HEM SS (1 kg of product in bulk)

Table 6: Mapequick CBS System 3 HEM SS: Potential environmental impact – mandatory indicators according to EN 15804 referred to 1 kg of product in bulk.

Indicator	Unit	A1 – A3	A4
GWP_{TOTAL}	(kg CO ₂ eq.)	2,97E-01	6,15E-03
GWP _{FOSSIL}	(kg CO ₂ eq.)	2,91E-01	5,82E-03
GWP _{BIOGENIC}	(kg CO ₂ eq.)	5,42E-03	2,74E-04
GWP _{LULUC}	(kg CO ₂ eq.)	4,03E-04	5,37E-05
ODP	(kg CFC 11 eq.)	2,04E-08	7,55E-16
AP	(mol H ⁺ eq.)	1,39E-03	7,15E-06
EP _{FRESHWATER}	(kg P eq.)	9,17E-06	2,12E-08
EP _{MARINE}	(kg N eq.)	2,28E-04	2,38E-06
EP _{TERRESTRIAL}	(mol N eq.)	3,90E-03	2,87E-05
POCP	(kg NMVOC eq.)	6,94E-04	6,15E-06
ADP _{MINERALS&METALS*}	(kg Sb eq.)	2,60E-06	3,85E-10
ADP _{FOSSIL*}	(MJ)	3,19E+00	7,90E-02
WDP*	(m ³ world eq.)	1,05E-01	7,01E-05

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; **EP_{FRESHWATER}**: Eutrophication Potential, freshwater; **EP_{MARINE}**: Eutrophication Potential, marine; **EP_{TERRESTRIAL}**: Eutrophication Potential, terrestrial; **POCP**: Formation potential of tropospheric ozone; **ADP_{MINERALS&METALS*}**: Abiotic Depletion Potential for non-fossil resources; **ADP_{FOSSIL*}**: Abiotic Depletion Potential for fossil resources; **WDP***: Water Deprivation Potential.

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

Table 7: Mapequick CBS System 3 HEM SS: Potential environmental impact – additional mandatory and voluntary indicators referred to 1 kg of product in bulk

Indicator	Unit	A1 – A3	A4
GWP-GHG	(kg CO ₂ eq.)	2,96E-01	5,89E-03

GWP-GHG: This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero. This new indicator cannot be compared with the GWP-GHG of the EPD according to the old PCR 1.2 (and earlier versions).

Table 8: Mapequick CBS System 3 HEM SS: Use of resources referred to 1 kg of product in bulk.

Indicator	Unit	A1 – A3	A4
PERE	MJ	1,11E-02	5,75E-03
PERM	MJ	0,00E+00	0,00E+00
PERT	MJ	1,11E-02	5,75E-03
PENRE	MJ	1,53E-01	7,93E-02
PENRM	MJ	0,00E+00	0,00E+00
PENRT	MJ	1,53E-01	7,93E-02
SM	kg	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00
FW	m ³	1,22E-05	6,30E-06

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 (primary energy and primary energy resources used as raw materials); **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 (primary energy and primary energy resources used as raw materials); **SM:** Use of secondary material; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Net use of fresh water.

Table 9: Mapequick CBS System 3 HEM SS: Waste production and output flows referred to 1 kg of product in bulk.

Indicator	Unit	A1 – A3	A4
HWD	kg	4,74E-13	2,46E-13
NHWD	kg	2,33E-05	1,21E-05
RWD	kg	2,87E-07	1,48E-07
Components for re-use	kg	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00

HWD: Hazardous waste disposed; **NHWD:** Non-Hazardous waste disposed; **RWD:** Radioactive waste disposed

Table 10: Mapequick CBS System 3 HEM SS: Information on biogenic carbon content at the factory gate referred to 1 kg of product in bulk.

Biogenic Carbon Content	Unit	Quantity
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in packaging	kg C	0,00E+00

More details about electrical mix used in this EPD, is shown below:

	Data source	GWP-GHG	Unit
Residual electricity grid mix (NO) – 2022	AIB	0,636	kg CO ₂ -eqv/kWh

8 DATA QUALITY

Table 11: Data quality

Dataset & Geographical reference	Database (source)	Temporary reference
A1; A3		
Activator	Supplier	2022
Residual electricity grid mix (NO)	Sphera Database	2022
A2		
Truck, Euro 5, 27t payload (GLO)	Sphera Database	2022
Diesel for transport (EU)	Sphera Database	2019
A4		
Truck, Euro 6, 27t payload (GLO)	Sphera Database	2022
Diesel for transport (EU)	Sphera Database	2019

All data included in table above refer to a period between 2019 and 2022; the most relevant ones are specific from supplier, while the others (i.e. transport and minor contribution dataset), come from European and global databases. All datasets are not more than 10 years old according to EN 15804 §6.3.8.2 “Data quality requirements”.

The Quality level concerning datasets used in the EPD can be considered as “very good” or “good” according to Annex E of the EN 15804 (current version).

Primary data concern the year 2022 and represent the whole annual production.

9 ADDITIONAL INFORMATION

9.1 Indication for the calculation of different scenario of module A4 (Transport from the factory to the jobsite)

To calculate the impact of transporting 1 kg of product from the factory gate (Sagstua) to the jobsite, use the following formula:

$$\text{Transport Impact} = \text{EF (kg/DU)} * \text{distance (km)}$$

EF: Emission Factor; DU: declared Unit

Table 12: The EFs are related to 1 kg of product transported with truck EURO 5 and EURO 6

Impact Category	Unit	EF (EURO 5)	EF (EURO 6)
GWP_{TOTAL}	(kg CO ₂ eq.)/km	6,26E-05	6,15E-05
GWP _{FOSSIL}	(kg CO ₂ eq.) /km	5,92E-05	5,82E-05
GWP _{BIOGENIC}	(kg CO ₂ eq.) /km	2,78E-06	2,74E-06
GWP _{LULUC}	(kg CO ₂ eq.) /km	5,46E-07	5,37E-07
ODP	(kg CFC 11 eq.) /km	7,67E-18	7,55E-18
AP	(mol H ⁺ eq.) /km	1,90E-07	7,15E-08
EP _{FRESHWATER}	(kg P eq.) /km	2,16E-10	2,12E-10
EP _{MARINE}	(kg N eq.) /km	8,62E-08	2,38E-08
EP _{TERRESTRIAL}	(mol N eq.) /km	9,69E-07	2,87E-07
POCP	(kg NMVOC eq.) /km	1,72E-07	6,15E-08
ADP _{MINERALS&METALS}	(kg Sb eq.) /km	3,91E-12	3,85E-12
ADP _{FOSSIL}	(MJ) /km	8,03E-04	7,90E-04
WDP	(m ³ world eq.) /km	7,12E-07	7,01E-07

Example:

If the product is transported by truck (EURO 6) from Sagstua (production plant) to Oslo (Jobsite) for approximately 90 km, the GWP impact will be:

$$GWP_{total} = 6,15E-05 * 90km = 5,54E-03 \text{ kg CO}_2\text{eq}$$

10 VERIFICATION AND REGISTRATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

CEN standard EN15804 served as the Core Product Category Rules (PCR)	
PCR:	PCR 2019:14 Construction products (EN 15804:A2), Version 1.3.1, 2021-02-05, UN CPC code 54
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact .
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	<input checked="" type="checkbox"/> EPD Process Certification <input type="checkbox"/> EPD Verification
Third party verifier:	Certiquality S.r.l. Number of accreditations: 0008PRD rev.000
Accredited or approved by:	Accredia
Procedure for follow-up of data during EPD validity involves third-party verifier	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

11 REFERENCES

- EN 15804: SUSTAINABILITY OF CONSTRUCTION WORKS - ENVIRONMENTAL PRODUCT DECLARATIONS - CORE RULES FOR THE PRODUCT CATEGORY OF CONSTRUCTION PRODUCTS
- EUROPEAN RESIDUAL MIXES VERSION 1.0, 2023-06-01 (AIB: ASSOCIATION OF ISSUING BODIES)
- GENERAL PROGRAMME INSTRUCTIONS OF THE INTERNATIONAL EPD® SYSTEM. VERSION 4.0
- ISO 14025 ENVIRONMENTAL LABELS AND DECLARATIONS - TYPE III ENVIRONMENTAL DECLARATIONS - PRINCIPLES AND PROCEDURES
- ISO 14044 ENVIRONMENTAL MANAGEMENT – LIFE CYCLE ASSESSMENT – REQUIREMENTS AND GUIDELINES
- PCR 2019:14 CONSTRUCTION PRODUCTS (EN 15804: A2), UN CPC CODE 54; VERSION 1.3.1

12 CONTACT INFORMATION



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ANNEX 1

ANNEX 1: Self declaration from EPD owner

Specific requirements

1 Applied electricity data set used in the manufacturing phase

The electricity mix for the electricity used in manufacturing (A3) is the electricity grid mix

<0,636 kg CO₂ eq/MJ>

2 Transport from the place of manufacture to a central warehouse

Transport distance, and CO₂-eqv./DU from transport of the product from factory gate to central warehouse in Oslo shall be given. The following table shall be included in the EPD:

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy use	Unit	Value (l/t)	kg CO ₂ -eqv./DU
Boat							
Truck	<85>	<Truck 27 tonn, EURO6>	<95>	<0,0199>	l/tkm	<1,89>	5,45E-03
Railway							
Rail							
Air							
Total	<85>	<Truck 27 tonn, EURO6>	<95>	<0,0199>	l/tkm	<1,89>	5,45E-03

3 Impact on the indoor environment

- Indoor air emission testing has been performed;
- No test has being performed
- Not relevant; specify: admixture for concrete