HEKİM YAPI
ENDÜSTRİSİ SAN. VE TİC. A.Ş.

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO14025 and EN15804: 2012+A2:2019 for

HEKİMBOARD
Fibercement Board

Manufactured by Hekim Yapı Endüstrisi San. Ve Tic. A.Ş.

The environmental impacts of this product have been assessed over its whole life cycle. Environmental Product Declaration has been verified by an independent third party.

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. This EPD has been updated to the latest norms and standards due to expiry.

Programme / The International EPD® System
Programme Operator / EPD International AB
Local Operator / EPD Turkey
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Geographical Scope / Global

TURKEY EPD®
ENVIRONMENTAL PRODUCT DECLARATIONS

EPD®
THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

PROGRAMME INFORMATION

The LCA for this EPD is conducted according to the guidelines of ISO 14040/44 and the requirements given in the Product Category Rules (PCR) document for Construction Products and CPC 54 Construction Services with reference to EN 15804 and the general program guidelines by The International EPD System in accordance with ISO 14025 standards.

The International EPD® System

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ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)

Product Category Rules (PCR):

2019:14 Version 1.11, 2021-02-05, Construction Products and CPC 375 Construction Services, EN 15804:2012 + A2:2019 Sustainability of Construction Works

PCR review was conducted by:

The Technical Committee of the International EPD® System. Review chair: Claudia A. Peña, University of Concepción, Chile

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

EPD process certification EPD verification ✓

Third party verifier: Prof. Vladimír Kočí

Approved by: The International EPD® System Technical Committee, supported by the Secretariat

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

Yes No ✓

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.

ABOUT
HEKiM YAPI

Hekim Yapı A.Ş., is the first company producing autoclaved fibercement boards with the formulation of all natural materials. Hekim Yapı A.Ş., established on 111 000 m^2 production area in 2nd Organized Industrial Zone of Hendek-Sakarya, has 125 000 m^3 of fibercement board production capacity annually in total with three production plants under the brand name of "Hekimboard".

In consequence of investments realized by Hekim Yapı A.Ş. in 2001, the fibercement products are grouped as; Smooth or textured flat boards under HekimBoard and Boardia brands, fibercement siding planks under TurkSiding brand, Laminated fibercement boards under FibercementLam brand and flexible fibercement boards under HekimBoard Flexia brand. All of the fibercement products produced by Hekim Yapı are safely and widely used for interior and exterior facade cladding applications since 2004. Hekim Yapı A.Ş. has realized an investment of EPS (Expandable Polystyrene Foam) production plant in 2010. The facility has an annual 500 000 m^3 production capacity of high quality white and graphite enhanced EPS insulation products as well as injection products for various application areas such as ceiling planks and packing materials.

Hekim Yapı A.Ş has realized two new investments in 2011. One of these investments was the production plant for EPS and rock wool insulated sandwich panels with an annual 2 000 000 m^2 production capacity. Roof and wall panels of different types and dimensions up to 1.25 m width and 16 m length under HekimPanel brand are produced in this plant.

A polyurethane insulated sandwich panel production line was established in 2016. The annual production capacity with this new line has reached 4 000 000 m^2 completing all product range as polyurethane, EPS and rock wool filled sandwich panels.

Second investment of Hekim Yapı A.Ş., in 2011 was the production plant of polyethylene terephthalate (PET) foils as a PET roll-machine. Investment of Hekim Yapı A.Ş. in 2014 was the production line of ready-to-use wall panels with EPS insulation. The panels are produced under HekimPan brand.

Hekim Yapı Endüstrisi Sanayi ve Ticaret A.Ş. established completely with its own capital will continue to be one of companies undertaking significant role to carry our country forward with the mission of being leader in latest technologies and to work uninterruptedly to ensure our country to take its place among developed countries thanks to strong infrastructure, experienced and self confident personnel.

Hekim Yapı aims to become the leader in the sector, aspires to respond to the customer needs and make a difference with high quality products in wide range. With this comprehension, the company obtained the certificates of ISO 9001:2008 Quality Management System and ISO 14000 Environmental Management System. And now, with the aim of getting this EPD, Hekim Yapı will further strengthen their environmental awareness, while fulfilling the market requirements by declaring the environmental impacts of their products for fibercement board.

ABOUT
THE PRODUCT

Fibercement boards are construction elements manufactured according to TS EN 12467 standard and extensively used in residential, institutional, commercial and industrial buildings as ceiling, internal lining, floor, partition, wall system, wall cladding, fencing, eaves & soffit lining, gable end, external siding, roof sarking, permanent formwork, water tank underlay elements etc. Common feature of these boards is having organic or inorganic (or both) fibres in their structures as reinforcement elements and Portland cement as a bonding member.

HekimBoard fibercement boards are autoclaved under high temperature and pressure to be extremely durable against the toughest athmospheric conditions. They can be used confidently in extreme weather conditions, from the heat of the desert to cold of the Arctic. HekimBoard fibercement boards can be produced with either smooth or textured surface such as natural stone, cedar or walnut tree, stone masonry or brick patterns with a very special production process and this feature allows for an unlimited number of aesthetic solutions.

Fibercement boards are categorized in the European Construction products definition and this declaration refers to that as per PCR for Construction Products and Construction Services with UN CPC code of 31449.

No substances included in the Candidate List of Substances of Very High Concern for authorisation under the REACH Regulations are present in the fibercement boards manufactured by Hekim Yapı, either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

Product Composition

Cement	% 15-40
Silica	% 25-60
Cellulose Fibre	% 1-15
Additives	% 0-5

HEKİMBOARD
PRODUCT RANGE

HEKİMBOARD
Smooth Board

HEKİMBOARD
Cedar Textured Board

HEKİMBOARD
Walnut Textured Board

HEKİMBOARD
Natural Stone Textured Board

HEKİMBOARD
Stone Masonry Textured Board

HEKİMBOARD
Mixed Stone Textured Board

HEKİMBOARD
Grooved Smooth Board

HEKİMBOARD
Grooved Cedar or Walnut Textured Board

HEKİMBOARD
Grooved Natural Stone Textured Board

HEKİMBOARD
Brick Textured Board

TURKSIDING
Fibercement Siding

FIBERCEMENTLAM
PET Laminated Fibercement Board

The inventory for the LCA study is based on the 2021 production figures for fibercement boards manufactured by Hekim Yapı Endüstrisi San. Ve Tic. A.Ş. (Hekim Yapı) in their production plant located in Sakarya, Turkey.

The LCA was modelled with SimaPro 9.3 LCA software using the impact factors and the latest version of the Ecoinvent database (V3.8) for secondary data.

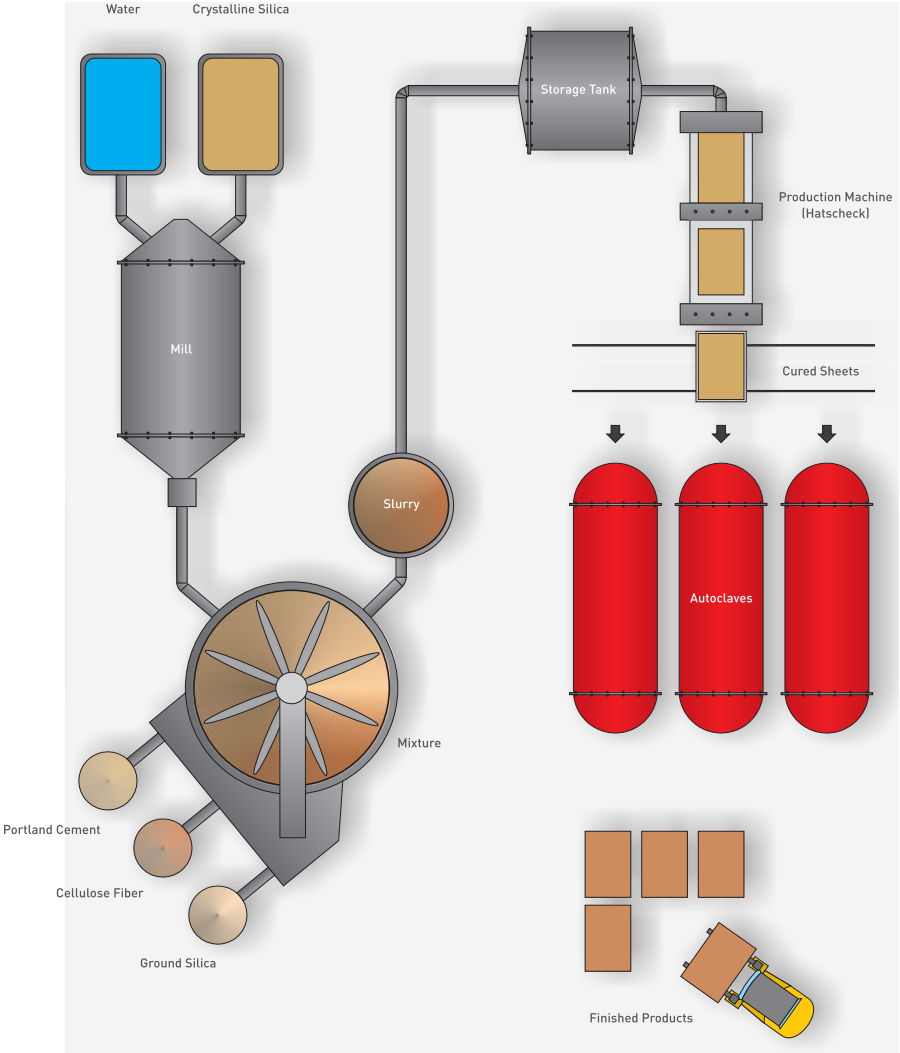
EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019 Norm.

The EPD certificate, its background data and the results will be used for business-to-business communications and is expected to be a reliable document for green building designers, architectures, manufacturers of construction products and the other stakeholders in the construction sector to understand the potential environmental impacts caused by fibercement boards.

For more information about this Environmental Product Declaration or it's contents, please contact info@hekimyapi.com

MANUFACTURING PROCESS

The fibercement production process starts with sand milling. Milled sand, water, cement, cellulose fibres and additives are mixed in a cone mixer to prepare a slurry. The slurry is then processed by use of vats, agitators and rotating sieve cylinders in Hatschek process. The rotation of the sieve cylinders allows the slurry to be deposited on sieve mesh. It is then transferred to the travelling felt.The green sheets are trimmed and stacked and are allowed to pre-cure before being sent to autoclave for the final curing stage. The pre-cured product is then cured inside the autoclave with high steam pressure and the end products are packaged to be sold.



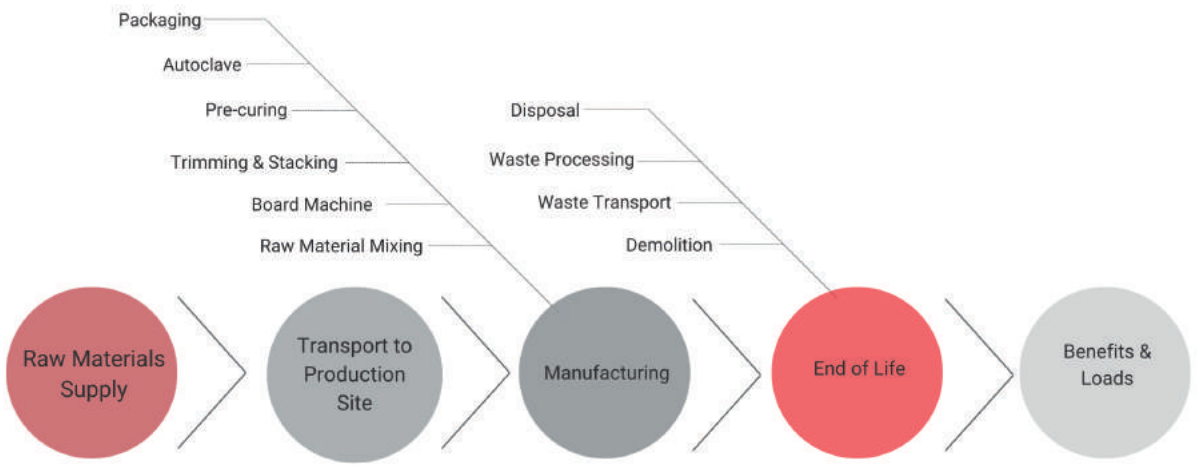
All the waste resulting from the main production and related processes of Hekim Yapı is managed in accordance with valid local legal requirements.

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATION	DESCRIPTION
Standard Sizes	Smooth and Textured: 1 250 x 2 500 mm, 1 250 x 3 000 mm
Thickness	Smooth: 6 ~ 20 mm – Textured: 8 ~ 12 mm
Length / Width Tolerance	± 5 mm / ± 3.75 mm
Thickness Tolerance (e: board thickness)	Smooth: ± 10% e, Textured: – 10% e / + 15% e
Squareness of Edges	± 2 mm/m
Straightness of Edges (a: side length)	± 0.1% a
Surface Wiew	Smooth or textured
Density	~ 1 350±50 kg/m^3
Vapor Diffusion Resistance	μ = 250
Porosity	~ 30%
Bending Strength (Minimum)	~ 14.0 N/mm^2 (lenght); ~ 9.0 N/mm^2 (width)
Hygrical Movement	0.5 mm/m (full saturation)

TECHNICAL SPECIFICATION	DESCRIPTION
Freezing Strength	Resistant to freezing according to TS EN 12467
Waterproofing	Waterproof according to TS EN 12467
Fire Reaction Class	Non-combustible, A1 class construction material according to EN 13501-1
Asbestos Content	Non-Asbestos (NT type product)
Other Hazardous Material Emission	Has no hazardous material or gas emission
Thermal Expansion Coefficient	αt = 0.005 mm/mK
Thermal Conductivity	λ = 0.20 W/mK
Modulus of Elasticity	8 000 N/mm^2 (length), 6 000 N/mm^2 (width)
Water Absorption	<30%
Stock Sheet Moisture	<10% (depending on the atmospheric humidity)
Bending Radius (By Thickness)	8 mm.. 8 000 mm; 10 mm.. 12 000 mm; 12 mm.. 24 000 mm; 16 mm.. 50 000 mm

SYSTEM BOUNDARY



A1: Raw Material Supply
Production starts with mainly locally sourced but some transported from other parts of the world raw materials. 'Raw material supply' includes raw material extraction and pre-treatment processes before production.

A2: Transportation
Transport is relevant for delivery of raw materials to the plant and the transport of materials within the plant.

A3: Manufacturing
'Manufacturing' starts with sand milling. Milled sand, water, cement, cellulose fibres and additives are mixed to prepare a slurry. The slurry is then processed in boarding machine to form green sheets. The green sheets are trimmed, stacked and to pre-cured before being sent to autoclave for the final curing stage. The product is then cured inside the autoclave with high steam pressure and the end products are packaged to be sold. Electricity and energy from hard coal and lignite are consumed during manufacturing.

C1: Deconstruction and Demolition
The C1 Module is associated with the influence of the fibercement board products' end of life stage.

C2: Transport
This module involves the impact that is caused by the transportation of the fibercement board products, while being discarded to a disposal site. 100 km is assumed for waste transportation.

C3: Waste Processing
The environmental impacts generated during the C3 phase are very low and therefore can be neglected. The fibercement board wastes can go directly to the waste site.

C4: Disposal
All fibercement board products end up at construction and demolition waste landfills as their final fate and modelled as such in the LCA.

D: Benefits and Loads
No potential benefits of recycling and re-use were taken into account in the current LCA.

ENVIRONMENTAL PERFORMANCE RELATED INFORMATION

Functional Unit/Declared Unit	The declared unit is the production of 1m² fibercement board (10 mm thickness with 13.5 kg weight).
Goal and Scope	This EPD evaluates the environmental impacts of 1 m² fibercement board from cradle to gate with disposal option life cycle perspective.
System Boundary	The system boundary covers stages A1 - A3, C1 - C4, and Module D.
Estimates and Assumptions	There are no additional product scenarios developed for this EPD. However, packaging waste for fibercement boards are modelled based on the collection rates enforced by the relevant regulations in Turkey. At the end of life, the products end up at construction and demolition waste landfills as their final fate (C4).
Cut-Off Rules	For this LCA study, 1% (w/w) cut-off criteria was applied.
Background Data	Ecoinvent 3.8
Data Quality	Raw materials, energy and water consumption and waste data is collected from Hekim Yapı.
Period Under Review	All primary data collected from Hekim Yapı is for the period year of 2021.
Allocations	There are no co-products in the production of fibercement boards manufactured by Hekim Yapı. Hence, there was no need for co-product allocation. The Company sources raw materials from different locations across Turkey and other parts of the world by different means of transport (truck and ship). For this reason, transport was allocated according to raw material tonnages. Raw material production and transport to the gate, energy consumption during manufacturing, packaging and waste data were allocated for an average declared product according to fibercement board production tonnages by Hekim Yapı in 2021. Hekim Yapı manufactures various fibercement boards under different brand names with specifications for different applications. The products that are part of this EPD are sold in market under the following brand names; HekimBoard, Boardia, CementBoard, and CementPan.

Conversion Factors

The LCA study included in this EPD has been declared for 1 m² fibercement board of 10 mm thickness with a weight of 13.5 kg. In the LCA study, the allocations were made on the basis of weight. For this reason, the following conversion factors can be used to calculate the environmental impacts of other thicknesses.

Thickness (mm)	6 mm	8 mm	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm
Multiplication Factor	1,67	0,80	1,00	1,20	1,40	1,60	1,80	2,00

ENVIRONMENTAL PERFORMANCE RELATED INFORMATION

(X = Included in LCA, ND= Not Declared, NR=Not Relevant)

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.

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
	Raw Materials 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	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	GLO	-	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific Data Used	>90%	>90%	>90%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	<10%	<10%	<10%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - Sites	NR	NR	NR	-	-	-	-	-	-	-	-	-	-	-	-	-	-

LCA RESULTS

Impact Category	Unit	A1-A3	C1	C2	C3	C4	D
GWP - Fossil	kg CO_2 eq	10.5	0	0.224	0	0.156	0
GWP - Biogenic	kg CO_2 eq	-0.060	0	0.001	0	0.002	0
GWP - Luluc	kg CO_2 eq	0.012	0	88.1E-6	0	158E-6	0
GWP - Total	kg CO_2 eq	10.5	0	0.225	0	0.158	0
ODP	kg CFC-11 eq	544E-9	0	51.9E-9	0	47.6E-9	0
AP	mol H+ eq	0.060	0	911E-6	0	0.001	0
*EP - Freshwater	kg P eq	0,003	0	14.5E-6	0	45.4E-6	0
EP - Freshwater	kg (PO_4) eq	0.010	0	44.2E-6	0	139E-6	0
EP - Marine	kg N eq	0.010	0	274E-6	0	454E-6	0
EP - Terrestrial	mol N eq	0.112	0	0.003	0	0.005	0
POCP	kg NMVOC	0,029	0	743E-6	0	0.001	0
ADPE	kg Sb eq	44.6E-6	0	780E-9	0	511E-9	0
ADPF	MJ	81.0	0	3.39	0	3.67	0
WDP	m^3 depriv.	3.24	0	0.010	0	0.160	0
PM	disease inc.	602E-9	0	15.6E-9	0	25.6E-9	0
IR	kBq U-235 eq	0.340	0	0.017	0	0.017	0
ETP - FW	CTUe	123E-9	0	2.65	0	2.62	0
HTTP - C	CTUh	25.1E-9	0	85.7E-12	0	113E-12	0
HTTP - NC	CTUh	206	0	2.77E-9	0	1.74E-9	0
SQP	Pt	43.2	0	2.41	0	9.09	0
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, EP-marine: 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, ETP-FW: Ecotoxicity freshwater, HTP-c: Cancer human health effects, HTP-nc: Non-cancer human health effects, SQP: Land use related impacts, soil quality.							
Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A4: Transport, C1: Deconstruction / demolition, C2: Transport, C3: Waste Processing, C4: Disposal, D: Future reuse. recycling or energy recovery potentials						
Disclaimer 1	This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.						
Disclaimer 2	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 the indicator.						
*Disclaimer 3	EP-freshwater: This indicator is calculated both in kg PO_4 eq and kg P eq as required in the charactarization model. (EUTREND model, Struijs et al, 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml)						

LCA RESULTS

Resource use

Impact Category	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	7.87	0	0.048	0	0.063	0
PERM	MJ	0	0	0	0	0	0
PERT	MJ	7.87	0	0.048	0	0.063	0
PENRE	MJ	81.0	0	3.39	0	3.67	0
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	81.0	0	3.39	0	3.67	0
SM	kg	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.103	0	562E-6	0	0.004	0
Acronyms	PERE: Use of renewable primary energy excluding resources used as raw materials, PERM: Use of renewable primary energy resources used as raw materials, PERT: Total use of renewable primary energy, PENRE: Use of non-renewable primary energy excluding 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, SM: Secondary material, RSF: Renewable secondary fuels, NRSF: Non-renewable secondary fuels, FW: Net use of fresh water.						

Waste & Output Flows

Impact Category	Unit	A1-A3	C1	C2	C3	C4	D
HWD	kg	216E-6	0	0	0	0	0
NHWD	kg	1.45E-3	0	0	0	0	0
RWD	kg	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0
EE (Electrical)	MJ	0	0	0	0	0	0
EE (Thermal)	MJ	0	0	0	0	0	0
Acronyms	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.						

Climate impact

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
*GHG-GWP	kg CO_2 eq	10.4	0	0.223	0	0.154	0

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. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013

Legend	A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A4: Transport, C1: Deconstruction / demolition, C2: Transport, C3: Waste Processing, C4: Disposal, D: Future reuse. recycling or energy recovery potentials

GLOSSARY OF TERMS

Global Warming Potential, GWP	Global warming is a concept expressing warming of the atmosphere leading to climate change. One of the human activities which has the greatest effect on global warming is the burning of fossil fuels such as petroleum, coal and natural gas. In LCA, global warming is expressed in terms of the equivalent weight of carbon dioxide (CO_2) emitted.
Ozone Depletion Potential, ODP	Ozone layer depletion is a concept expressing the reduction of ozone in the stratosphere and depletion of the ozone layer (the 'ozone hole') as a consequence of emissions of man-made resources such as CFCs, HCFCs, chlorine, bromine, etc. Damage to the ozone layer reduces its ability to prevent UV light entering the earth's atmosphere, increasing the amount of carcinogenic UVB light hitting the earth's surface. In LCA, ozone layer depletion is expressed in terms of the equivalent weight of CFC-11 emitted.
Acidification Potential, AP	Acidification is an impact category expressing the toxic impact that acidifying substances have on soil, underground water-courses, ground water, organisms, ecosystems and materials. Reaction of acidic gases with water in the atmosphere creates 'acid rain'. The formation of acid rains causes a reduction in biodiversity. In LCA, acidification is expressed in terms of the equivalent weight of sulphur dioxide (SO2) emitted.
Eutrophication Potential, EP	It is an abnormal proliferation of vegetation in the aquatic ecosystems caused by the addition of nutrients into rivers, lakes or ocean which determinates a lack of oxygen. The eutrophication potential is mainly influenced by emission into water of phosphates and nitrates. Its occurrence can lead to damage to ecosystems, increasing mortality of aquatic fauna and flora and to loss of species that are dependent on low-nutrient environments. In LCA, EP is expressed in mass of $PO4^{3-}$ eq.
Formation potential of tropospheric ozone photochemical oxidants, POCP	POCP is the formation of reactive substances (mainly ozone) which are injurious to human health and ecosystems and which also may damage crops. This problem is also indicated with "summer smog". In LCA, POCP is expressed in kg C_2H_4 eq.
Abiotic Depletion Potential, ADP	In LCA, resource depletion is one of the impact categories expressing how much of the world's natural resources (petroleum, iron ore, etc.) are used up. It has global, regional and local aspects of impact and expresses the amount of mineral/ fossil fuel used. In LCA, fossil and non-fossil resource depletion are expressed in terms of the MJ and Sb eq. respectively.

REFERENCES

/GPI/ General Programme Instructions of the International EPD® System. Version 4.0.

/EN ISO 9001/ Quality Management Systems - Requirements

/EN ISO 14001/ Environmental Management Systems - Requirements

/EN ISO 45001:2018/ Occupational Health and Safety Management Systems - Requirements

/ISO 10002:2018/ Quality management — Customer satisfaction

/ISO 14020:2000/ Environmental Labels and Declarations — General principles

/EN 15804:2012+A2:2019/ Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products

/ISO 14025/ DIN EN ISO 14025:2009-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures

/ISO 14040/44/ DIN EN ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework (ISO14040:2006) and Requirements and guidelines (ISO 14044:2006)

/PCR for Construction Products and CPC 54 Construction Services/ Prepared by IVL Swedish Environmental Research Institute, Swedish Environmental Protection Agency, SP Trä, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB, The International EPD System, 2019:14 Version 1.11 DATE 2019-12-20

/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

/Ecoinvent / Ecoinvent Centre, www.ecoinvent.org

/SimaPro/ SimaPro LCA Software, Pré Consultants, the Netherlands, www.pre-sustainability.com

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