

EPD – Environmental Product Declaration

2202 MATRIX REVESTIMENTO FACHADA BY VOTORANTIM CIMENTOS

Registration number: S-P-00897

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MORTAR

EPD®



MORTAR 2202 MATRIX REVESTIMENTO FACHADA

1. COMPANY

Votorantim Cimentos is the market leader in cement in Brazil and the eighth largest global producer in terms of installed capacity, according to the Global Cement Report 2013 data. The company is part of the Votorantim Group and is present in 14 countries through the South America, North America, Europe, Asia and Africa. It is a large industry that produces cement, concrete, aggregates and complementary products such as mortar and lime.

Votorantim Cimentos has 23 units certified in ISO 9001 (Quality Management System), 10 units certified in ISO 14001 (Environmental Management System), 6 units certified in OHSAS 18001 (Occupational Health and Safety), 1 unit certified in ISO 50001 (Energy Management), 1 unit certified in SA 8000 (Social Accountability), and other certifications such: Greenguard, ECO and Energy Star (Votorantim Cimentos Integrated Report, 2012).

The company is in constant development in order to guarantee the sustainable practices (one of the 4 pillars of the Votorantim Cimentos) and has a commitment to certify, in ISO 14001, 100% of its units by 2020.

2. PRODUCT

The mortar 2202 Matrix Revestimento Fachada has a high workability and high adhesion. It is used for facade coating and indicated for wall coating in external areas. Its use is recommended for the following types of substrates: concrete, concrete blocks, ceramic blocks, ceramic bricks and silo-limestone blocks, only with the necessary application on roughcast. It is sold in packages of 50kg.



2.1. FUNCTIONAL UNIT AND STUDIED SYSTEM

The life cycle assessment is based on the WBCSD-CSI Tool for concrete and cement EPDs, version 1.4, dated 08/11/2017 (thereafter referred to as “the tool”), verified as compliant in accordance with the PCRs (PCR 2012:01 Construction products and Construction services v.2.2, PCR 2013:02 Concrete v.1.02, PCR 2010:09 Cement v.2.1., hereafter the PCR) and the General Programme Instructions (GPI 2.5) for the International EPD® System. This tool may be accessed at the following address: <https://concrete-epd-tool.org/>. Following the amendment of the tool (WBCSD CSI 2015), the tool is extended to the EPDs of plaster (CPC 3741).

The functional unit is 1 metric tonne of mortar, defined in accordance with the tool. The Reference Service Life (RSL) is not specified.

The following figure shows the studied system, split between 3 categories: A1 raw material supply, A2 transport and A3 core processes.



A1: Raw material supply

- Extraction and processing of raw materials
- Extraction and processing of primary fuels
- Recycling processes of secondary materials
- Energy production used in raw material production



A2: Transport

- Transportation up to factory gate and internal transport



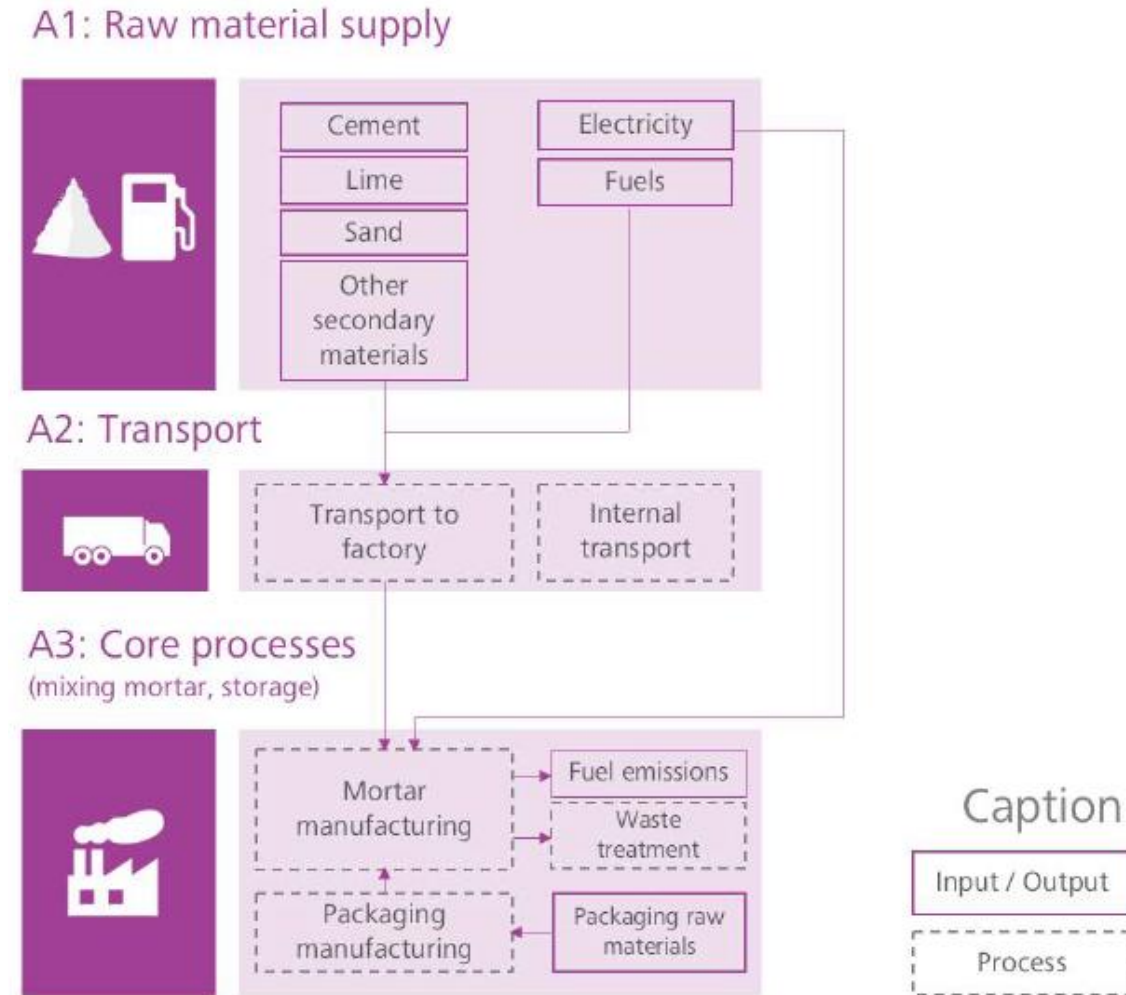
A3: Core processes

- Mortar manufacturing (production of raw mix, burning of clinker, grinding of cement, storage of cement for dispatch)
- Packaging manufacturing
- Waste treatment and transport

2.2. LIFE CYCLE STAGES

SYSTEM BOUNDARIES

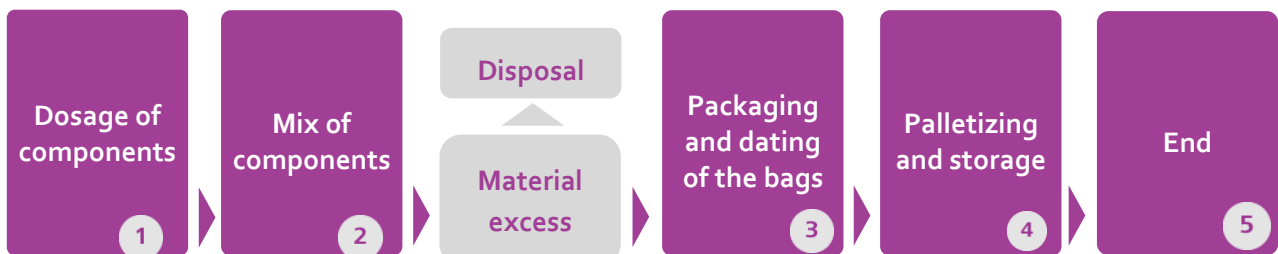
The system boundaries are presented in the following figure.



UPSTREAM PROCESSES: RAW MATERIAL ACQUISITION AND REFINEMENT

The raw material acquisition is made by the transport of materials to the industry.

CORE PROCESS: MORTAR PRODUCTION



Dosage of components 1

In this phase the percentage of the components is established according with the type of mortar to be produced. The dosage is done automatically.

Mix components 2

The machine mixes the raw materials, forming a perfectly homogeneous and high quality mortar.

Pack and date the bags 3

The packers controlled by computers put the mortar in bags of 20 kg or 50 kg (In this case). Then, the bags follow to an automatic palletizer.

Palletizing and Store in the inventory according with the mortar type 4

For the 2202 Matrix Revestimento Fachada the bags are palletized and stored in silos.

3. CONTENT DECLARATION

COMPONENT	CAS NUMBER	CONCENTRATION RANGE
Portland Cement	65997-15-1	5 - 25
Silica sand	14808-60-7	10 - 30
Sand calcium carbonate	471-34-1	40 - 65

4. ENVIRONMENTAL PERFORMANCE-RELATED INFORMATION

The cradle-to-gate life cycle stages are broken down into 3 life cycle stages using terminology from EN 15804:

- A1: raw material extraction and processing, processing of secondary material input
- A2: transport to the manufacturer
- A3: manufacturing, including impacts from direct energy generation and waste disposal

These environmental performance-related information is representative of concrete production in 2016 calculated with the WBCSD-CSI Tool for concrete and cement EPDs. Additional information on the impact calculation are available in the tool documentation (WBCSD CSI 2015).

In agreement with the PCR, the environmental impact indicators are calculated using characterisation factors from the latest CML baseline indicators from the Institute of Environmental Sciences, Faculty of Science, University of Leiden, Netherlands (CML 2001 v4.21). CEN standard EN 15804 served as the core PCR.

EPDs of construction products may not be comparable if they do not comply with the requirements of comparability set in EN 15804.

4.1. USE OF RESOURCES

RESOURCE USE	Total (A1-A3)	UNIT
Renewable primary energy used as energy resource	1.36E+02	MJ
Renewable primary energy used as raw materials	0.00E+00	MJ
Total renewable primary energy	1.36E+02	MJ
Non-renewable primary energy used as energy resource	9.34E+02	MJ
Non-renewable primary energy used as raw materials	0.00E+00	MJ
Total non-renewable primary energy	9.34E+02	MJ
Secondary material	2.04E+01	kg
Renewable secondary fuels	4.80E+01	MJ
Non-renewable secondary fuels	2.69E+01	MJ
Net fresh water	2.94E+00	m ³

4.2. POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL IMPACTS	Total (A1-A3)	UNIT
Global warming potential, GWP (100 years)	1.42E+02	kg CO ₂ -eq.
Depletion potential of the stratospheric ozone layer, ODP	9.66E-06	kg CFC 11-eq.
Acidification potential of soil and water, AP	4.88E-01	kg SO ₂ -eq.
Eutrophication potential, EP	9.98E-02	kg PO ₄ ³⁻ -eq.
Formation potential of tropospheric ozone, POCP	2.45E-02	kg C ₂ H ₄ -eq
Abiotic depletion potential for non-fossil resources, ADP-elements	3.17E-04	kg Sb-eq.
Abiotic depletion potential for fossil resources, ADP-fossil fuels	9.05E+02	MJ

4.3. WASTE PRODUCTION

Waste*	Total (A1-A3)	UNIT
Hazardous waste disposed	0.00E+00	kg
Non-hazardous waste disposed	4.54E-01	kg
Radioactive waste disposed	0.00E+00	kg

*The contribution of activities situated upstream of the clinker manufacturing are not included in the results.

4.4. OTHER ENVIRONMENTAL INDICATORS

Output flows	Total (A1-A3)	UNIT
Components for re-use	0.00E+00	kg
Materials for recycling	1.23E+00	kg
Materials for energy recovery	1.00E-02	kg
Exported energy	0.00E+00	MJ

5. ADDITIONAL INFORMATION

The production of 2202 Matrix Revestimento Fachada is in line with Votorantim Cimentos vision, which includes Customer Focus, Empowered People, Best in Class Operations and Sustainable Practices. We believe that cement production must use clean technologies that constantly improve natural resource allocation, reduce emissions and waste. The company invests in R&D to develop new technologies and improve existing ones to promote eco-efficiency in its processes and products. Moreover, we are committed to protecting water sources and biodiversity, through the management of protected areas in the vicinity of our units.

6. PROGRAMME-RELATED INFORMATION

PROGRAMME:	THE INTERNATIONAL EPD® SYSTEM EPD INTERNATIONAL AB BOX 210 60 SE-100 31 STOCKHOLM SWEDEN WWW.ENVIRONDEC.COM
EPD registration number:	S-P-00897
Published:	2016-06-20
Valid until:	2021-06-20
Revision date:	2017-12-21
Product Category Rules:	PCR 2012:01 Construction products and Construction services, Version 2.0
Product group classification:	UN CPC 3741 PLASTER
Reference year for data:	2016
Geographical scope:	Brazil

PRODUCT CATEGORY RULES (PCR): PCR 2012:01 CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES, VERSION 2.0

PCR review was conducted by:

The Technical Committee of the International EPD® System. Chair: Massimo Marino Contact via info@environdec.com.

Independent verification of the declaration and data, according to ISO 14025:2006:

EPD Process Certification (internal)

EPD Verification (external)

Third party verifier:

Maurizio Fieschi, fieschi@studiofieschi.it, www.studiofieschi.it

Accredited by:

The International EPD® System

See PCR for detailed requirements.

6.1. MANDATORY STATEMENTS

EPDs within the same product category but from different programmes may not be comparable.

6.2. CONTACT INFORMATION

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Programme operator:	 <p>EPD International AB info@environdec.com</p>

7. REFERENCES

- EIA (2012) Electricity/Heat in select countries and regions
- General Programme Instructions of the International EPD® System. Version 2.5.
- PCR 2012:01 Construction products and Construction services, Version 2.2
- WBCSD-CSI (2015) WBCSD-CSI tool for EPDs of concrete and cement: LCA core model and database report v1.4 Amendment: Plasters, lime and cement clinker products
- VOTORANTIM CIMENTOS. Integrated Report 2012. Published in October 2013. São Paulo.

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For us, sustainability means achieving our growth ambitions, in the following way: taking the present and future needs of society into account; offering eco-efficient and innovative building materials, and services, to our customers; acting in an ethical, transparent manner and in accordance with the laws and regulations; providing a motivating, healthy and safe work environment for our employees and contract staff; supporting our local communities and encouraging their progress.