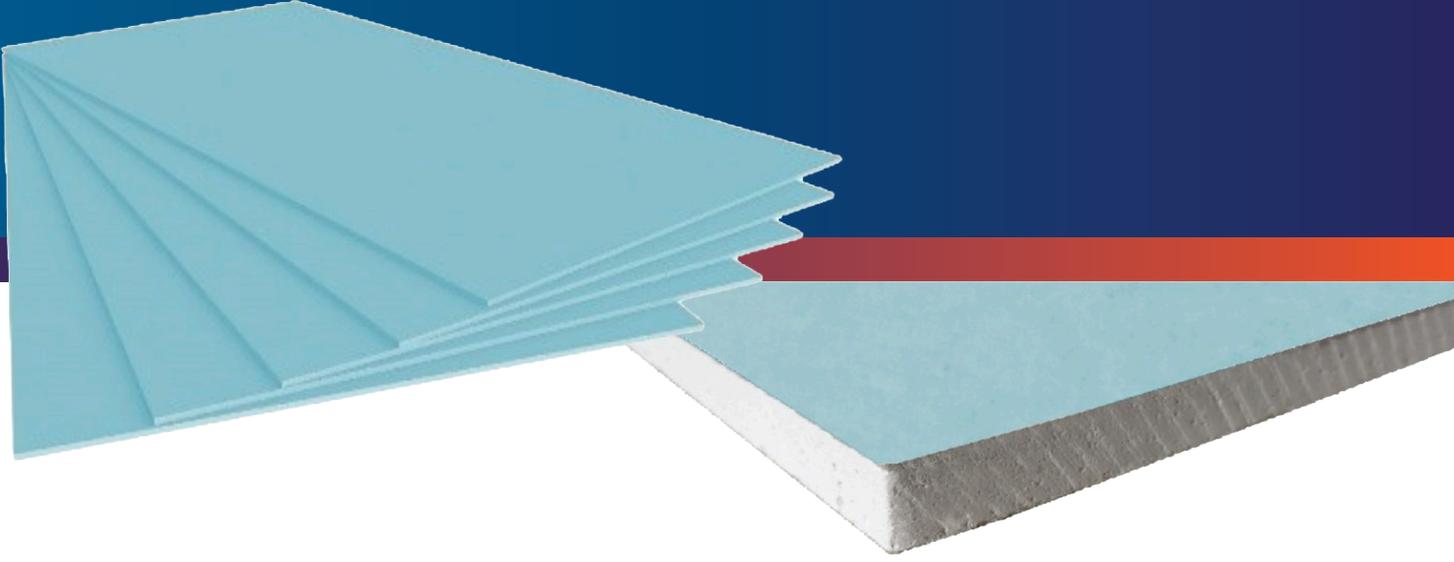




AYTAŞ
ALÇI

ENVIRONMENTAL PRODUCT DECLARATION



In accordance with ISO14025 and EN 15804:2012+A2:2019/AC:2021 for

Aypan D Plus Type D-FH2-IR

Manufactured by AYTAŞ Alçı Enerji Maden ve İnş. San.Tic. A.Ş.

Programme: The International EPD® System

Programme Operator: EPD International AB

Local Operator: EPD Türkiye

S-P Code: S-P-08753

Publication Date: 2023-10-15

Revision Date and Version: 2023-12-11, V1.01

Validity Date: 2028-10-14

Geographical Scope: Türkiye

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.



GENERAL INFORMATION

The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden
EPD Türkiye www.epdturkey.org info@epdturkey.org managed and run by SÜRATAM
www.suratam.org Nef 09 B Blok No:7/15 34415 Kagıthane/Istanbul, Türkiye

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR) Product Category Rules (PCR): 2019:14 Version 1.2.5, Construction Products and Construction Services, EN 15804:2012+A2:2019/AC:2021 for 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. 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, via:
EPD verification by individual verifier

Third party verifier: Prof. Ing. Vladimír Kočí, Ph.D., MBA LCA Studio Šárecká 5,16000
Prague 6 - Czech Republic

Approved by: The International EPD® System

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

Yes No

Life Cycle Assessment (LCA)

LCA accountability: Metsims Sustainability Consulting

The EPD owner has the sole ownership, liability, and responsibility for the EPD. 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 cut-off 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 AYTAŞ ALÇI



AYTAŞ Alçı A.Ş. was established in 2007 in Ankara, Bala, wherein the highest quality gypsum stratum is located. Two production plants, namely AYGIPS and AYPAN are located on an overall of open area of 100.000 square meters and closed area of 22.000 square meters. AYGIPS powder gypsum production plant was activated on February, 2008. AYGIPS plant has a capacity of 2200 tones powder gypsum per day. AYPAN production plant was activated on May 2009 and its annual capacity is 25.000.000 square meter plasterboard. AYTAŞ Alçı is acting with the vision to make AYGIPS, AYPAN, AYSIST and OUTWEAR brands most wanted in international market, and to be able to answer constantly changing consumer needs, and to create a respectful brand, which continuously improves in order to comply with rapidly and continuously changing environmental conditions as well as contributes to the widening of usage area of gypsum-based construction materials.

AYTAŞ Alçı is increasing its being well-known not only within Turkey but also in surrounding countries. An overall of 25 countries, such as United Kingdom, Spain, Nigeria, Ukraine, Azerbaijan, Belgium, Bulgaria, Armenia, Georgia, Cyprus, Macedonia, Malta, Sudan, Syria, Russia, Turkmenistan, Jordan, Afghanistan, and Greece, are among the countries, where AYGIPS, AYPAN, OUTWEAR and AYSIST branded products are exported to.

ABOUT THE PRODUCT

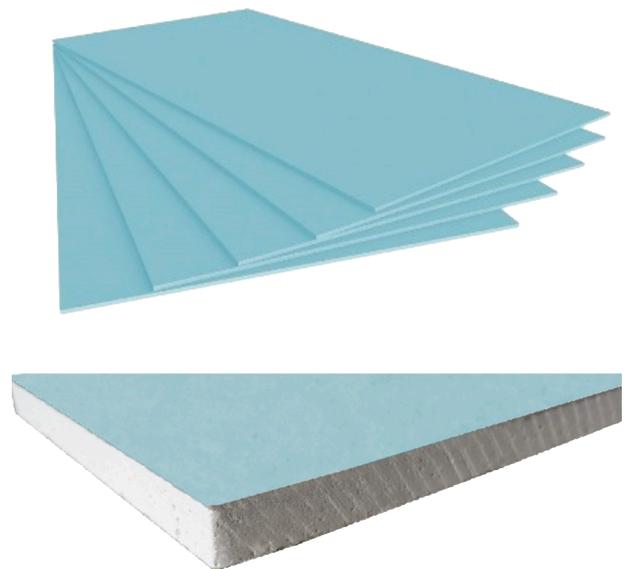
Aypan D Plus; It is used in the manufacturing of curtain wall and partition wall where resistance to impact, moisture and fire is demanded in the interior. Determined high density, core cohesion is increased, water absorption rate is reduced, fire, impact resistant, strengthened gypsum board.

It is used in places with heavy indoor traffic, on surfaces subject to impact and impact.

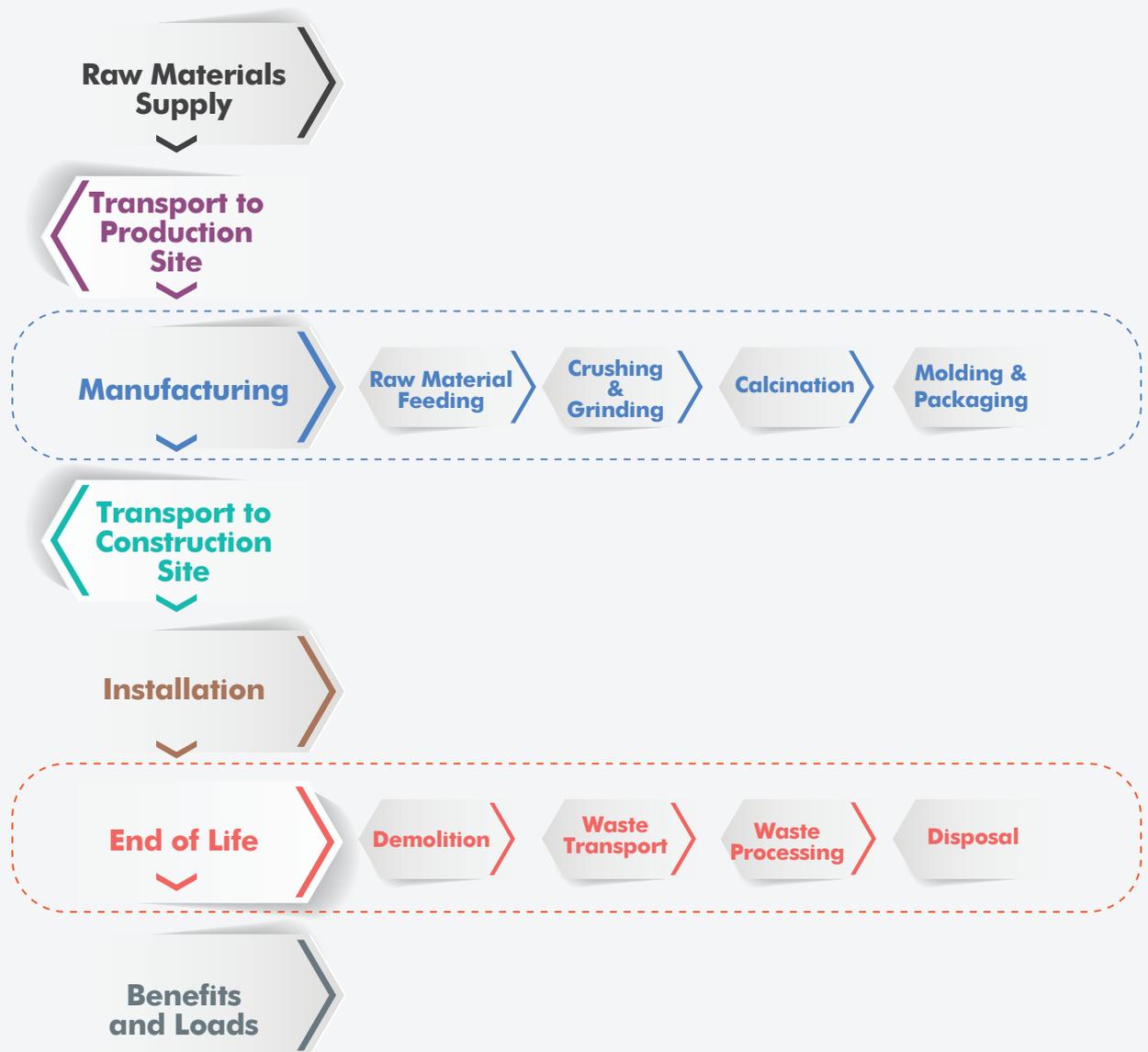
- Aypan D Plus consists of a special surface cardboard coated on both sides and a high density natural gypsum stone determined in its core, increased core cohesion, fire, moisture resistance and increased strength. The so-called core or core is reinforced with specially produced additives and fibers for the purpose of increasing the impact, moisture and fire resistance performance of the gypsum board.
- The high density natural gypsum found in the core provides hardness, impact resistance, lightness and workability to the board.
- It provides flexibility and strength to the board with a special surface carton on both sides.
- Easily cut with a utility knife.
- All applications made with Aypan D Plus are lightweight, flexible and robust, providing secure structures against earthquakes as they are connected to building carriers with flexible connection details.
- Walls made using Aypan D Plus are much thinner than traditional wall manufacturing and provide space saving.
- In accordance with the needs of the project, suitable parts of Aypan D Plus can be selected in the impacted parts of the wall (for example, up to 120 cm height from the floor), and in other parts, suitable plates from Aypan series.
- It is easy to work, it provides fast manufacturing. It reduces application costs in construction

Technical Specification	
Reference Standart	TS EN 520+A1
Specifications	
Length (mm)	2000-3600
Width (mm)	1200
Thickness (mm)	12.5
Average Weight (kg/m ²)	≥ 12.5
Flexural Strength - Perpendicular to Liner Paper Fibers (N)	≥ 725
Flexural Strength - Parallel to Liner Paper Fibers (N)	≥ 300
Edge Type	KK, IK
Thermal Conductivity – λ (W/mK)	0.25
Core Cohesion (min)	≥ 15
Fire Class	A2- s1, d0
Surface Water Absorbion (g/m ²)	≤ 220
Total Water Absorbion (%)	≤ 10
Density (kg/m ³)	≥ 1000
Impact Permission Diameter (m/m)	≤ 15

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



SYSTEM BOUNDARIES & DESCRIPTION



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.

A2 - TRANSPORT

Transport information of the raw materials are provided by the manufacturer. The distances and routes are calculated accordingly.

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

Gypsum extracted from the gypsum quarry is first crushed in crusher to have smaller particle sizes. Then it is calcined in the kilns and transferred to the gypsum hemi-hydrate silos at plasterboard production area. Gypsum hemi-hydrate, additives and water are fed into mixer to have a homogenous mixture then slurry from mixer is poured between two layer of plasterboard paper. Before feeding to drier plasterboard is cut. After drier plasterboard is trimmed to exact dimensions, stacked and packed.

The production processes are given below respectively.

- Crushing
- Calcination
- Mixing
- Cutting
- Drying
- Trimming
- Stacking
- Packaging

A4 - TRANSPORT

Transport of final product to customers are considered and the routes and distances are calculated accordingly. Transport routes were provided by the manufacturer for 2022.

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

For the implementation of the AYPAN D Plus Type D-FH2-IR; plaster, screws and metal profiles are used for the implementation of the product. Amount of this materials is given in the table.

Parameter	Value
Plaster	2 kg
Screws	18 pieces
Metal Profil	3 meters

C1 - DECONSTRUCTION / DEMOLITION

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

C2 - WASTE TRANSPORT

This step 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.

Vehicle Type	Value
Vehicle Type	Vehicle: Lorry Size Class: 7.5-16 metric ton Emission Standard: EURO5 Fuel Type: Diesel
Distance	50 km (assumption)

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 effects 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 STAGE

All gypsum-based plasterboards 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 in the current LCA report. Only the benefit due to the recycling of the packaging has been calculated.



LCA Information

Declared Unit: 1 m² (10 kg) of AYPAN D Plus Type D-FH2-IR Plasterboard

Time Representativeness: 2022

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

System Boundaries: Cradle to grave. The results of the LCA with the indicators as per EPD requirement are given in the following tables for product manufacture (A1, A2, A3), construction process stage (A4, A5), end of life stage (C1, C2, C3, C4) and benefits and load stage (D).

	Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Benefits and Loads		
	Raw Material Supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-construction demolition	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling 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	GLO	TR	GLO	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO		
Specific Data Used	>90%					-	-	-	-	-	-	-	-	-	-	-	-	-	
Variation – Products	0%					-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – Sites	0%					-	-	-	-	-	-	-	-	-	-	-	-	-	-

(X = Module included, ND = Not declared)

The inventory for the LCA study is based on the 2022 production figures. This EPD's system boundary is cradle to grave.

Allocations

Water consumption, energy consumption and raw material transportation were weighted according to 2022 production figures. In addition, hazardous and non-hazardous waste amounts were also allocated from the 2022 total waste generation.

Cut-Off Criteria

1% cut-off is applied. 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).

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.

LCA Stages	Data Type
Raw Material Supply	Generic database, plant specific data
Raw Material Transport	Generic database, plant specific data
Manufacturing	Generic database, plant specific data
Product Transport	Generic database, generic data
Demolition	Generic database, scenario and generic data
Waste Transport	Generic database, scenario and generic data
Waste Processing	-
Disposal	Generic database, scenario and generic data
Benefits and Loads	Generic database, scenario and generic data

Content Declarations

Product Composition

Materials Used in the Production of 1 m² AYPAN D Plus Type D-FH2-IR

Product Composition (% in mass)	
Calcium Sulfate	50-55 %
Water	40-45 %
Paper	0-5 %
Water Repellent	0-5%
Additives	<1%

Packaging

40 grams of strip is used for 1 m² product packaging.

LCA Results

Information on biogenic carbon content according to EN 15804+A2

Biogenic Carbon Content	Unit	Quantity
Biogenic carbon content in product	kg C	0.011
Biogenic carbon content in packaging	kg C	0.004

Environmental Impact Category Indicators According to EN 15804 for Aypan D Plus Type D-FH2-IR 12.5 mm Plasterboard

IMPACT CATEGORY	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – Fossil	kg CO ₂ eq	2.86	0.395	4.71	0.586	0.120	0	0.091	-0.051
GWP – Biogenic	kg CO ₂ eq	-0.485	1.16E-04	0.004	0.002	3.96E-05	0	0.515	9.94E-04
GWP – Luluc	kg CO ₂ eq	0.009	1.91E-04	0.003	0.007	5.41E-05	0	5.34E-05	-3.15E-05
GWP – Total	kg CO ₂ eq	2.39	0.395	4.72	0.595	0.120	0	0.606	-0.050
ODP	kg CFC-11 eq	9.05E-08	6.03E-09	8.21E-08	3.83E-09	2.55E-09	0	2.52E-09	-2.84E-10
AP	mol H+ eq	0.009	0.001	0.020	0.004	3.65E-04	0	6.56E-04	-1.84E-04
EP – Freshwater	kg P eq	0.001	3.13E-05	0.002	6.64E-04	8.08E-06	0	7.25E-06	-8.91E-06
EP – Marine	kg N eq	0.003	4.64E-04	0.005	6.93E-04	1.25E-04	0	2.52E-04	-3.44E-05
EP – Terrestrial	mol N eq	0.025	0.005	0.047	0.006	0.001	0	0.003	-3.53E-04
POCP	kg NMVOC	0.009	0.002	0.021	0.002	5.47E-04	0	9.40E-04	-1.56E-04
ADPE	kg Sb eq	8.04E-06	1.04E-06	2.82E-05	6.20E-07	3.74E-07	0	1.21E-07	-1.83E-07
ADPF	MJ	45.4	5.61	49.9	6.04	1.65	0	2.17	-1.58
WDP	m ³ depriv.	1.03	0.029	0.518	0.323	0.006	0	0.096	-0.044
PM	disease inc.	7.33E-08	2.99E-08	3.52E-07	1.82E-08	6.52E-09	0	1.40E-08	-1.81E-09
IR	kBq U-235 eq	0.090	0.005	0.157	0.005	0.003	0	0.001	-0.004
ETP – FW	CTUe	13.6	3.29	48.3	0.755	0.885	0	1.064	-0.060
HTTP – C	CTUh	8.21E-10	1.67E-10	3.25E-08	1.24E-10	4.91E-11	0	3.71E-11	-1.45E-11
HTTP – NC	CTUh	2.24E-08	5.41E-09	1.84E-07	5.39E-09	1.44E-09	0	1.05E-09	-3.46E-10
SQP	Pt	72.3	5.67	15.0	0.594	0.845	0	4.31	-0.195
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, A5: Installation, C1: Deconstruction / Demolition, C2: Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary								
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 and Voluntary Impact Category Indicators for Aypan D Plus Type D-FH2-IR 12.5 mm Plasterboard

Climate impact									
INDICATOR	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
*GHG-GWP	kg CO ₂ eq	2.82	0.386	4.55	0.588	0.118	0	0.087	-0.049

GHG-GWP = 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

A1: Raw Material Supply, A2: Transport, A3: Manufacturing, A4: Transport, A5: Construction, C1: Deconstruction / demolition, C2: Transport, C3: Waste Processing, C4: Disposal, D: Benefits and Loads Beyond the System Boundary

Resource Use Indicators for Aypan D Plus Type D-FH2-IR 12.5 mm Plasterboard

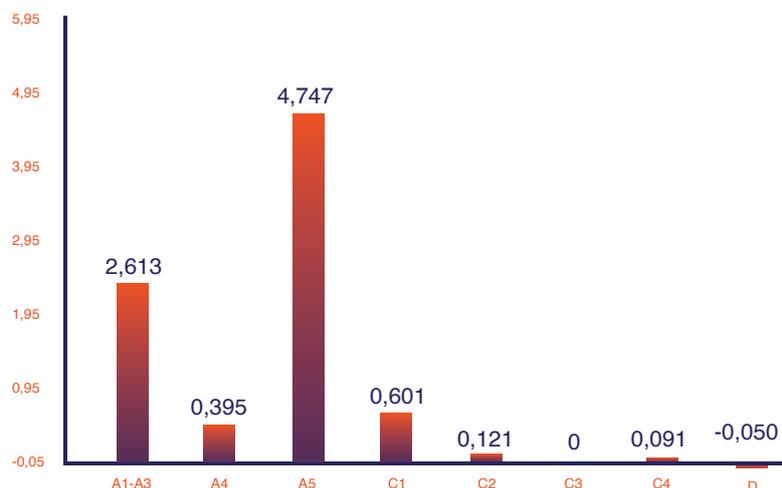
Resource use									
IMPACT CATEGORY	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	14.8	0.071	4.26	2.00	0.029	0	0.018	-0.061
PERM	MJ	0	0	0	0	0	0	0	0
PERT	MJ	14.8	0.071	4.26	2.00	0.029	0	0.018	-0.061
PENRE	MJ	45.4	5.61	49.9	2.00	1.65	0	2.17	-1.58
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	45.4	5.61	49.9	2.00	1.65	0	2.17	-1.58
SM	kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m ³	0.058	0.001	0.053	0.002	2.58E-04	0	0.002	-1.37E-04
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.								

Output Flow Indicators for Aypan D Plus Type D-FH2-IR 12.5 mm Plasterboard

Waste & Output Flows									
IMPACT CATEGORY	UNIT	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	2.67E-05	0	0	0	0	0	0	0
NHWD	kg	3.39E-06	0	0	0	0	0	0	0
RWD	kg	0	0	0	0	0	0	0	0
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EE (Electrical)	MJ	0	0	0	0	0	0	0	0
EE (Thermal)	MJ	0	0	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.								

Interpretation

It is seen that the greatest impact on the global warming potential comes from the A5-installation phase. The main reason for this is the production of steel profiles used in its installation rather than the plasterboard product. The biggest impact from the plasterboard itself is due to the raw material stage.



GWP Distribution of LCA Stages

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 50001/ Energy Management Systems - Requirements 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 2019:14 Construction products (EN 15804:A2) (1.2.5) prepared by IVL Swedish Environmental Research Institute, EPD International Secretariat, date 2022-11-01.

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

AYTAŞ Alçı / <https://www.aygips.com.tr/en>

Version History

V1.01 - 2023-12-11

Technical specifications have been updated.

Contact Information

Programme

The International EPD® System
www.environdec.com

Programme operator

EPD International AB
Box 210 60
SE-100 31 Stockholm, Sweden

www.environdec.com
info@environdec.com



EPD registered through fully aligned regional programme:
EPD Turkey
www.epdturkey.org
info@epdturkey.org

SÜRATAM A.Ş.
Nef 09 B Blok No:7/15, 34415
Kağıthane / İstanbul, TÜRKİYE
www.suratam.org



Owner of the declaration



AYTAŞ ALÇI ENERJİ MADEN VE İNŞ. SAN.TİC. A.Ş.
Cevizlidere No:5/A Balgat / Ankara
www.aygips.com.tr

LCA practitioner and EPD Design



Metsims Sustainability Consulting

Türkiye:
Nef 09 B Blok NO:7/46-47
34415 Kagithane/Istanbul, TÜRKİYE
+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

3rd party verifier



Prof. Ing. Vladimír Kočí, Ph.D., MBA

Šárecká 5,16000
Prague 6 - Czech Republic
www.lca.cz



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