

ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	Çimsa Çimento San. ve Tic. A.Ş.
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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CEM IV / B(P)32,5R

Çimsa Çimento San. Ve Tic. A.Ş.

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General Information

<p>Çimsa Çimento San. Ve Tic. A.Ş.</p> <hr/> <p>Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p> <hr/> <p>Declaration number EPD-CIS-20160153-CAA1-EN</p> <hr/> <p>This Declaration is based on the Product Category Rules: Cement, 07.2014 (PCR tested and approved by the SVR)</p> <hr/> <p>Issue date 20/08/2021</p> <hr/> <p>Valid to 19/08/2026</p> <hr/> <div style="text-align: center;">  </div> <hr/> <p>Dipl. Ing. Hans Peters (President of Institut Bauen und Umwelt e.V.)</p> <hr/> <div style="text-align: center;">  </div> <hr/> <p>Dr. Alexander Röder (Managing Director IBU)</p>	<p>CEM IV / B(P)32,5R</p> <hr/> <p>Owner of the Declaration Çimsa Çimento San. Ve Tic. A.Ş. Malatya Karayolu 35. km Melikgazi/Kayseri Turkey</p> <hr/> <p>Declared product / Declared unit CEM IV / B(P)32,5R / 1 t</p> <hr/> <p>Scope: Within this study a life cycle analysis according to /ISO 14040/44/ is performed for CEM IV / B (P)32,5R pozzolanic cement produced by Çimsa Çimento San. ve Tic. A.Ş. at the production plant located in Kayseri. This analysis relies on transparent, plausible and documented basis data. All the model assumptions, which influence the results, are declared. The life cycle assessment is representative for the products introduced in the declaration for the given system boundaries. The life cycle assessment covers the manufacturing of the products from cradle-to-gate with options (A1-A3 + A5). The declaration holder is liable for underlying data and supporting documents.</p> <p>The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.</p> <hr/> <p>Verification</p> <table border="1" style="width: 100%;"> <tr> <td colspan="2">The CEN Norm /EN 15804/ serves as the core PCR</td> </tr> <tr> <td colspan="2" style="text-align: center;">Independent verification of the declaration according to /ISO 14025/</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/> internally</td> <td style="text-align: center;"><input checked="" type="checkbox"/> externally</td> </tr> </table> <hr/> <div style="text-align: center;">  </div> <hr/> <p>Ms Jane Anderson (Independent verifier appointed by SVR)</p>	The CEN Norm /EN 15804/ serves as the core PCR		Independent verification of the declaration according to /ISO 14025/		<input type="checkbox"/> internally	<input checked="" type="checkbox"/> externally
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Product

Product description / Product definition

The product considered is pozzolanic cement. CEM IV/B (P) 32,5R cement is produced by grinding of the mixture composed from mineral additives (pozzolanic materials), Portland cement clinker, and gypsum.

Application

CEM IV/B (P) 32,5R pozzolanic cement is used for creation of concrete types which do not require high strength and in manufacturing of briquette. It is also used in reinforced concrete structures and lean concrete structures. Another field of application is preparation of plaster mesh, masonry mortar, and surface / ground concrete. This type of cement is used in construction of sidewalks, parks, gardens, and architectural buildings.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies.

The products need a Declaration of Performance taking into consideration /EN 197-1/ and the CE-marking.

For the application and use the respective national provisions apply.

Technical Data

The technical data of CEM IV/B (P) 32,5R pozzolanic cement is given in the table below.

Constructional data

Name	Value	Unit
Appearance and smell	Gray powder and scentless	-
Solubility in water	0.1 - 1 (Negligible)	M-%

pH in water	12-13	-
Specific gravity	2,82	g/cm ³
Initial setting time	180	min
Early strength	17	Mpa N/mm ²
Standard strength	37	Mpa N/mm ²

Base materials / Ancillary materials

Name	Value	Unit
Clinker	51	M-%
Natural Pozzolan	46	M-%
Minor Additional component	2.95	M-%
Gypsum	0.05	M-%

Grinding aid and strength enhancing chemicals are used as additional auxiliary materials.

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to /EN 197-1:2012/ Cement – Part 1/Composition, specification and conformity criteria for common cements/.

Manufacture

During the manufacturing process it is aimed to produce the most suitable product (cement- CEM/IV B (P) 32,5R) in terms of quality requirements and customer needs. Therefore, the production process is optimized in which natural trass is used maximally and the GHG emissions are minimized. Raw materials are gathered after required tests are performed in the raw material quarries. The raw materials which provide the required quality are carried with trucks to the production plant. The amounts of compounds/materials are adjusted according to the quality control analysis done by the operators. Samples are taken according to the periods which are predefined in the quality plan. Cement which is produced in the cement mills according to the standards are transferred to the ultimate cement silos. Samples are taken from the products before they are sent to clients and quality control of the product is performed. The quality control is included in every step of the whole production process.

Packaging

Paper bags are used for packaging of CEM IV/B (P) 32,5R. Since there is no follow-up application for packaging waste (kraft paper) generated during installation into building, as a worst case scenario packaging waste is considered that it is sent to landfill. This packaging waste is modelled under Module A5 in order to observe biogenic carbon caused by the packaging material.

Reference service life

This EPD is based on cradle-to-factory gate with options. Therefore, since the EPD prepared for CEM IV/B (P) 32,5R does not cover the use stage, no reference service life is required.

LCA: Calculation rules

Declared Unit

The declared unit is 1 t of CEM IV/B (P) 32,5R.

Declared unit

Name	Value	Unit
Declared unit	1	t
Conversion factor to 1 kg	1000	-

System boundary

Type of EPD: cradle-to-gate with options

The system boundary includes the production of CEM IV/B (P) 32,5R pozzolanic cement from extraction of raw material to the production of finished packaged product at the factory gate (cradle to gate-with options).

In this study, the product stage information modules A1, A2, A3 and A5 are considered. These modules include production of raw material extraction and processing (A1), transport of the raw materials to the manufacturer (A2), manufacturing of the product (A3), the disposal of packaging waste generated in the factory (A3) and disposal of packaging materials generated during installation into building (A5).

Cut Off Criteria

All inputs and outputs to a (unit) process are included in the calculation, for which data were available. The applied cut – off criteria is 1 % of renewable and non-renewable primary energy usage. The total of neglected input flows is a maximum of 5 % of energy usage and mass.

Product Stage (A1-A3+A5) includes the provision of raw materials/packaging materials, transportation, energy and waste processing of final residues.

However, production of capital goods, infrastructure, production of manufacturing equipment and personnel-related activities during production are not included in this LCA study.

As an assumption, packaging waste (kraft paper) generated during installation is considered that it is sent to landfill since there is no follow-up application, namely worst case scenario is considered. This packaging waste is modelled under Module A5.

Background Data

The LCA model of CEM IV/B (P) 32,5R pozzolanic cement was made by using the GaBi Professional (DB version 6.115, year 2016, SP 29) software system for

life cycle analysis by ERKE Sustainable Building Design Consultancy Ltd.

In this assessment, all data for the production stage; raw material extraction, manufacturing processes, transportation and installation were declared by manufacturer.

No innovative energy system such as energy recovery systems, utilizing renewable energy on site is used in the factory. However, as the process "Electricity grid mix of Turkey" is selected, some amount of renewable energy usage is seen in the results. Additionally, due to the some selected processes such as raw materials' production stages, renewable energy usage is directly calculated by the software.

Lower Heating Values (Net Calorific Values) have been used in the energy declarations.

Data Quality

The process data and the used background data GaBi Professional (DB version 6.115, year 2016, SP 29) are consistent. In addition, the origin of the data is documented. Additional information is gathered regarding the age of the data. The input and output data of the whole process plant was strongly emphasized. The supplied data was provided by Çimsa Çimento San. ve Tic. A.Ş and checked for plausibility. Therefore, the data quality can be described as good.

All primary required data for LCA Analysis were in the time period between 01.01.2016 and 31.12.2016 for 12 consecutive months. Datasets within the last 5 years were used for calculation.

Period Under Review

The period under consideration is defined as one year. The monthly data is collected by the producer and is averaged to obtain the yearly data. Datasets within the last 5 years were used for calculation.

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

This LCA model of CEM IV/B (P) 32,5R pozzolanic cement was made by using the GaBi Professional (DB version 6.115, year 2016, SP 29).

LCA: Scenarios and additional technical information

The modules A4, B1, B3, B4, B5, Reference Service Life (RSL), B6, B7 and C1-C4 are neither considered nor declared in this study. In addition to the product stage (A1, A2, A3), Module A5 is also considered within LCA scope.

Module A5: In order to observe biogenic carbon caused by the packaging product such as kraft paper, this module has been included to the LCA scope. Biogenic carbon is leaving the life cycle in this module during installation of the product.

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	X	MND	MND	MNR	MNR	MNR	MND	MND	MND	MND	MND	MND	MND

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: CEM IV / B(P)32,5R

Parameter	Unit	A1-A3	A5
Global warming potential	[kg CO ₂ -Eq.]	5.69E+2	2.31E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	1.65E-6	7.76E-12
Acidification potential of land and water	[kg SO ₂ -Eq.]	1.90E+0	8.75E-4
Eutrophication potential	[kg (PO ₄) ³ -Eq.]	1.26E-1	1.12E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	1.01E-1	8.16E-4
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.08E-3	4.05E-8
Abiotic depletion potential for fossil resources	[MJ]	3.37E+3	2.97E+0

RESULTS OF THE LCA - RESOURCE USE: CEM IV / B(P)32,5R

Parameter	Unit	A1-A3	A5
Renewable primary energy as energy carrier	[MJ]	3.31E+2	2.11E-1
Renewable primary energy resources as material utilization	[MJ]	6.21E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	3.37E+2	2.11E-1
Non-renewable primary energy as energy carrier	[MJ]	3.54E+3	3.09E+0
Non-renewable primary energy as material utilization	[MJ]	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	3.54E+3	3.09E+0
Use of secondary material	[kg]	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0
Use of net fresh water	[m ³]	2.12E+2	1.18E+2

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: CEM IV / B(P)32,5R

Parameter	Unit	A1-A3	A5
Hazardous waste disposed	[kg]	4.28E-5	1.75E-8
Non-hazardous waste disposed	[kg]	7.87E+2	2.41E+0
Radioactive waste disposed	[kg]	4.50E-2	4.71E-5
Components for re-use	[kg]	0.00E+0	0.00E+0
Materials for recycling	[kg]	1.20E-2	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0

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