



**ENVIRONMENTAL PRODUCT DECLARATION**

**FireShield 15,9**



*In accordance with: ISO 14025, EN15804+A2:2019/AC:2021, ISO 21930*

Program:	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>
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<b>Programme:</b>	<b>The International EPD® System</b> EPD registered through the fully aligned regional hub: EPD Southeast Asia
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<b>EPD owner</b>	Knauf Vietnam Co., Ltd. Lot B3A, Hiep Phuoc IZ, Hiep Phuoc Commune, Ho Chi Minh City, Vietnam <a href="http://Knauf Việt Nam   Knauf.com">Knauf Việt Nam   Knauf.com</a>  Contact: Jiaxin Li ( <a href="mailto:epd.apac@knauf.com">epd.apac@knauf.com</a> )
<b>Product Category Rules:</b>	PCR 2019:14. Construction products (EN 15804+A2) Version 2.0.1
<b>Product group classification:</b>	UN CPC 37530
<b>Reference year for plant data:</b>	2024
<b>Geographical application scope:</b>	Vietnam

Product Category Rules (PCR)
CEN standard EN 15804+A2 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14. Construction products (EN 15804+A2) Version 2.0.1
Complementary product category rules (C-PCR) to PCR 2019:14: C-PCR-031. Gypsum-based construction products (EN 17328:2024) Version: 2024-08-06, UN CPC 37530.
PCR review was conducted by: The Technical Committee of the International EPD System
<i>Review chair: Rob Rouwette</i> <i>The review panel may be contacted via <a href="mailto:support@envrondec.com">support@envrondec.com</a>.</i>

Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006.
<input type="checkbox"/> Individual EPD verification without a pre-verified LCA/EPD tool <input type="checkbox"/> Individual EPD verification with a pre-verified LCA/EPD tool <input checked="" type="checkbox"/> EPD process certification* without a pre-verified LCA/EPD tool <input type="checkbox"/> EPD process certification* with a pre-verified LCA/EPD tool <input type="checkbox"/> Fully pre-verified EPD tool
Third-party verification: <i>Bureau Veritas Certification Sweden AB with accreditation number 1236</i>
Third-party verifier is accredited by: <i>SWEDAC - Sverige AB 1236</i>
*EPD process certification involves an accredited certification body certifying and periodically auditing the EPD process and conducting external and independent verification of EPDs that are regularly published. More information can be found in the General Programme Instructions on <a href="http://www.envrondec.com">www.envrondec.com</a> .
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Version	Date	Reason
Original version of the EPD	2025-06-10	Initial Release

## General information

### Information about the company

#### Description of the organisation:

The Knauf Group is one of the world's leading manufacturers of modern insulation materials, dry lining systems, plasters and accessories, thermal insulation composite systems, floor screed, floor systems, and construction equipment & tools. With more than 300 production facilities and sales organisations in over 90 countries, the Knauf Group is one of the largest players in the industry on all continents.

Knauf Vietnam's business has started since 2013 and offers walls and ceiling solutions, and the plants are installed in two locations: Ho Chi Minh and Hai Phong and supplies the Vietnam market with locally produced gypsum board and metal profiles. This EPD only covers the Ho Chi Minh plant.



Figure 1 : Knauf site in Ho Chi Minh, Vietnam (Source : Knauf Vietnam)

#### Name and location of production site:

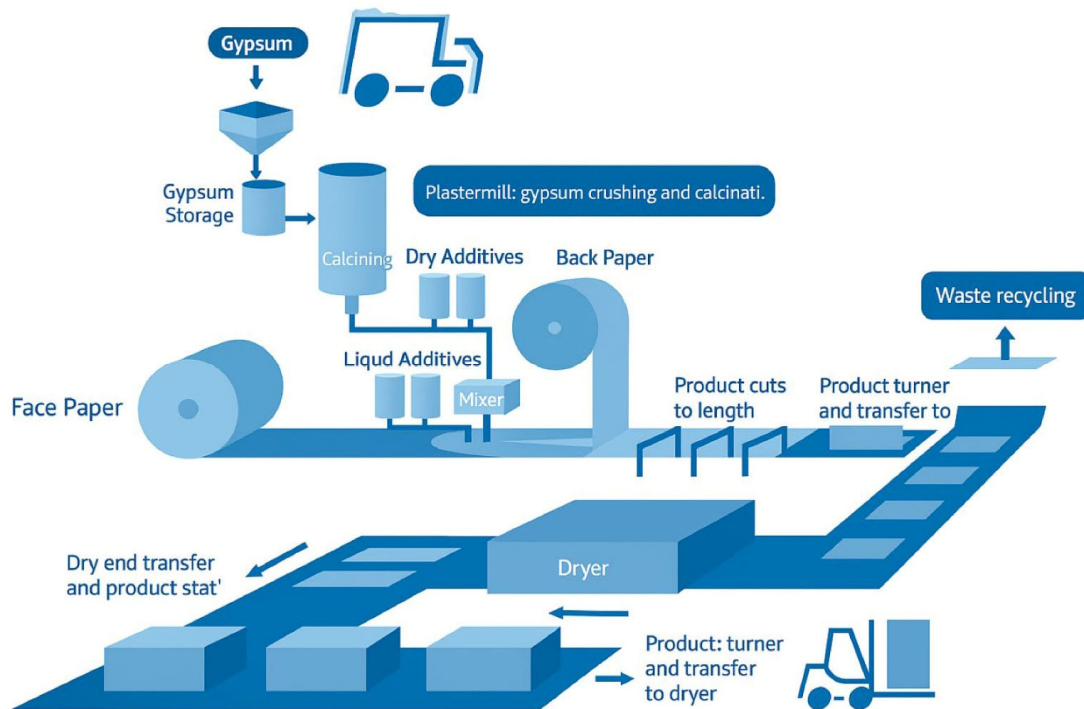
The intended application of this product in the construction industry is within Vietnam. The data utilized for the production stage life cycle assessment is related to production plants located in Ho Chi Minh, Vietnam.

The site is ISO9001-2015, ISO14001-2015 and ISO45001-2018 certified.

Ho Chi Minh: Lot B3a, Hiep Phuoc Industrial Zone, Hiep Phuoc Commune, Ho Chi Minh City, Vietnam, 700000

### Information about gypsum plasterboard production

Raw materials are homogeneously mixed to form a gypsum slurry that is spread via hose outlets onto a paper liner on a moving belt conveyor. A second paper line is fed onto the production line from above to form the plasterboard. The plasterboard continues along the production line where it is finished, dried, and cut to size. Apart from natural gypsum and recycled paper, the key inputs in the plasterboard manufacturing process are natural gas and water. Knauf aims to reduce its water withdrawals by 2 per cent yearly.



## Product information

**Product name:** FireShield 15,9

**Product identification:** FireShield 15,9 is a fire-resistant plasterboard.

**Product description:** The main application for FireShield 15,9 is being used for fire-resistant systems. The product is compliant with QCVN 16:2023/BXD.

**Geographical scope:** The manufacturing is done in Ho Chi Minh, Vietnam. Energy-related information is described in the next section. Regarding the market area, the product is mainly marketed in Vietnam.

### Technical Characteristics:

Parameter	Value	Unit
Thickness	15,9	mm
Weight	13,94	Kg/m <sup>2</sup>
Reaction to Fire	Non combustible	
Nominal Density	877	Kg/m <sup>3</sup>
Flexural breaking load, longitudinal	≥ 654	N
Flexural breaking load, transversal	≥ 205	N

### UN CPC code:

37530: Articles of plaster or of compositions based on plaster.

## LCA information

### Functional unit / declared unit

The declared unit is 1m<sup>2</sup> of plasterboard FireShield 15.9 with thickness of 15.9 mm.

Reference service life: The RSL of 50 years used in this analysis corresponds to the average life of plasterboards in general.

### Time representativeness & Information on Primary Data:

Plant production data for the complete year 2024 is used. The product considered in this EPD is produced in Ho Chi Minh, Vietnam.

The data which is used to carry out the LCA calculations contains > 80% primary data. Data quality information used in this EPD is compliant with EN 15941.

### Database(s) and LCA software used:

The LCA model, the data aggregation and environmental impacts are calculated with the software Sphera 10.9.1.17 and its content version 2025.1 and Ecoinvent Database version 3.11. The impact models used are those indicated in EN 15804:2012+A2:2019/AC:2021, version EF 3.1.

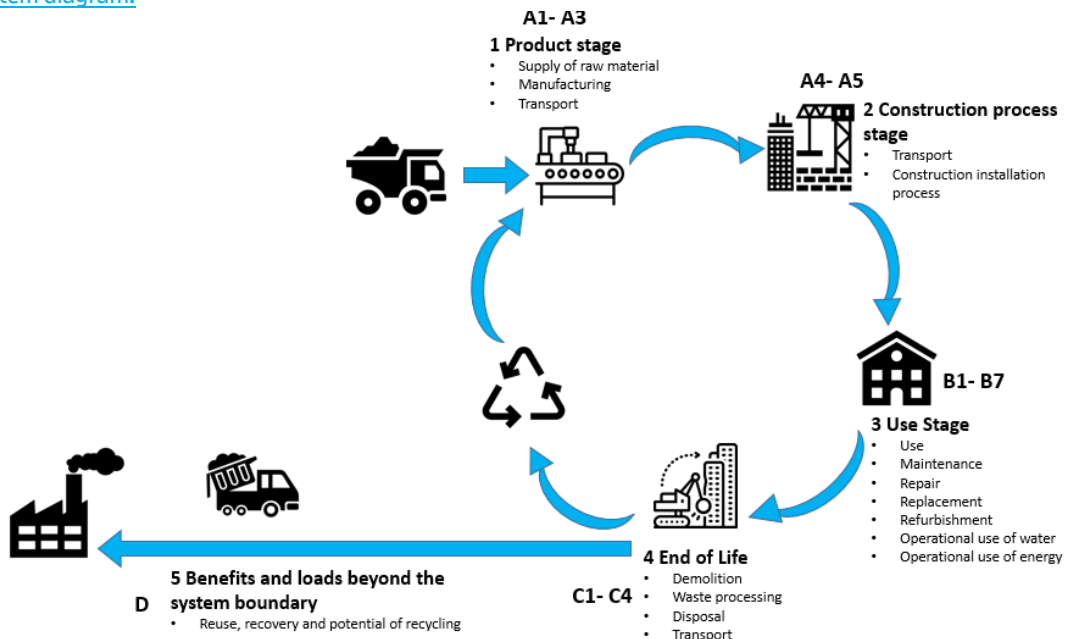
### Energy information

Energy input (reference year: 2024) from Vietnam is selected. The emission of CO<sub>2</sub> is 0.631 kg per kWh for electricity and 0.306 kg per kWh for heating (natural gas).

### Cut-off criteria:

At least 99% of the total mass and energy flows across the life cycle stages assessed are included. Neglected processes cumulatively contribute less than 1% to the total impacts for all environmental indicators. Energy use, transport, and packaging materials are accounted for across all relevant life cycle stages, and no significant processes have been omitted.

System diagram:



Description of system boundaries:

The system boundary of the EPD follows the modularity approach defined by the EN 15804:2012+A2:2019/AC:2021.

**The type of EPD is cradle-to-grave.**

For a comprehensive assessment, it is strongly recommended to consider the results from all the modules. Relying exclusively on Modules A1–A3 may lead to incomplete conclusions.

A comprehensive list and detailed explanations of each stage within the EPD are available as follows.

**The product stage (A1–A3) includes:**

- A1 – raw material extraction and processing, processing of secondary material input (e.g. recycling processes),
- A2 – transport to the manufacturer and
- A3 – manufacturing.

This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of-waste state or disposal of final residues during the product stage.

The LCA results are presented in an aggregated format for the product stage, where modules A1, A2, and A3 are consolidated into a single module, denoted as A1–A3.

Product Parameters	Value
Product weight	13,94 kg
Thickness	15,9 mm
Area	1 m <sup>2</sup>
Packaging – Gypsum stripes	0,105 kg
Packaging – Packaging board	0,122 kg

**The construction process stage** includes:

- A4 - transport to the construction site and
- A5 - installation into the building.

The transport to the building site (A4) included in this LCA uses a standard distance of 100km by truck. This facilitates the extrapolation of the results in A4 to the real distance. This consists of the following parameters:

Parameter	Value
Average transport distance (truck)	100 km
Type of fuel and vehicle used for transport (truck)	Truck Euro 5 (more than 32t / 24.7 t payload)
Truck capacity utilisation (including 40% of empty returns)	80% of the weight capacity
Loss of plasterboard on site	5%
Packaging – Gypsum stripes	100% landfilled
Packaging – Packaging board	100% landfilled

During the installation (A5) of plasterboard, screws, joint tape, fillers and water are generally used. The parameters below were considered.

Parameter	Value
Screws	12 units
Filler	0.33 kg
Joint tape	1.25 m
Water	0.178 kg
Loss of ancillary materials on site	10%

The treatment and the transport of the packaging waste after the installation of the product (A5) has been considered.

**The Use stage** (B1–B7) includes:

- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational Energy Use
- B7: Operational Water Use

Once installation is complete, no actions or technical operations are required during the use stages until the end of life. Therefore, the FireShield 15,9 plasterboard has no impact on this stage.

**The end-of-life stage** includes:

- C1 – de-construction, demolition,
- C2 – transport to waste processing,
- C3 – waste processing for reuse, recovery and/or recycling and
- C4 – disposal.

This includes provision of all transport, materials, products and related energy and water use.

Although gypsum products from Knauf are partly recycled at their end-of-life, an established collection system does not yet exist in all countries. Therefore, the assumption chosen in this study, 100% landfill (C4) after the use phase, is the most conservative approach.

Parameter	Value
Energy consumption for demolition/deconstruction	1.1 kWh diesel/ton plasterboard
Disposal type	100 % landfill 0 % recycled
Average transport distance waste (C2)	100 km
Type of vehicle used for transport.	Truck Euro 5 (20–26 t / 17.3 t payload)
Truck capacity utilization	80% of the weight capacity

**Module D** includes reuse, recovery and/or recycling potentials. According to EN 15804:2012+A2:2019 any declared benefits and loads from net flows leaving the product system not allocated as co-products and having passed the end-of waste state shall be included in module D. The benefits considered in module D originate the steel screw recycling.

#### [Recycled material](#)

The gypsum waste generated during the manufacturing process is recycled internally and fed back into the plasterboard production process.

The paper liner is made from recycled paper.

#### [Cut-off rules and Additional information:](#)

All raw materials used in the manufacture of the declared product, the required energy, water consumption and the resulting emissions are considered in the LCA. As a result, recipe components with a share of less than 1% are included. All neglected processes contribute less than 5% to the total mass or less than 5% to the total energy consumption. For information, the impact of the gypsum plasterboard plant construction or manufacturing equipment is not taken into account in the life cycle assessment.

Ancillary materials required for fixing and installation are included in the scope of this LCA. The impact of any additional construction products or materials (steel profiles, for example) are not included in this EPD and should be accounted for at building level.

#### [Conversion to mass](#)

The conversion factor used in this EPD involves multiplying the results by 0,072 to obtain Environmental Impact Indicator results for 1 kg.

#### [Name and contact information of LCA practitioner:](#)

CO<sub>2</sub> Logic (a South Pole company)  
 Cantersteen 47  
 1000 Brussels  
 Belgium  
 Contact : Simon Van Brussel – s.vanbrussel@southpole.com

### Content Declaration

The product does not contain substances on the "Candidate List of Substances of Very High Concern for Authorisation" in force at the time of the EPD publication under the REACH regulation (if above 0.1% of the mass).

Product components	Weight %	Post-consumer recycled material %	Biogenic material, kg C/component % (out of total)	Biogenic material, kg C/product
Gypsum	62%	0	0	0
Water	35%	0	0	0
Liner	2%	100	39.7	1.25E-01
Additives	1%	0	45.8	1.46E-02
<b>Total</b>	<b>100%</b>	-	-	<b>1.40E-01</b>
Packaging Materials	Weight, kg/ DU or FU	Weight -% (versus the product)		Biogenic material, kg C/product
Packaging – Gypsum stripes	0.105	0.47		1.26E-03
Packaging – Packaging board	0.122	0.54		1.46E-03
<b>Total</b>	<b>0.228</b>	<b>1.01</b>		<b>2.72E-03</b>

[Declared Modules, geography, share of specific data \(in GWP-GHG indicator\) & data variation](#)

Life cycle stages and the description of the system boundaries for the reference product LCA (X= included in the LCA, MND = module is not declared).

	Production stage			Construction stage		Use stage	End of life stage				Loads and benefits beyond the system boundary
	A1	A2	A3	A4	A5	B1 - B7	C1	C2	C3	C4	D
	Raw Materials	Raw materials transport	Manufacturing	Delivery (transport)	Installation	Use Maintenance Repair Replacement Refurbishment Operational energy Operational water	Demolition or deconstruction	Transport to treatment site	Waste processing	Disposal	Future reuse, recycling or energy recovery potential
	X	X	X	X	X	X	X	X	X	X	X
Geography	Rest of the world	Rest of the world	Vietnam	Rest of the world	Rest of the world	Rest of the world	Rest of the world	Rest of the world	Rest of the world	Rest of the world	Rest of the world
Share of primary data	84,5%										
Variation* - products	Not relevant										
Variation** - Sites	Not relevant										

\*Variation regarding the average EPD result in terms of GWP-GHG indicator amongst products covered with this EPD

\*\*Variation regarding the average EPD result in terms of GWP-GHG indicator

According to PCR 2019:14 v2.0.1 infrastructure should be outside of the system boundary (except for energy-related infrastructure). However, infrastructure impacts could have been considered in some Sphera or Ecoinvent background datasets.

The result of the data quality assessment for each process that is contributing more than 10% to the GWP-GHG results:

Process	Source	Source type	Reference year	Data category	Geographical representativeness	Technological representativeness
Raw materials & packaging	Database	ecoinvent 3.11	2024	Secondary data	Good	Good
Natural gas consumption in manufacturing of product	Collected data	Supplier	2024	Primary data	Good	Very good
Other energy consumption in manufacturing of product (electricity and diesel)	Collected data	Supplier	2024	Primary data	Very good	Good
Transport of raw materials	Collected data	Supplier	2024	Primary data	Average	Good



## Environmental performance

**Potential environmental impacts:** 1m<sup>2</sup> of plasterboard FireShield 15.9 with a thickness of 15.9 mm and weight of 13.94 kg

These results are representative of all the products mentioned in this EPD.

ENVIRONMENTAL IMPACTS										
Parameter	Unit	A1-3***	A4	A5	B1-B7	C1	C2	C3	C4	D**
GWP-total	kg CO <sub>2</sub> eq.	4.96E+00	1.13E-01	3.31E-01	0.00E+00	8.01E-02	1.25E-02	6.61E-04	5.51E-01	-3.07E-02
GWP-fossil	kg CO <sub>2</sub> eq.	5.27E+00	1.08E-01	3.95E-01	0.00E+00	8.01E-02	1.20E-02	6.61E-04	1.01E-01	-3.07E-02
GWP-biogenic	kg CO <sub>2</sub> eq.	-3.39E-01	2.99E-03	-6.58E-02	0.00E+00	6.74E-06	3.15E-04	6.41E-09	4.50E-01	-2.69E-06
GWP-luluc	kg CO <sub>2</sub> eq.	2.43E-02	1.17E-03	1.45E-03	0.00E+00	7.52E-06	1.23E-04	7.69E-07	4.95E-05	-2.20E-05
ODP	kg CFC 11 eq.	2.15E-05	1.33E-11	1.06E-06	0.00E+00	1.04E-09	1.36E-11	7.42E-12	2.69E-09	-1.81E-09
AP	mol H <sup>+</sup> eq.	2.65E-02	4.46E-04	2.09E-03	0.00E+00	7.24E-04	5.26E-05	6.63E-06	7.28E-04	-1.69E-04
EP-freshwater	kg P eq.	7.04E-04	3.70E-07	1.39E-04	0.00E+00	2.58E-06	9.80E-08	3.24E-07	1.06E-05	-2.27E-05
EP-marine	kg N eq.	9.25E-03	2.13E-04	7.12E-04	0.00E+00	3.35E-04	2.50E-05	1.54E-06	2.97E-04	-3.81E-05
EP-terrestrial	mol N eq.	9.24E-02	2.31E-03	6.88E-03	0.00E+00	3.67E-03	2.71E-04	1.73E-05	3.09E-03	-3.78E-04
POCP	kg NMVOC eq.	2.93E-02	4.11E-04	2.16E-03	0.00E+00	1.09E-03	5.12E-05	5.14E-06	1.06E-03	-1.55E-04
ADP-minerals&metals*	kg Sb eq.	2.96E-05	8.37E-09	2.08E-06	0.00E+00	2.93E-08	1.65E-09	3.44E-08	1.58E-07	-5.49E-07
ADP-fossil*	MJ	7.53E+01	1.46E+00	5.71E+00	0.00E+00	1.04E+00	1.61E-01	8.81E-03	2.26E+00	-4.46E-01
WDP*	m <sup>3</sup> world eq.	1.34E+00	5.85E-04	1.60E-01	0.00E+00	2.60E-03	1.24E-04	1.35E-04	1.04E-01	-8.90E-03
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption									

\* Disclaimer 2: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

\*\* : [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].

\*\*\* The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.

### Potential environmental impact – additional mandatory and voluntary indicators

Indicator	Unit	Tot.A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG [2]	kg CO <sub>2</sub> eq.	5.30E+00	1.10E-01	4.05E-01	0.00E+00	8.01E-02	1.12E-01	6.61E-04	1.01E-01	-3.07E-02

[2] 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

**Use of resources:** 1m<sup>2</sup> of plasterboard FireShield 15.9 with a thickness of 15.9 mm and weight of 13.94 kg

These results are representative of all the products mentioned in this EPD.

RESOURCES USE										
Parameter	Unit	A1-3***	A4	A5	B1-B7	C1	C2	C3	C4	D*
PERE [3]	MJ	9.06E+00	1.10E-01	1.50E+00	0.00E+00	6.21E-03	1.17E-02	1.06E-03	2.29E-02	-3.27E-02
PERM [3]	MJ	4.94E+00	0.00E+00	1.21E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT [3]	MJ	1.40E+01	1.10E-01	2.71E+00	0.00E+00	6.21E-03	1.17E-02	1.06E-03	2.29E-02	-3.27E-02
PENRE [3]	MJ	7.39E+01	1.46E+00	5.78E+00	0.00E+00	1.00E+00	1.61E-01	8.81E-03	2.26E+00	-4.46E-01
PENRM [3]	MJ	1.48E+00	0.00E+00	7.29E-02	0.00E+00	3.30E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT [3]	MJ	7.54E+01	1.46E+00	5.85E+00	0.00E+00	1.04E+00	1.61E-01	8.82E-03	2.26E+00	-4.46E-01
SM	kg	3.17E-01	0.00E+00	1.56E-02	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 <sup>3</sup>	3.12E-02	5.56E-05	3.17E-03	0.00E+00	6.06E-05	7.29E-06	3.14E-06	2.42E-03	-2.07E-04
Acronyms	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									

\*: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].

\*\*\* The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.

[3] From International EPD PCR 2.0.1 for Construction Products, the option B, mentioned in Annex 3, was used for the calculation if the primary energy use indicators.

**Waste production and output flows:** 1m<sup>2</sup> of plasterboard FireShield 15.9 with a thickness of 15.9 mm and weight of 13.94 kg

These results are representative of all the products mentioned in this EPD.

OUTPUT FLOWS AND WASTE CATEGORIES										
Parameter	Unit	A1-3***	A4	A5	B1-B7	C1	C2	C3	C4	D*
Hazardous waste disposed	kg	1.09E-01	1.30E-05	2.83E-02	0.00E+00	9.44E-04	1.33E-05	4.03E-05	1.30E-02	0.00E+00
Non-hazardous waste disposed	kg	9.12E-01	3.19E-04	1.46E+00	0.00E+00	4.88E-03	3.26E-04	0.00E+00	1.48E+01	-5.85E-02
Radioactive waste disposed	kg	7.59E-05	2.76E-06	8.15E-06	0.00E+00	3.12E-07	2.82E-06	2.15E-08	1.24E-06	-2.94E-06
Components for reuse	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
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.14E-02	0.00E+00	0.00E+00
Materials for energy recovery	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
Exported energy. electricity	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
Exported energy. 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

\*: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].

\*\*\* The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.

**Additional impact categories and indicators:** 1m<sup>2</sup> of plasterboard FireShield 15.9 with a thickness of 15.9 mm and weight of 13.94 kg

These results are representative of all the products mentioned in this EPD.

ADDITIONAL IMPACT CATEGORIES AND INDICATORS										
Parameter	Unit	A1-3****	A4	A5	B1-B7	C1	C2	C3	C4	D***
PM	Disease Incidence	1.29E-07	3.01E-09	1.68E-08	0.00E+00	2.03E-08	3.30E-10	8.94E-11	1.47E-08	-3.09E-09
IRP*	kBq U235 eq.	8.53E-02	4.17E-04	9.56E-03	0.00E+00	3.88E-04	6.58E-05	2.64E-05	1.50E-03	-1.71E-03
ETP-fw**	CTUe	4.99E+01	1.89E+00	3.19E+00	0.00E+00	8.15E-02	1.99E-01	5.70E-03	4.67E-01	-2.26E-01
HTP-c**	CTUh	2.52E-09	2.55E-11	2.59E-10	0.00E+00	7.44E-11	2.78E-12	5.00E-12	4.38E-10	-2.91E-10
HTP-nc**	CTUh	3.18E-08	1.42E-09	3.57E-09	0.00E+00	1.41E-10	1.52E-10	3.10E-11	1.85E-09	-3.06E-09
SQP**	dimensionless	1.84E+01	6.47E-01	1.38E+01	0.00E+00	7.47E-02	7.33E-02	1.40E-02	4.30E+00	-1.25E-01
Acronyms	PM = Particulate matter emissions; IRP= Ionising radiation, human health; ETP-fw: Ecotoxicity (freshwater); ETP-c: Human toxicity, cancer effects; HTP-nc: Human toxicity, non-cancer 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 of these results are high or as there is limited experience with the indicator.

\*\*\*: [Life Cycle D stage covers benefits and loads beyond the system boundary stage (reuse, recovery and recycling potential) therefore, when summing up results, this stage should be considered separately].

\*\*\*\* The indicator's results are calculated using a reference product, with equal weighting between plants, if this is a single plant, it means 100% for that plant.

Note: The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins and/or risks.

The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3). Environmental impacts from the product's full life cycle must be evaluated to ensure a comprehensive understanding.



[Information on biogenic carbon content](#)

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	kg C	kg CO <sub>2</sub> eq.
Biogenic carbon content in product	1.40E-01	5.12E-01
Biogenic carbon content in packaging	2.72E-03	9.99E-3

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>.

## LCA interpretation

### ENVIRONMENTAL IMPACTS

The Global Warming Potential (GWP) and the Abiotic Depletion Potential for fossil resources (ADP-fossil) are the two most relevant impact indicators, together contributing with more than 50% to the single score. This is primarily driven by energy consumption (particularly from natural gas and electricity) during the plasterboard production process (A3). For other relevant indicators, the contribution of each life cycle stage may vary; however, the upstream stages (A1 and A2) generally represent the largest share of the environmental impacts across most categories.

**The Global Warming Potential (GWP-total)** is clearly dominated by the production, mostly due to energy consumption.

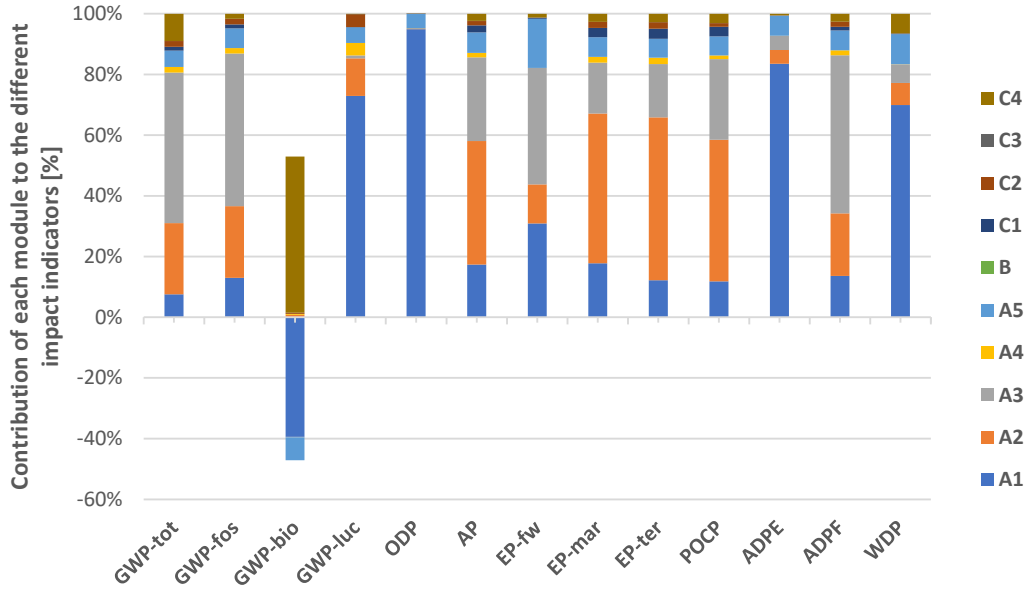
**The Abiotic Depletion Potential for Fossil Resources Potential (ADP-fossil)** is also dominated by energy consumption for the production.

**The Acidification Potential (AP)** is dominated by the raw materials transport and by the production due to the process's emissions and the electricity consumption.

**The Formation Potential of Tropospheric Ozone (POCP)** is dominated by emissions from the raw materials transport and the manufacturing processes (including energy use).

The **Ozone Depletion (ODP)** and **Abiotic Depletion Potential for Non-Fossil Resources (ADP- minerals & metals)** are dominated by the raw materials production.

**The Particulate Matter (PM)** is dominated by the raw materials production.

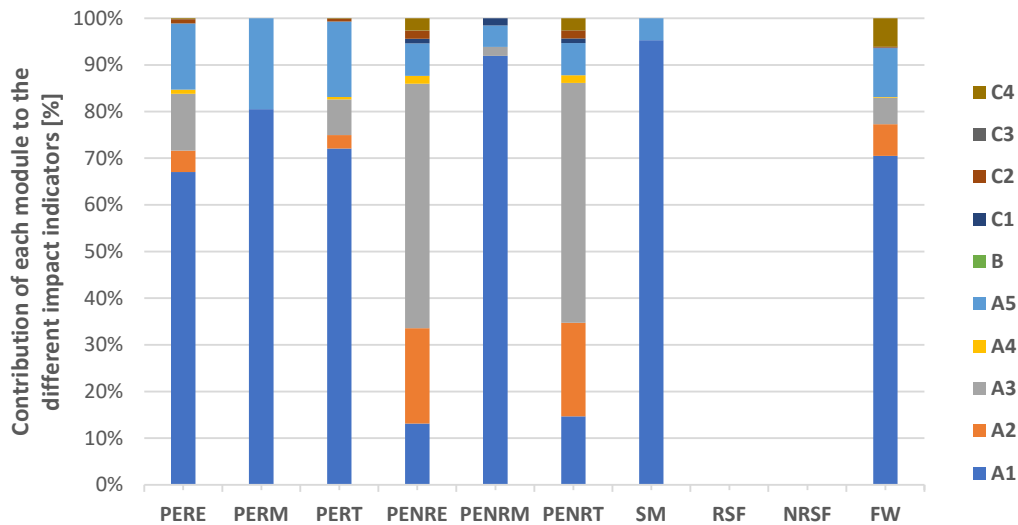


## RESOURCES USE

**Total Use of Non-Renewable Primary Energy Resources (PENRT)** is dominated by the production of plasterboard products (especially due to the energy consumption) and with little influence of transport (A2) and raw materials.

**Total Use of Renewable Primary Energy Resources (PERT)** is dominated by the use of raw materials at the start of the life cycle (A1) and at the installation (A5).

The **Use of freshwater (FW)** is mostly driven by the water used in the production process of the raw materials (A1) and at the installation (A5).



ADP	Abiotic Depletion Potential
AP	Acidification Potential
CEN	European Committee for Standardization
CO <sub>2</sub>	Carbon dioxide
CPC	Central product classification
CPR	Construction product regulation
c-PCR	Complementary product category rules
EP	Eutrophication potential
EPD	Environmental product declaration
EU	European Union
FU	Functional Unit
FW	Fresh Water
GHG	Greenhouse gas
GPI	General programme instructions
GWP	Global warming potential
HTP	High Temperature Plastics
HTP	Human Toxicity Potential
IRP	Ionising radiation Potential
ISO	International Organization for Standardization
LCA	Life cycle assessment
LDPE	Low density Polyethylene
NRSF	Use of non-renewable secondary fuels
ODP	Depletion potential of the stratospheric ozone layer
PCR	Product category rules
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
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
PM	Particulate Material
POCP	Potential of Tropospheric Ozone
RSF	Use of renewable secondary fuels
RSL	Reference Service Life
SM	Use of secondary material
SQP	Soil Quality Potential
UN	United Nations
WDP	Water Deprivation Potential

## References

**International EPD® System**

General Programme Instructions of the International EPD® System. Version 5.0.

Product category rules (PCR): PCR 2019:14 v2.0.1. Construction products (EN 15804+A2) Version 1.0

Complementary product category rules (C-PCR) to PCR 2019:14: C-PCR-031 Gypsum-based construction products (EN 17328:2024) Version: 2024-08-06

**LCA for Experts Sphera 10.9.1.17**

LCA for Experts Sphera 10.9.1.17: Software and database for life cycle engineering. LBP, University of Stuttgart and Sphera, 2023

**EN 17328:2024**

Complementary product category rules for gypsum-based construction products

**ISO 21930**

Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services

**ISO 14021**

ISO 14021:2016 Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)

**ISO 14025**

DIN EN ISO 14025:2011-10: Environmental labels and declarations – Type III environmental declarations – Principles and procedures

**EN 15804:2012+A2:2019/AC:2021**

EN 15804:2012+A2:2019/AC:2021: Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products

**EN 15941:2024**

Sustainability of construction works - Data quality for environmental assessment of products and construction work - Selection and use of data

**Background report - Knauf Vietnam EPDs - Gypsum (Background Report)**

Calculation rules for the Life Cycle Assessment and Requirements and more details about the production on the Background Report.

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