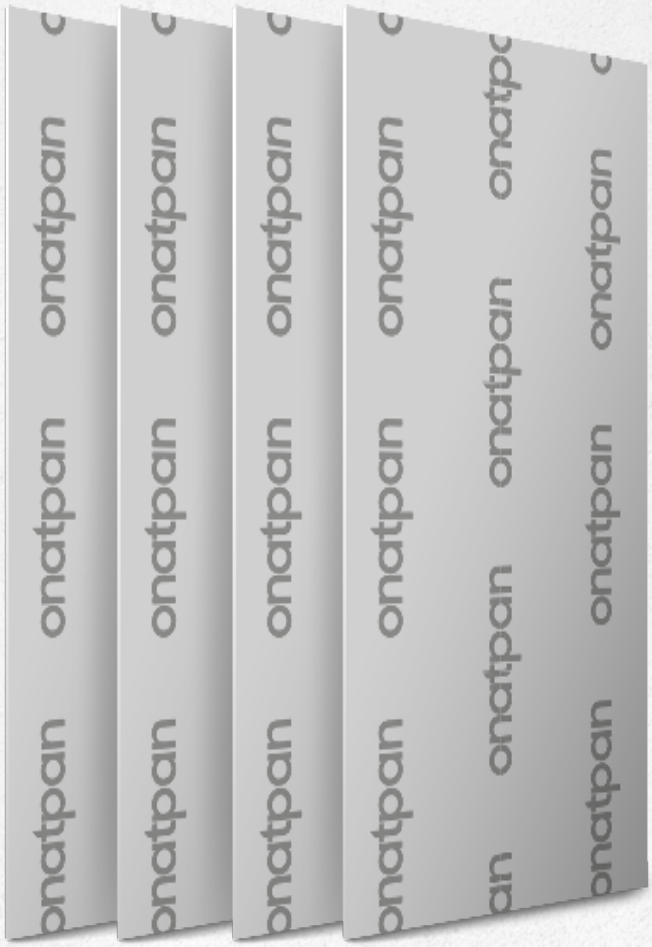

Environmental Product Declaration

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

Onatpan-White-Standard

from **Onpo Madencilik İnş. San. ve Tic. A.Ş.**

Programme: The International EPD® System
Programme Operator: EPD International AB
EPD Registration Number: EPD-IES-0015832
Publication Date: 2024-08-05
Validity Date: 2029-08-04
Geographical Scope: Global

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^2 plasterboard production. 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

CEN standard EN 15804 serve as the core Product Category Rules (PCR) , PCR 2019:14 Construction products, version 1.3.3., Construction EN 15804:2012+A2:2019/AC:2021 Sustainability of Construction Works

PCR review was conducted by: The 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.

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

EPD process certification EPD verification **X**

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via EPD is verified by individual verifier.

Third party verifier: Dr. Nasser Ayoub
Approved by: The International EPD® System Technical Committee supported by the Secretariat

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

Yes X X No **X**

Life Cycle Assessment (LCA)
LCA accountability: Orhan Atacan BSc, MBA - Metsims Sustainability Consulting

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.

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 the Company

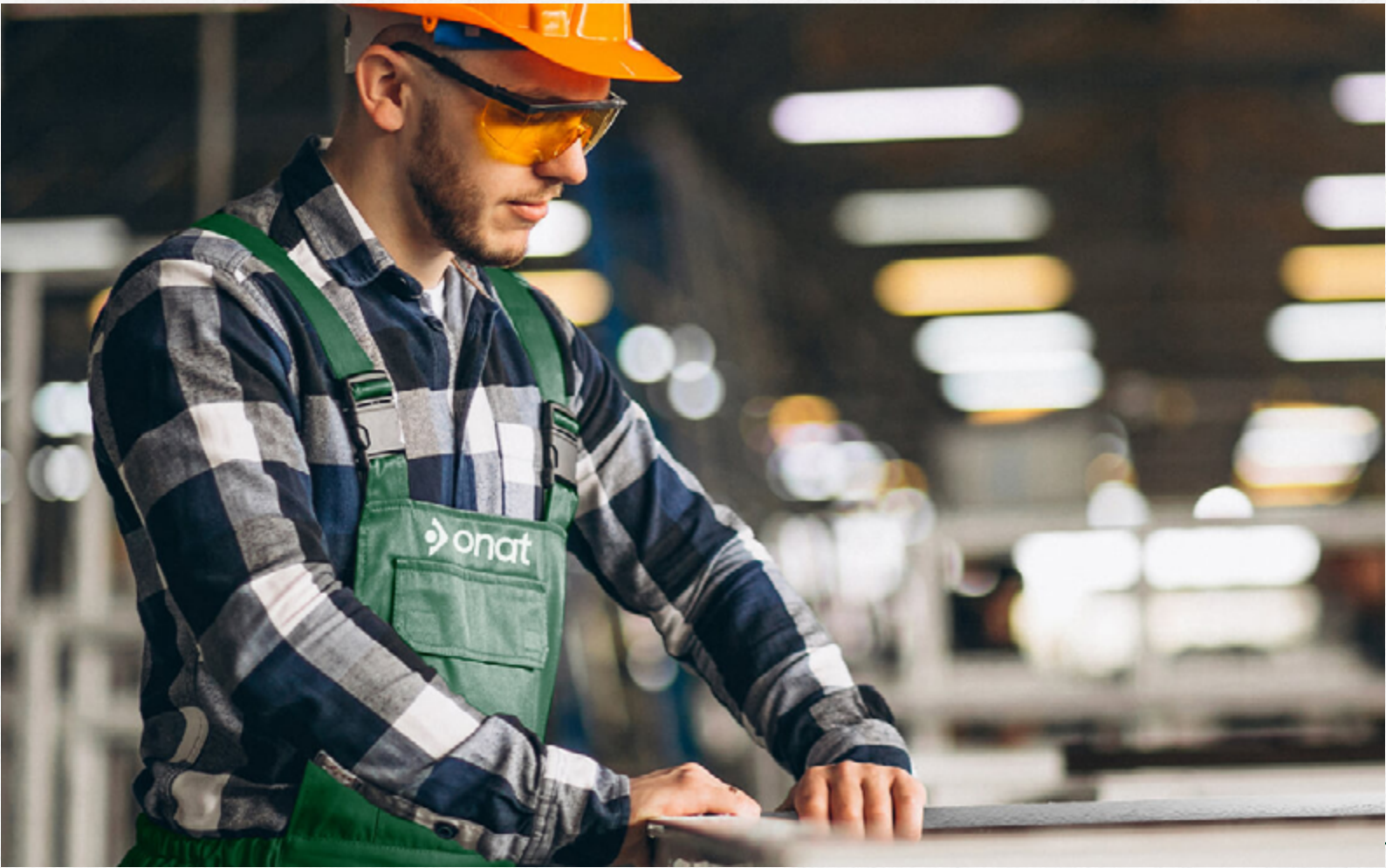
Owner of the EPD: Onpo Madencilik Ins. San ve Tic. A.S.
Production Plant: Ankara, Türkiye

Onpo Madencilik Ins. San ve Tic. A.S. has been established in year 2005. Since the day we were founded, we have worked to reveal the difference and reach the leading position in the Turkish plaster industry. Thus, we established the ONAT ALÇI brand in 2011. We continued to work in line with our future goals and principles in our factory, which contributes to the construction sector at the 20th km of Ankara Bala road.

While developing our durable, reliable and quality products, we have adopted the basic principle of contributing to a strong state and a strong economy. For this reason, in 2015, we expanded our influence by adding ONATPAN Gypsum Board factory to our company with 100% domestic capital, which is affiliated with Ali Rıza Onat Müt. Ins. ve Proj. Hizm. Tic ve San A.S. Thus, with its strong product range and production capacity, we continue to show our difference in the construction sector by producing 450 000 tons of Powder Gypsum and 15 000 000 m^2 of Gypsum Board per year in an area of 100 000 m^2.

Today, we continue to work with precision to ensure customer satisfaction and service quality, as well as our product quality, capacity and diversity. We talk to our customers, listen to them and constantly work to find solutions to their problems. We act with an innovative perspective in order to adapt our work to today's conditions, and we constantly follow technological developments. In line with these principles, we continue to provide multi-faceted benefits to Turkey's construction industry.

The company have Quality Management System - ISO 9001, Occupational Health and Management System - ISO 45001 and Environmental Management System - ISO 14001.



About the Product

ONATPAN White is a flexible, lightweight plasterboard product with improved workability properties, coated with double-sided special paper, using natural gypsum and advanced technology. It is a plasterboard that can be used as a dry surface layer on walls, as a covering layer on ceilings or as a suspended ceiling, as a partition wall, and as a cladding on load-bearing columns and beams.

It provides easy and fast application.

It offers an aesthetic and natural appearance by being used in construction decoration works. It provides a comfortable environment.

Application

ONATPAN White is applied with screws on metal or wooden framework.

It is applied on the existing wall with YAPONAT adhesive plaster.

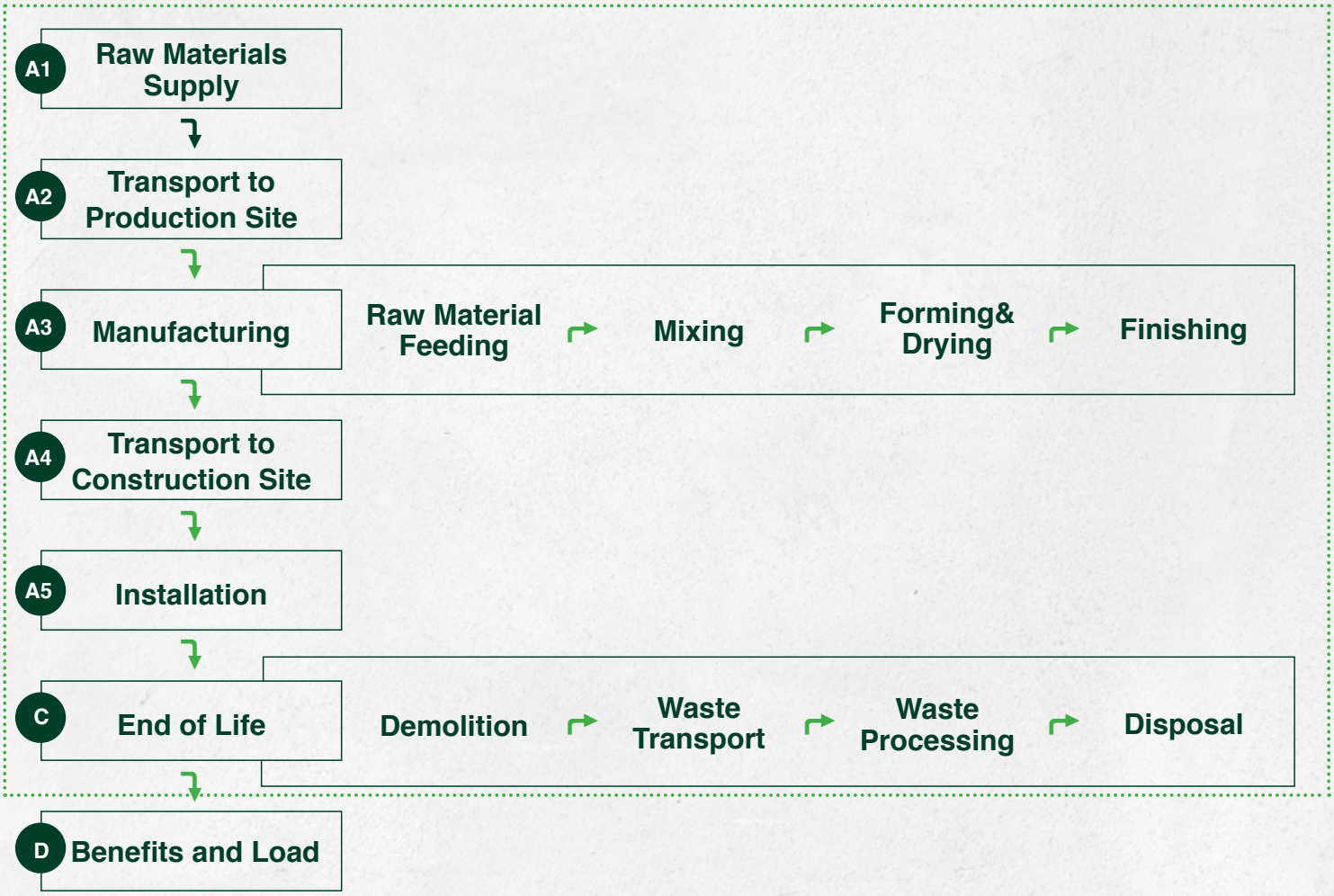
Thanks to its thinned long edges, a smooth and uniform surface is obtained by using DERZONAT joint filler plaster in the joint areas.

The product UN CPC code is 37530 according to Central Product Classification (CPC) Version 2.1.

Technical Specifications (Accoring to EN 520 + A1)

Average Weight (Kg/m^2)	≤ 9,00
Fracture Load in Bending (Short Edge Direction) (N)	≥ 210
Fracture Load in Bending (Long Side Direction) (N)	≥ 550
Edge Type	Blunt Edge, Tapered Edge
Thermal Conductivity (W/m.K)	0,24
Coefficient of Resistance to Water Vapor Transmission	10
Fire Reaction Class	A2-s1-d0
Width (mm)	900-1200
Length (mm)	1800-3000

System Boundaries & Description



..... System Boundary

A1 - Raw Material Supply

Production starts with raw materials mainly locally sourced, but some transported from other parts of the world. 'Raw material supply' includes raw material extraction and pre-treatment processes before production. The stage covers the supply (quarrying) and production of all binder components and additives. The use of electricity, fuel and auxiliary materials in production is also taken into account.

A2 - Raw Material Transport

Raw material transport from supplier to manufacturer is considered in raw material supply stage. The distances and routes are calculated accordingly. Depending the manufacturer, locally supplied steel 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

A3 - Manufacturing

The production process of plasterboard begins with the extraction and crushing of gypsum, followed by calcination to create gypsum hemi-hydrate. This hemi-hydrate is then mixed with fillers and additives to achieve a specific formulation. The critical step in plasterboard manufacturing involves incorporating this mixture with water and encasing it between two layers of kraft paper, serving as a reinforcement. This assembly is then set, cut to size, dried, and inspected for quality before being packaged for distribution. This streamlined process ensures the production of durable and high-quality plasterboard, essential for construction projects.

The end products are then packaged or sold as bulk. Electric and natural gas are consumed during the manufacturing.

Information	Description
Electricity Data	Türkiye electricity grid mix from Ecoinvent, Medium Voltage
Type of dataset	Cradle to gate
GWP of Electricity Data	0,578 kg CO_2 eq./kWh

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

In the application of plasterboard, screws, steel profiles, and gypsum are utilized as the core materials. This selection is critical for the installation process, particularly for securing the plasterboard to ceilings and walls. The method involves attaching the plasterboard onto steel profiles with screws, ensuring a robust and enduring structure. By focusing on mechanical fastening, this approach diverges from traditional plaster applications, emphasizing the importance of structural integrity and ease of installation. Utilizing screws for attachment, steel profiles for framing, and gypsum boards for finishing, plasterboard is positioned as a versatile and effective solution in modern construction, ideal for crafting smooth, durable interior surfaces.

Additionally, LCA also includes the end-of-life of packaging waste at the installation site. End-of-life scenarios of packaging materials are modelled by assuming EU statistics.

Input	Value
Gypsum	12,9 kg
Screw	0,125 kg
Steel Profile	0,005 kg

C1 - Deconstruction / Demolition

There is no energy use during uninstallation, manpower and some tools are sufficient.

C2 - Waste Transport

Waste transport includes the transport of materials after they reach their end-of-life. The average distance was assumed 50 km by truck from demolition site to a waste or recycling area.

Parameter	Value
Vehicle Type	Vehicle: Lorry Size Class: 16-32 metric ton Emission Standard: EURO4 Fuel Type: Diesel
Distance	50 km

C3 - Waste Processing

The product is considered to be landfilled without reuse, recovery or recycling. It is classified as ‘nonhazardous waste’ in the European list of waste products. The impacts of any treatment process to the demolished waste is included in this stage. It is assumed that no treatment is needed as 100 % of the material goes to a landfill.

C4 - Disposal

All plasters end up at construction and demolition waste landfills as their final fate and modelled as such in the LCA.

D - Benefits

No potential benefits of recycling and re-use were taken into account. Only the benefit due to the recycling of the packaging has been calculated.

LCA Information

Declared Unit: 1 m^2 gypsum plasterboard (for a thickness of 12,5 mm)

Conversion Factor: Weight of 1 m^2 plasterboard is 9 kg. A mass conversion factor of 0,111 should be used.

Time Representativeness: 2023 (12 months)

Database(s) and LCA Software: Ecoinvent 3.9.1 and SimaPro 9.5

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

	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	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO		TR	GLO													
Specific Data Used	>90%					-											
Variation - Products	0%					-											
Variation - Sites	0%					-											

(X:Included in LCA, ND: Not Declared)

Geographical Scope

The geographical scope of this EPD is global.

Allocation

According to 2023 production figures, total water consumption, energy consumption and raw material transportation are allocated by weighted average. In addition, total hazardous and non-hazardous waste amounts were allocated according to production tonnage. There is no co-product allocation.

Background Data

For all LCA modelling and calculation, Ecoinvent database (v3.9.1) and SimaPro (v9.5) 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.

Assumptions

Upstream and downstream road transportation are assumed to be carried out with EURO5 motor vehicles with a size class of 16-32 metric tonnes where distances acquired through Google Maps. In addition, 50 km distance for the waste transport at C2 stage is assumed.

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

Gypsum is the main input of the process. Additives are included in the assessment.

Product Component	Weight, %	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Gypsum	90-99	0	0
Kraft Paper	0-5	0	0,42
Additivies	0-5	0	0
Starch	0-5	0	0,46

Packaging Composition

Plasters are packaged and send to customer. Pallets, and nylon films are generally used in packaging.

Product Component	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Pallet	0,011	1,1%	0,59
Nylon Film	0,0005	0,05%	0
Strip	0,00003	0,003%	0

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. Data quality assessment is given below table.

Stage	Data Type
Raw Material Supply	Generic database, plant spesific data
Raw Material Transport	Generic database, plant spesific data
Manufacturing	Generic database, plant spesific data
Product Transport	Generic database, generic data
Installation	Generic database, generic data
End of Life	Generic database, generic data
Benefits and Loads	Generic database, generic data

LCA Results

It is discouraging the use of the results of modules A1-A3 (A1-A5 for services) 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**	**C1**	**C2**	**C3**	**C4**	**D**
Global Warming Potential	Fossil	kg CO_2 eq.	7,65E-01	5,57E-01	1,76E+00	5,20E-01	8,41E-02	0,00E+00	6,80E-02	-1,33E-02
	Biogenic	kg CO_2 eq.	-5,68E-01	1,53E-04	1,64E-01	1,99E-03	2,69E-05	4,18E-01	9,96E-03	-3,38E-05
	Luluc	kg CO_2 eq.	9,88E-03	3,12E-04	2,41E-03	6,18E-03	4,11E-05	0,00E+00	4,11E-05	-8,32E-05
	Total	kg CO_2 eq.	2,06E-01	5,58E-01	1,93E+00	5,29E-01	8,42E-02	4,18E-01	7,80E-02	-1,34E-02
ODP		kg CFC-11 eq.	2,45E-08	8,65E-09	5,91E-08	3,49E-09	1,84E-09	0,00E+00	1,97E-09	-3,54E-10
AP		mol H+ eq.	4,77E-03	5,57E-03	8,24E-03	3,72E-03	3,48E-04	0,00E+00	5,12E-04	-7,72E-05
EP - Freshwater		kg P eq.	6,62E-04	3,88E-05	4,96E-04	5,98E-04	5,93E-06	0,00E+00	5,66E-06	-5,05E-06
EP - Marine		kg N eq.	1,71E-03	1,52E-03	1,84E-03	6,24E-04	1,33E-04	0,00E+00	1,97E-04	-2,39E-05
EP - Terrestrial		mol N eq.	1,53E-02	1,66E-02	1,92E-02	5,61E-03	1,42E-03	0,00E+00	2,11E-03	-2,61E-04
POCP		kg NMVOC	4,09E-03	5,19E-03	7,09E-03	1,64E-03	5,10E-04	0,00E+00	7,34E-04	-1,14E-04
**ADPE		kg Sb eq.	5,37E-06	1,27E-06	1,41E-05	5,58E-07	2,72E-07	0,00E+00	9,44E-08	-7,47E-08
**ADPF		MJ	1,05E+01	7,80E+00	2,24E+01	5,44E+00	1,20E+00	0,00E+00	1,69E+00	-2,30E-01
**WDP		m^3 depriv.	7,65E-01	3,50E-02	4,66E-01	2,91E-01	4,89E-03	0,00E+00	7,49E-02	-6,84E-03
Additional environmental impact indicators per declared unit (Optional)										
PM		disease inc.	5,38E-08	4,64E-08	1,03E-07	1,69E-08	6,90E-09	0,00E+00	1,12E-08	-1,35E-09
*IR		kBq U-235 eq.	5,58E-02	6,43E-03	5,33E-02	4,29E-03	1,61E-03	0,00E+00	1,07E-03	-1,50E-03
**HTP - C		CTUh	5,89E-10	2,41E-10	2,77E-09	1,12E-10	3,84E-11	0,00E+00	2,89E-11	-1,05E-10
***HTP - NC		CTUh	9,82E-09	4,95E-09	2,17E-08	4,53E-09	8,46E-10	0,00E+00	3,62E-10	-1,77E-10
**SQP		Pt	6,63E+01	6,33E+00	8,15E+00	5,36E-01	7,15E-01	0,00E+00	3,36E+00	-7,18E+00
Legend		A1: Raw Material Supply. A2: Transport. A3: Manufacturing. A1-A3: Sum of A1. A2. and A3. A4: Transport to Site. 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		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.								

ADDITIONAL MANDATORY IMPACT CATEGORY INDICATORS PER DECLARED UNIT									
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP - GHG	CTUh	7,85E-01	5,59E-01	1,77E+00	5,29E-01	8,44E-02	0,00E+00	6,83E-02	-1,35E-02
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									

RESOURCE USE INDICATORS PER DECLARED UNIT									
Parameter	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1,29E+01	8,96E-02	2,38E+00	1,80E+00	1,87E-02	0,00E+00	1,45E-02	-1,32E+00
PERM	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
PERT	MJ	1,29E+01	8,96E-02	2,38E+00	1,80E+00	1,87E-02	0,00E+00	9,57E+00	-1,32E+00
PENRE	MJ	1,05E+01	7,80E+00	2,24E+01	5,44E+00	1,20E+00	0,00E+00	1,69E+00	-2,30E-01
PENRM	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
PENRT	MJ	1,05E+01	7,80E+00	2,24E+01	5,44E+00	1,20E+00	0,00E+00	6,16E+00	-2,30E-01
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
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
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
FW	m3	3,94E-02	1,40E-03	1,39E-02	2,20E-03	1,95E-04	0,00E+00	1,80E-03	-8,33E-05

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**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	kg	1,00E-03	1,94E-04	6,76E-04	3,90E-04	2,97E-05	0,00E+00	2,09E-05	-2,35E-05
NHWD	kg	1,97E-01	5,37E-01	3,20E-01	3,17E-02	5,87E-02	0,00E+00	1,12E+01	-4,33E-03
RWD	kg	1,42E-05	1,52E-06	1,33E-05	1,01E-06	3,90E-07	0,00E+00	2,50E-07	-3,90E-07
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
MFR	kg	0,00E+00	0,00E+00	3,50E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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
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
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

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.

Interpretation

Interpretation Of All LCA Stages

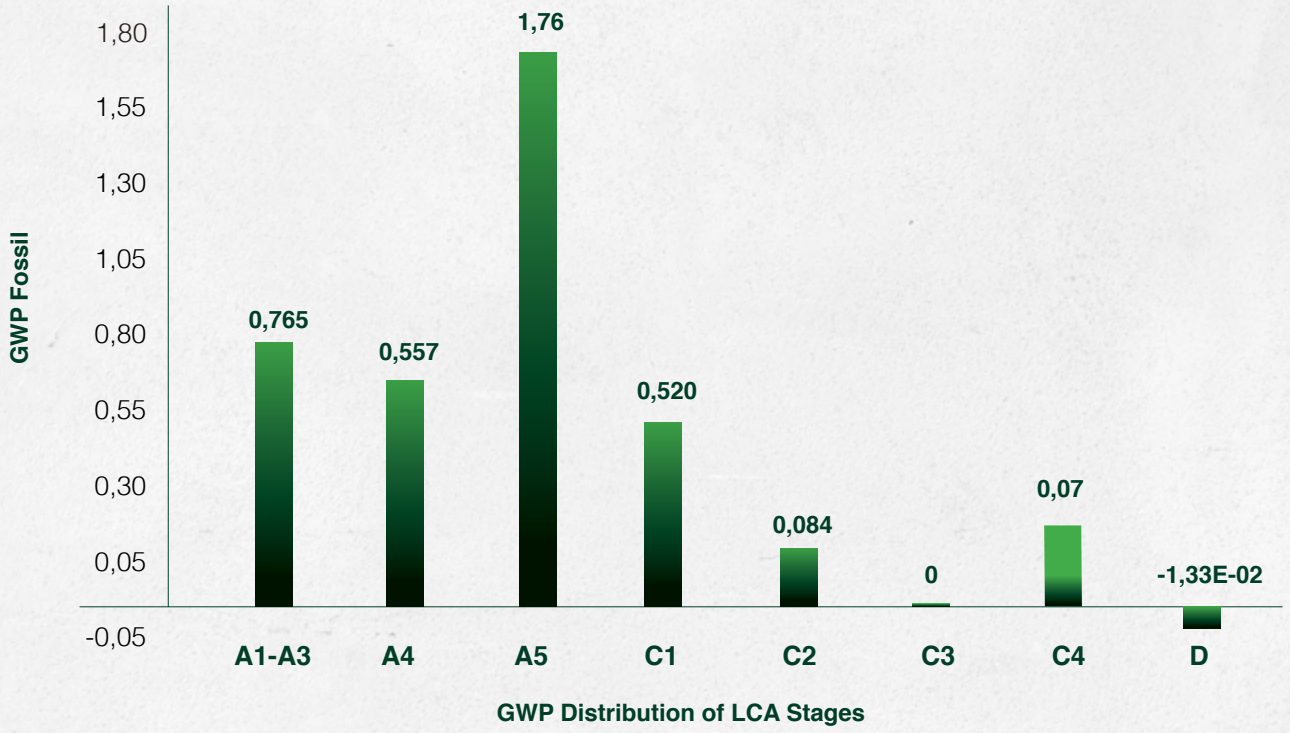
When the environmental impact categories of the product are evaluated, the production stages (A1-A3) and installation stage (A5) seem more dominant than other life cycle stages. The most dominant phase in the GWP-luluc, EP-freshwater and water depletion potential categories is the production stage, while the installation stage is dominant in all other impact categories. The use of plaster (as an adhesive), steel profiles and steel screws during the installation stage is the reason for the prominent impacts here. The table below lists the share of life cycle stages in each impact category. Impact category of GWP-biogenic and D module are not included in the percentage display because they contain negative values.

Parameter		A1-A3	A4	A5	C1	C2	C3	C4
Global Warming Potential	Fossil	14,8%	46,9%	13,8%	2,2%	0,0%	1,8%	9,5%
	Biogenic							
	Luluc	1,7%	12,8%	32,8%	0,2%	0,0%	0,2%	30,1%
	Total	14,7%	50,8%	13,9%	2,2%	11,0%	2,1%	9,9%
ODP		8,7%	59,3%	3,5%	1,8%	0,0%	2,0%	12,5%
AP		24,1%	35,6%	16,1%	1,5%	0,0%	2,2%	13,5%
EP - Freshwater		2,1%	27,5%	33,1%	0,3%	0,0%	0,3%	21,8%
EP - Marine		25,2%	30,5%	10,3%	2,2%	0,0%	3,3%	19,5%
EP - Terrestrial		27,5%	31,9%	9,3%	2,4%	0,0%	3,5%	17,5%
POCP		26,9%	36,8%	8,5%	2,7%	0,0%	3,8%	14,0%
ADPE		5,9%	65,1%	2,6%	1,3%	0,0%	0,4%	18,4%
ADPF		15,9%	45,7%	11,1%	2,4%	0,0%	3,5%	11,5%
WDP		2,1%	28,5%	17,8%	0,3%	0,0%	4,6%	31,9%

Environmental Impact Distribution by LCA Stages

Impact Categories

The chart below examines the GWP comparison between life cycle stages. The graph shows that the installation stage (A5) has the highest GWP value. The production stage, following this stage, has the second highest GWP. Due to the product's dry weight (app. 9 kg/m^2), the shipment phase to the customer (A4) has a high GWP value compared to the other phases and is the third-highest module.



Production Stages (A1-A3)

The production stage includes 3 stages: raw material extraction (A1), transportation of the raw material to the factory site (A2) and manufacturing (A3). The GWP-total impact has a lower value than the GWP-fossil due to the negative biogenic carbon impact from kraft paper and cellulose. The negative bionic impact value should be taken into account when interpreting the GWP-total value.

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

Ecoinvent / Ecoinvent Centre, www.ecoinvent.org

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

Metsims / www.metsims.com

Onat / www.onpo.com

Contact Information

Programme	EPD® THE INTERNATIONAL EPD® SYSTEM	The International EPD® System www.environdec.com
Programme Operator	TURKIYE EPD® THE INTERNATIONAL EPD® SYSTEM	EPD registered through fully aligned regional programme: EPD Türkiye www.epdturkey.org info@epdturkey.org NEF O9 B Blok No:7/15, 34415 Kaıthane/stanbul, TÜRKKYE
Owner of the declaration	onat	Onpo Madencilik Ins. San ve Tic. A.S. Zübeyde Hanım Mah. Turgut Özal 1 BLV. NO: 6/2 ALTINDA - ANKARA / TÜRKYE info@onpo.com.tr www.onpo.com.tr
LCA practitioner and EPD Design	metsims Sustainability Consulting	Türkiye: Nef 09 B Blok No:7/46-47 34415 Kagıthane/Istanbul, TURKEY +90 212 281 13 33 The United Kingdom: 4 Clear Water Place Oxford OX2 7NL, UK 0 800 722 0185 www.metsims.com info@metims.com


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