KÇS
KİPAŞ GAZBETON

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

Autoclaved Aerated Concrete

manufactured by

KÇS KAHRAMANMARAŞ ÇİMENTO BETON SAN. VE MADENCİLİK İŞLETMELERİ A.Ş.

"EPD of multiple products, based on the representative product, density ranges from 120 kg/m³ to 580 kg/m³ with representative density of 385 kg/m³"

Programme: The International EPD® System, www.environdec.com

Programme Operator: EPD International AB

Licensee: EPD Türkiye

EPD Registration Number: EPD-IES-0017851

Version Date: 2025-01-02

Validity Date: 2030-01-01

Geographical Scope: Global

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com.

How to Read This EPD?

An Environmental Product Declaration (EPD) is an ISO Type III Environmental Declaration based on ISO 14025 standard. An EPD transparently reports the environmental performance of products or services from a lifecycle perspective. The preparation of an EPD includes different stages, from acquiring raw materials to the end of life of the final product/ service. EPDs are based on international standards and consider the entire value chain. Additionally, EPD is a third-party verified document. This EPD includes several sections described below.

1. General and Program Information

The first part of an EPD has information about the name of the manufacturer and product/service and other general information such as the validity and expiration dates of the document, the name of the program operator, geographical scope, etc. The second page states the standards followed and gives information about the program operator, third-party verifier, etc. The followed Product Category Rule (PCR) is indicated on the second page.

2. Company and Product/Service Information

Information about the company and the investigated product is given in this section. It summarizes the characteristics of the product provided by the manufacturer. It also includes information about the product such as product composition and packaging.

3. LCA Information

LCA information is one of the most important parts of the EPD as it describes the functional/ declared unit, time representativeness of the study, database(s) and LCA software, along with system boundaries.

The table presented in this part has columns for each stage in the life cycle. The considered stages are marked ‘X’ whereas the ones that are not declared are labeled as ‘ND’. Not all EPDs consider the full life cycle assessment for a product’s entire life stages. The ‘System Boundary’ page is also the place where one can find detailed information about the stages and the assumptions made.

4. LCA Results

The results of the Life Cycle Assessment analysis are presented in table format. The first column in each table indicates the name of the impact category and their measurement units are presented in the second column. These tables show an amount at each life cycle stage to see the impact of different indicators on different stages. Each impact can be understood as what is released through the production of the declared unit of the material—in this case, 1 m^3 Autoclaved Aerated Concrete. The benefits of reuse/recycling of the declared product is reflected in this section.

The first impact in the table is global warming potential (GWP), which shows how much CO_2 is released at each stage. Other impacts include eutrophication potential, acidification potential, ozone layer depletion, land use related impacts, etc. The second table provides results for resource use and the third table is about the waste produced during the production. The fourth and final table shows the results for the GWP-GHG indicator, which is almost equivalent to the GWP-Total indicator mentioned previously. The only difference is that this indicator excludes the biogenic carbon content by following a certain methodology.

Programme Information

The International EPD® System: EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden, info@environdec.com

EPD Türkiye: NEF O9 B Blok No:7/15, 34415 Kağıthane/İstanbul, Türkiye
info@epdturkey.org

"CEN standard EN 15804 serve as the core Product Category Rules (PCR)"

PCR 2019:14 Construction products, version 1.3.4., Construction EN 15804:2012+A2:2019/AC:2021 Sustainability of Construction Works , UN CPC code is 3755:"Prefabricated structural components for building or civil engineering, of cement, concrete or artificial stone"

PCR review was conducted by: Technical Committee of the International EPD® System. See www.environdec.com 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.

External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through an individual EPD verification

Third party individual verifier: Vijay Thakur
Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes No X

KÇS Kahramanmaraş Çimento Beton San. ve Madencilik İşletmeleri A.Ş. has the sole ownership, liability, and responsibility for this EPD.

Life Cycle Assessment (LCA)
LCA accountability: Furkan Can Akalın & Hüdai Kara - Metsims Sustainability Consulting

The International EPD® System

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www.environdec.com

EPDs within the same product category but registered in different EPD programmes 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 cutoff rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison.

About the Company

Owner of the EPD: KÇS Kahramanmaraş Çimento Beton San. ve Madencilik İşletmeleri A.Ş.

Production Plant: Söke OSB, 09220 Organize Sanayi Bölgesi/Söke/Aydın/Türkiye

KİPAŞ HOLDİNG

Kipaş Holding founded in 1984 under the leadership of ÖKSÜZ and GÜMÜŞER families is the first and only holding of Kahramanmaraş. Practises in the 6 main sectors. Kipaş Holding, which has investments mainly in textile and additionally in cement, paper, energy, education and logistics; has 10 thousand employees.

As the highest tax payer of Kahramanmaraş and exporting approximately 200 million dollars worth of goods to nearly 100 countries and is one of the most top 100 exporter companies in Türkiye; Kipaş is listed in the ISO 500 with the 6 of its companies. Kipaş Holding, which attaches great importance to R&D studies, is among the first 250 companies in this field.

KİPAŞ CEMENT AUTOCLAVED AERATED CONCRETE

KÇS (Kahramanmaraş Cement Industry) has an annual production capacity of 3,200,000 tons of clinker and 4,000,000 tons of cement, as well as 15 concrete plants operating in 7 cities with a total capacity of 33,000 m³/day, 2 aggregate quarries in Kahramanmaraş, Kahramanmaraş Autoclaved Aerated Concrete Facility with an annual capacity of 450,000 m³ and Aydın / Söke Autoclaved Aerated Concrete Facility with an annual capacity of 700,000 m³. Around 1,000 people are employed within these facilities. Owing to its rich and productive limestone quarries and clay pits, our subsidiary produces CEM I, CEM III, and CEM IV type cements in accordance with Turkish (TS), European (EN) and American (ASTM) Standards.

About AAC Blocks

KÇS Kipaş Gazbeton Block Products are self-insulated building materials used in all kinds of buildings, including masonry buildings, interior and exterior walls, produced in accordance with TS EN 771-4 standard, TSE certified and CE marking regulations.

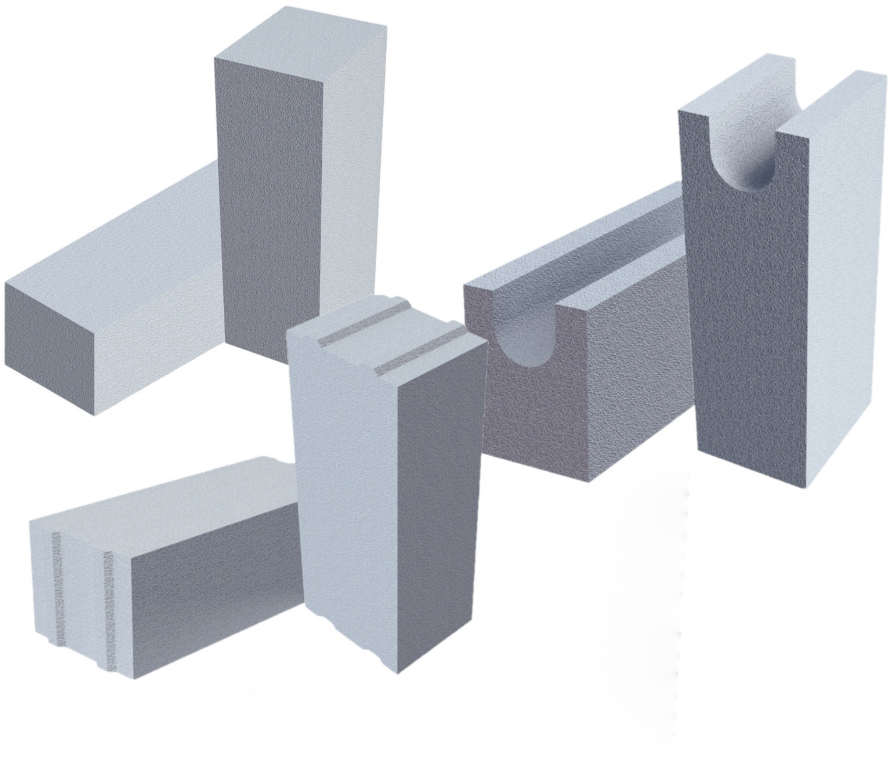
With its high thermal insulation, Class A1 non-combustible, smooth and high-precision dimensions, light weight, it offers comfort and safety together while saving energy in buildings.

KÇS Kipaş AAC Blocks;

- can be used in interior and exterior walls of all kinds of building systems
- thanks to its porous structure, it allows the walls to breathe,
- provides thermal insulation thanks to its porous and light structure,
- thanks to its components, it prevents the formation of fungus, mold and bacteria on the walls,
- thanks to its lightness, it provides earthquake safety by reducing the load on the structural system of the building,
- provides fire safety with its A1 Class non-flammable feature and can also be used as a fire barrier,
- lightweight and easy to process, it offers ease and speed of application and allows working with little waste

Technical specifications of the autoclaved aerated concrete are provided in the table below along with the relevant standards.

Structured Data	Relevant Standard	Unit	G2/400
Configuration	EN 1996-1-1/2	Shape	Smoothly shaped and with lamp mortise
Compressive Strength	TS EN 772-1	N/mm²	≥ 2.50
Gross Dry Unit Volume Weight	TS EN 772-13	kg/m³	380±20
Deviation from Dimensions	TS EN 772-20	mm	TLMB (EN 771-4)
Joint Surface Parallelism	TS EN 772-16	mm	Maximum 1.0
Moisture Movement (Shrinkage)	TS EN 680	mm/m	Maximum 0.2
Net Dry Unit Volume Weight	TS EN 772-13	kg/m³	380±20
Thermal Conductivity	TS EN 12667	W/m.K	Maximum 0.087
Water Vapor Permeability	TS EN ISO 12572	μ	5-10
Moisture Content	TS EN 1353	%	Maximum 30
Fire Resistance	EN 13501-1	Class	A1 Non-Flammable
Initial Shear Bond Strength	TS EN 1052-3	N/mm²	≥0.3



System Boundaries & Description

A1 - Raw Material Supply

This stage includes the extraction and pre-treatment processes of raw materials before production. These raw materials are water, cement, sand, gypsum, lime and aluminium powder for AAC blocks.

A2 - Raw Material Transport

Raw material transport from supplier to manufacturer is considered in raw material supply stage. KÇS Kipas sources most of its raw materials from the local region. In addition, some raw materials are supplied from abroad. The distances and routes are calculated accordingly. While road is used for domestic raw material supply, road and seaway are used for raw materials origin from abroad.

Transport Mode	Type
Road	Vehicle: Lorry Size Class: >32 metric ton Emission Standard: EURO5 Fuel Type: Diesel
Sea	Vehicle: Container Ship DWT (Load Capacity): 43000 tonnes Fuel Type: Heavy Fuel Oil

A3 - Manufacturing

This stage includes production-related environmental impacts of the investigated product. All energy-related inputs are supplied by the manufacturer. Also effects of packaging is included in this stage. The manufacturing stage includes the following processes as shown in the below production flow diagram: raw material processing, mixing the materials, proportioning, casting, aeration, cutting, high-pressure steam curing and packaging.

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- **01** Sand preparation and storage
- **02** Dosing, mixing, casting
- **03** Fermentation area
- **04** Transport to cutting line and mould removal
- **05** Completion and oiling of the casting mould
- **06** Cutting line
- **07** Transport plant, tilting table, green separating table
- **08** Transport platform and waiting area in front of autoclaves
- **09** Autoclave/steam boiler
- **10** Re-tilting table, hardening grid transport and hardening car return
- **11** Block transfer device
- **12** Packaging plant
- **13** Reinforcement area

Scenarios used are realistic and representative of one of the most probable alternatives and shall not include processes or procedures that are not in current use, or which have not been demonstrated to be practical. (For module A4, A5, B1, C1-C4, & D)

A4 - Product Transport

Product transport from manufacturer to customer is considered in product material supply stage. The distances and routes are calculated accordingly. Depending the customer location, product is transported via trucks and other supplies come through seaway.

Transport Mode	Type
Road	Vehicle: Lorry Size Class: >32 metric ton Emission Standard: EURO5 Fuel Type: Diesel
Sea	Vehicle: Container Ship DWT (Load Capacity): 43000 tonnes Fuel Type: Heavy Fuel Oil

A5 - Installation

This stage includes the impacts caused by product assembly. In the study, 14 kg mortar used during assembly were included and the end of life impacts of the packages were calculated under this heading.

B1 - Use

Due to the CaO content of the cement and lime used in the product, AAC blocks absorb CO_2 during their lifetime. Theoretical CO_2 uptake by carbonation process during the product's service life is calculated by considering the CaO content within cement and lime with reference to the Hartmut B. Walther (2022) paper. 85% recarbonation rate over 50 years is considered.

C1 - Demolation

It is assumed that 0.07 MJ energy is needed for the deconstruction/demolition of 1 kg of final product. This is from the JRC technical report called "Model for Life Cycle Assessment (LCA) of buildings" prepared by Dos Santos Gervasio, H. and Dimova, S. in 2018 published by the publication's office of the European Union. According to this assumption, around 27 MJ (0.07 MJ * 385 kg) of electricity energy is needed for the deconstruction/ demolition of the product.

C2 - Waste Transport

This step includes the transport of materials after they reach their end-of-life. The average distance was assumed 100 km by truck from demolition site to a waste or recycling area.

Transport Mode	Type
Road	Vehicle: Lorry Size Class:16-32 metric ton Emission Standard: EURO5 Fuel Type: Diesel

C3 - Waste Processing

The impact of sorting and related waste processing efforts are included at this stage.

C4 - Disposal

The recycled amount of waste AAC product can substitute the use of aggregate content for further concrete making processes. According to the Cement Sustainability Initiative (CSI), this substitution can be between 10 - 45%. In this study, 30% substitution is assumed. The rest of the product is assumed landfilled and its impact is calculated at this stage.

D - Reuse, recovery, or recycling potential

The recycled amount of waste concrete can substitute the use of aggregate content for further concrete making processes. According to the Cement Sustainability Initiative (CSI), this substitution can be between 10 - 45%. In this study, 30% substitution is assumed. This benefit is allocated accordingly.

LCA Information

Functional Unit: 1 m^3 (385 kg) of Autoclaved Aerated Concrete (AAC) block produced by KÇS Kipaş.

Time Representativeness: Full year of 2023 (01.01.2023 - 31.12.2023).

Database(s) and LCA Software: Ecoinvent 3.10 and SimaPro 9.6

System Boundaries: Cradle to gate with options, modules C1–C4, module D and with optional modules (A4, A5 & B1).

	Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Benefits and Loads
	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	Transport	Waste Processing	Disposal	Reuse-Recycling-Recovery 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	X	X	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	TR	GLO	TR	GLO	GLO	GLO	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific Data Used	12%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - Products	-56% / +17%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - Sites	0%				-	-	-	-	-	-	-	-	-	-	-	-	-

(ND: Not declared, X:Included in LCA, GLO:Global, TR:Türkiye)

Source of Electricity

The electricity data modelled for the production processes is taken from Ecoinvent 3.10 dataset that represents medium voltage electricity production in Türkiye with the reference year, 2021. The chosen dataset has GWP-GHG impact of 0.575 kg CO_2 eq. / kWh. The dataset consist the following production percentages for electricity. Coal, 37%, Hydro, 33%, Natural gas, 17 %, Wind, 8%, Geothermal, 3%, Biogas, 1%, Other, 1%, Biomass, <1%.

Allocation

Source of raw material, water consumption, energy consumption and raw material transportation were weighted according to 2023 production figures. In addition, hazardous and non-hazardous waste amounts were also allocated from the 2023 total waste generation.

Cut-Off Criteria

1% cut-off is applied in LCA. Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

Reach Regulation

No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH regulations are present in this product either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

Product Composition

The content declaration is provided as intervals due to confidentiality reasons.

Product Component	Weight, %	Post-consumer material, weight-%	Biogenic material, weight-% of product	Biogenic material, kgC/declared unit
Silica Sand	45%-55%	0	0	0
Cement	25%-35%	0	0	0
Crystal Water	5-10%	0	0	0
Lime	5-10%	0	0	0
Gypsum	5-10%	0	0	0
Aluminium Powder	0-5%	0	0	0
Sum	**100%**	**0**	**0**	**0**

Packaging Composition

Polypropylene film, and Euro pallet are used for packaging. Details are given in the table below.

Product Component	Weight, kg	Weight-% (versus the product)	Biogenic material, kg C/declared unit
Popypropylene Film	0.4	<1%	0
Euro Pallet	0.35	<1%	0.14
Sum	**0.75**	**<1%**	**0.14**

LCA Modelling, Calculation And Data Quality

The results of the LCA with the indicators as per EPD requirement are given in the LCA result tables. All energy calculations were obtained using Cumulative Energy Demand (LHV) methodology, while fresh water use is calculated with selected inventory flows in SimaPro according to the PCR. There are no co-product allocations within the LCA study underlying this EPD. The regional energy datasets were used for all energy calculations.

Background Data

For all LCA modelling and calculation, Ecoinvent database (v3.10) and SimaPro (v9.6) LCA software were used. Characterization factors of EN 15804 reference package based on EF 3.1 are utilized. Impact of infrastructure and capital goods are excluded from the analysis.

LCA Results

It is discouraging the use of the results of modules A1-A3 without considering the results of module C. 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.

CORE ENVIRONMENTAL IMPACTS PER DECLARED UNIT											
Mandatory indicators		**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**C1**	**C2**	**C3**	**C4**	**D**
Global Warming Potential	Total	kg CO_2 eq.	1.51E+02	1.12E+01	4.07E+00	-5.54E+01	1.55E+01	4.15E+00	0.00E+00	1.69E+00	-5.02E-01
	Fossil	kg CO_2 eq.	1.51E+02	1.12E+01	3.47E+00	-5.54E+01	1.53E+01	4.15E+00	0.00E+00	1.69E+00	-5.02E-01
	Biogenic	kg CO_2 eq.	-8.01E-02	1.91E-03	5.97E-01	0.00E+00	3.79E-02	7.36E-04	0.00E+00	4.56E-04	0.00E+00
	Luluc	kg CO_2 eq.	9.27E-02	4.45E-03	1.30E-03	0.00E+00	1.64E-01	1.66E-03	0.00E+00	8.68E-04	-4.09E-04
ODP		kg CFC-11 eq.	7.03E-07	1.57E-07	1.49E-08	0.00E+00	9.12E-08	6.12E-08	0.00E+00	4.87E-08	-4.82E-09
AP		mol H+ eq.	4.01E-01	3.75E-02	1.28E-02	0.00E+00	9.98E-02	1.42E-02	0.00E+00	1.19E-02	-3.38E-03
EP - Freshwater		kg P eq.	2.24E-02	8.80E-04	5.23E-04	0.00E+00	1.54E-02	3.26E-04	0.00E+00	1.40E-04	-1.43E-04
EP - Marine		kg N eq.	1.67E-02	1.21E-02	3.47E-03	0.00E+00	1.76E-02	4.65E-03	0.00E+00	4.55E-03	-1.03E-03
EP - Terrestrial		mol N eq.	1.04E+00	1.32E-01	3.69E-02	0.00E+00	1.61E-01	5.06E-02	0.00E+00	4.97E-02	-1.16E-02
POCP		kg NMVOC	3.27E-01	5.21E-02	1.07E-02	0.00E+00	4.78E-02	2.08E-02	0.00E+00	1.78E-02	-3.46E-03
*ADPE		kg Sb eq.	1.50E-04	3.60E-05	8.49E-06	0.00E+00	1.71E-05	1.13E-05	0.00E+00	2.63E-06	-2.42E-06
*ADPF		MJ	3.02E+02	1.53E+01	1.04E+01	0.00E+00	1.10E+02	5.74E+00	0.00E+00	2.56E+00	-2.69E+00
*WDP		m^3 depriv.	3.91E+01	7.11E-01	7.42E-01	0.00E+00	7.80E+00	3.09E-01	0.00E+00	1.81E+00	-6.96E+00
Additional environmental impact indicators per declared unit (Optional)											
PM		disease inc.	2.89E-06	8.90E-07	1.61E-07	0.00E+00	4.44E-07	4.15E-07	0.00E+00	2.72E-07	-6.42E-08
**IR		kBq U-235 eq.	2.66E+00	1.29E-01	7.16E-02	0.00E+00	1.25E-01	5.32E-02	0.00E+00	2.64E-02	-3.44E-02
ETP-FW		CTUe	1.69E+02	4.19E+01	7.21E+00	0.00E+00	4.34E+01	1.45E+01	0.00E+00	5.65E+00	-2.40E+00
*HTP - C		CTUh	1.52E-07	5.81E-08	5.00E-09	0.00E+00	1.76E-08	2.06E-08	0.00E+00	7.61E-09	-4.23E-09
*HTP - NC		CTUh	7.93E-07	9.79E-08	2.21E-08	0.00E+00	9.89E-08	3.87E-08	0.00E+00	7.06E-09	-3.79E-09
*SQP		Pt	3.02E+02	9.39E+01	2.87E+01	0.00E+00	2.10E+01	6.06E+01	0.00E+00	8.13E+01	-7.64E+00

Legend	A1: Raw Material Supply. A2: Transport. A3: Manufacturing. A1-A3: Sum of A1. A2. and A3. A4: Transport to Site A5: Construction. B1: Use, C1: De-Construction. C2: Waste Transport. C3: Waste Processing. C4: Disposal. D: Benefits and Loads Beyond the System Boundary.
Acronyms	GWP-total: Climate change. GWP-fossil: Climate change- fossil. GWP-biogenic: Climate change - biogenic. GWP-luluc: Climate change – land use and transformation. ODP: Ozone layer depletion. AP: Acidification terrestrial and freshwater. EP-freshwater: Eutrophication freshwater. EPmarine: Eutrophication marine. EP-terrestrial: Eutrophication terrestrial. POCP: Photochemical oxidation. ADPE: Abiotic depletion - elements. ADPF: Abiotic depletion - fossil resources. WDP: Water scarcity. PM: Respiratory inorganics - particulate matter. IR: Ionising radiation HTP-c: Cancer human health effects. HTP-nc: Non-cancer human health effects. SQP: Land use related impacts. soil quality
*Disclaimer 1	The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with
**Disclaimer 2	This impact category deals mainly with the eventual impact of low dose ionising radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents. occupational exposure. or due to radioactive waste disposal in underground facilities. This indicator also does not measure potential ionising radiation from the soil. from radon and from some construction materials is also not measured by this indicator.

ADDITIONAL MANDATORY IMPACT CATEGORY INDICATORS PER DECLARED UNIT										
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**C1**	**C2**	**C3**	**C4**	**D**
***GWP - GHG	kg CO_2 eq.	1.51E+02	1.12E+01	3.56E+00	-5.54E+01	1.55E+01	4.16E+00	0.00E+00	1.69E+00	-5.04E-01
***Disclaimer 3	GWP-GHG = Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology. The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. The GWP-GHG indicator is identical to GWP-total except that the characterisation factor (CF) for biogenic CO_2 is set to zero.									

RESOURCE USE INDICATORS PER DECLARED UNIT										
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	9.47E+01	2.07E+00	1.03E+01	0.00E+00	7.13E+01	7.94E-01	0.00E+00	3.87E-01	-4.60E-01
PERM	MJ	7.07E+00	0.00E+00	-7.07E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.02E+02	2.07E+00	3.28E+00	0.00E+00	7.13E+01	7.94E-01	0.00E+00	3.87E-01	-4.60E-01
PENRE	MJ	3.01E+02	1.53E+01	1.17E+01	0.00E+00	1.10E+02	5.74E+00	0.00E+00	2.56E+00	-2.69E+00
PENRM	MJ	1.31E+00	0.00E+00	-1.31E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.02E+02	1.53E+01	1.04E+01	0.00E+00	1.10E+02	5.74E+00	0.00E+00	2.56E+00	-2.69E+00
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.17E+00	2.46E-02	5.35E-02	0.00E+00	6.23E-02	1.14E-02	0.00E+00	4.29E-02	-1.63E-01
Legend	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; 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 re-sources; SM: Use of secondary material; RSF: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels; FW: Use of net fresh water									

WASTE & OUTPUT INDICATORS										
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	kg	1.96E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	5.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.69E+02	0.00E+00
RWD	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+02	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE (Electrical)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE (Thermal)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Legend	HWD: Hazardous waste disposed, NHWD: Non-hazardous waste disposed, RWD: Radioactive waste disposed, CRU: Components for reuse, MFR: Material for recycling, MER: Materials for energy recovery, EE (Electrical): Exported energy electrical, EE (Thermal): Exported energy, thermal.									

Additional Environmental Information

Variation among the product range

This EPD presents the results of the investigated product based on the representative density (385 kg/m^3). The manufacturer has a density range of 120 to 580 kg for 1 m^3 AAC block production. Density variations based on 1 m^3 scale, effects the recipe (material inputs) of the product, thus alter the results at A1 stage. The density change does not affect the energy requirements at A3 stage thus the variations are attributed to the A1 stage.

Table on the right, lists the largest variations for each environmental indicator in terms of percentages for products with minimum and maximum densities by taking the representative density (385 kg/m^3) as 100% investigated through A-C modules.

Impact indicators	Unit	Product with minimum density	Product with maximum density
GWP - Fossil	kg CO_2 eq.	-60%	19%
GWP - Biogenic	kg CO_2 eq.	-30%	38%
GWP - Luluc	kg CO_2 eq.	-36%	12%
GWP - Total	kg CO_2 eq.	-60%	19%
ODP	kg CFC-11 eq.	-48%	15%
AP	mol H+ eq.	-43%	7%
EP - Freshwater	kg P eq.	-39%	6%
EP - Marine	kg N eq.	-50%	13%
EP - Terrestrial	mol N eq.	-52%	14%
POCP	kg NMVOC	-50%	14%
ADPE	kg Sb eq.	-42%	13%
ADPF	MJ	-40%	5%
WDP	m^3 depriv.	-24%	39%
GWP-GHG	kg CO_2 eq.	-60%	19%
PM	disease inc.	-37%	8%
IR	kBq U-235 eq.	-51%	11%
ETP-FW	CTUe	-36%	8%
HTP - C	CTUh	-40%	11%
HTP - NC	CTUh	-56%	16%
SQP	Pt	-33%	12%
PERE	MJ	-37%	12%
PERM	MJ	0%	0%
PERT	MJ	-34%	12%
PENRE	MJ	-41%	6%
PENRM	MJ	0%	0%
PENRT	MJ	-40%	5%
SM	kg	0%	0%
RSF	MJ	0%	0%
NRSF	MJ	0%	0%
FW	m^3	-42%	33%

References

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The International EPD® System / The International EPD® System is a programme for type III environmental declarations, maintaining a system to verify and register EPD®s as well as keeping a library of EPD®s and PCRs in accordance with ISO 14025. www.environdec.com

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