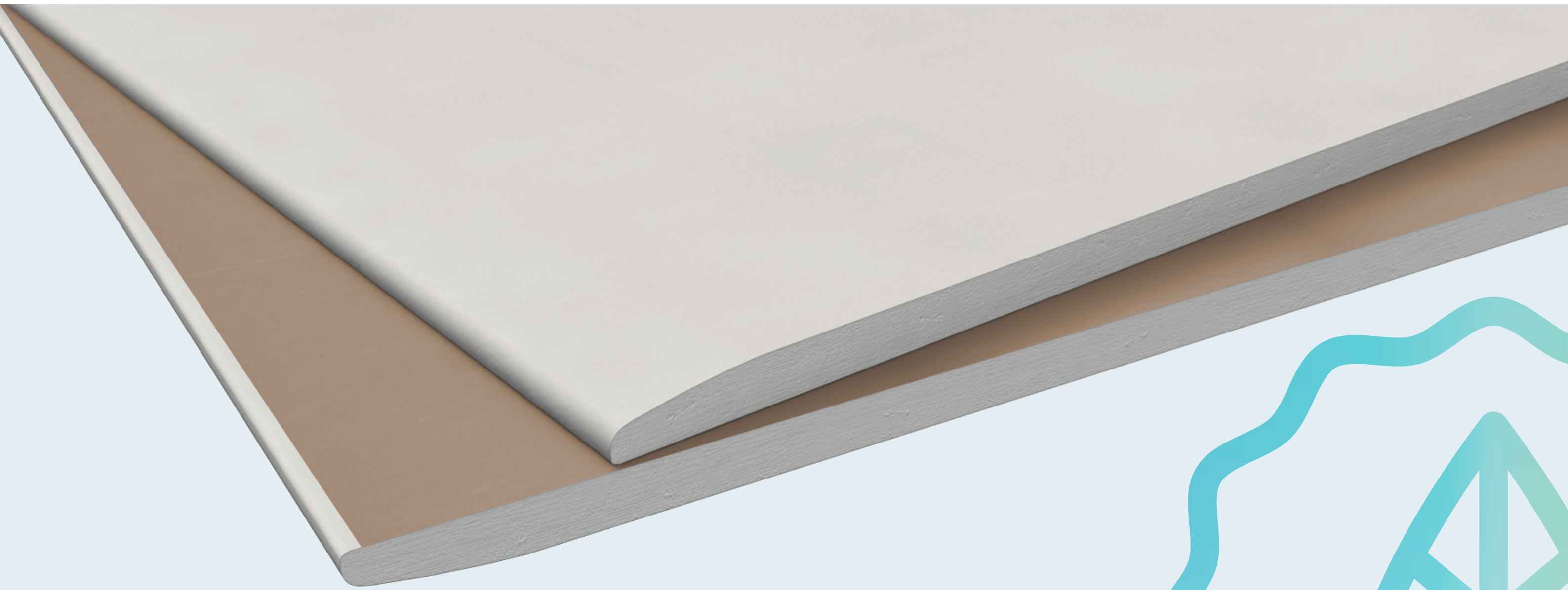
ECO EPD 00001143

N° VERIFICATION : S-P-01933

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804 for:

9.5 mm, 12.5 mm, 15 mm Plasterboard Knauf GKB®



> **Programme:**
The International EPD® System
www.environdec.com

> **Programme operator:**
EPD International AB

> **EPD registration number:**
S-P-01933

> **Publication date:**
2020/04/22

> **Valid until:**
2025/04/22

> **Manufacturer:**
Knauf di Knauf S.r.l. S.a.s. - Via Livornese, 20
56040 Castellina Marittima (PI), Italy

1. GENERAL INFORMATION

Manufacturer: Knauf di Knauf S.r.l. S.a.s.
Programme used: The International EPD® System.
For more information see www.environdec.com
EPD registration number/declaration number: S-P-01933
Product / product family name and manufacturer represented: GKB® plasterboard, manufactured by Knauf di Knauf S.r.l. S.a.s.
Product description and use: GKB® plasterboard is made up of a gypsum core (calcium sulphate dihydrate) with additive and a paper liner. GKB® plasterboard is designed for use in the residential sector.
Declaration issued: 2020/04/22
Valid until: 2025/04/22
Owner of the declaration: Knauf di Knauf S.r.l. S.a.s. - Via Livornese 20, 56040 Castellina Marittima (PI), Italy. Tel. 050 69211 - Fax 050 692301, knauf@knauf.it.
EPD prepared by: Ergo s.r.l, www.ergosrl.net
Scope: The LCA is based on 2018 production data for Castellina Marittima manufacturing site in Italy for 9.5 mm, 12.5 mm, 15 mm GKB®. This EPD covers information modules A1 to C4 (cradle to gate with option) as defined in EN 15804:2014 for GKB® sold and used in Europe. The use stage (B1-B7) was not considered in this study.
Functional unit/declared unit: The declared unit (DU) is 1 m^2 of gypsum-based plasterboard.

CEN standard EN 15804 served as the core PCR[a]	
PCR:	PCR 2012:01 Construction products and construction services, Version 2.3.
Product group classification:	The UN CPC code of the product is 314 Boards and panels.
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: Massimo Marino. email: info@environdec.com
Independent verification of the declaration and data, according to ISO 14025:	☐ EPD process certification ☒ EPD verification
Third party verifier:	RINA Services S.p.A.Via Corsica 12, Genova -Italy, Tel +39 010-5385306, www.rina.org ACCREDIA Registration number:001H REV. 17
Accredited or approved by:	The International EPD® System

[a]Product Category Rules

According to EN 15804, EPDs of construction products may not be comparable if they do not comply with this standard. It should be noted that EPDs within the same product category from different programs may not be comparable.

2. ABOUT THE COMPANY

Knauf is one of the world's leading manufacturers of modern insulation materials, dry lining systems, plasters and accessories, thermal insulation composite systems, paints, floor screed, floor systems, and construction equipment and tools. With 150 production facilities and sales organizations in over 86 countries, 27,500 employees worldwide, and sales of 6.5 billion Euro (in 2016), the Knauf Group is without doubt one of the big players on the market – in Europe, the USA, South America, Russia, Asia, Africa, and Australia.
The company's headquarter in Italy is in Castellina Marittima (Pisa). Currently, the Castellina Marittima plant has a global area of 90,000 square meters, covers an area of 30,000 square meters and owns more than 100 hectares of quarries. The products manufactured in Knauf plant in Castellina Marittima are plasterboard, steel profiles required for the implementation of the plasterboards, ceilings, stucco and impregnators.

3. PRODUCT INFORMATION

3.1 Product description

Knauf GKB® plasterboard is a standard gypsum board consisting of an aerated gypsum core encased in and firmly bonded to strong paper liners. GKB® plasterboards are used in all areas of interior construction especially for partition walls, counterwalls on metal or direct-tackle structure, countertops and velettes. GKB® plasterboard is available in sizes 9.5 mm, 12.5 mm, 15 mm and 18 mm; this EPD applies only to 9.5 mm, 12.5 mm and 15 mm sizes.

3.2 Technical data

Technical data referred to Knauf GKB® plasterboard are given in Table 1.

Table 1 - Technical information.

Product identification	DIN 18180 GKB UNI EN 520 A
Nominal density	The assumed density is 680 kg/m³ of GKB® 9.5 mm, 667 kg/m³ of GKB® 12.5 mm and 885 kg/m³ of GKB® 15 mm.
Thermal conductivity	0.20 W/mk
Class of reaction to fire performance (accordingto EN 13501:1)	Building material class: A2 Burning droplets: s1 Smoke gas development: d0

3.3 Delivery Status

The EPD refers to 9.5 mm, 12.5 mm and 15 mm thick Knauf GKB® plasterboard.

3.4 Base materials / Ancillary materials

Plasterboards covered by this EPD are made from:

- gypsum: up to 96%
- cardboard: up to 3%
- additives (including starch, glass fibers and foaming agent, additive for core cohesion): less than 1%

Knauf GKB® plasterboards do not contain SVHC (Substances of Very High Concern).
No additives used are classed as substances of concern; substances are not listed specifically to protect proprietary information.

3.5 Packaging

Plasterboards Knauf GKB® are piled up on bearers and are protected against damage by strapping tape (polyethylene). Packing materials are externally recovered/disposed of.

3.6 Recycled material

Board liner for the covering of gypsum core is produced from 100% recycled waste paper and is supplied by truck from the German and Spanish manufacturing sites. The GKB® manufacturing process uses a part of recovered gypsum derived from production wastes and dust from the filtration plants.

3.7 Re-use phase

Once plasterboards Knauf GKB® are installed, they are not suited for re-use in an unchanged way. Prior to collection, plasterboards Knauf GKB® should be separated from other used building materials.

3.8 Disposal

Knauf GKB® plasterboards have to be disposed of in compliance with the following waste codes of the European Waste Catalogue /EWC/:17 08 02 gypsum-based construction materials.

3.9 Further information

Further information can be found through the enquiry desk:
+39 050 69211
E- mail: knauf@knauf.it | www.knauf.it

3.10 Manufacture

Knauf GKB® plasterboard is manufactured using a continuous production process, showed in the Figure 1 below:

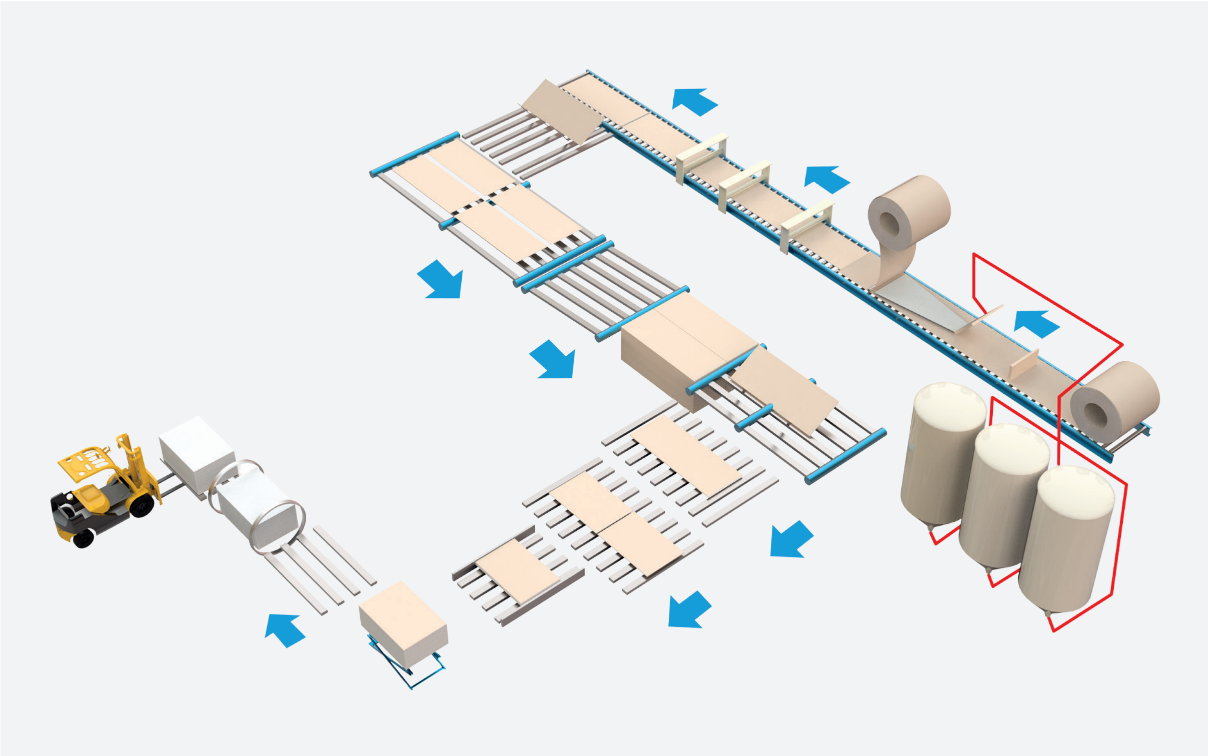


Figure 1 - Gypsum board manufacturing process.

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.

3.11 Environment and Health during manufacture

At Knauf, Health and Safety is a core value. The Company's aim is always to be injury-free. A target of zero accidents at work for employees, visitors and contractors is set by the business.
In all aspects of the Company's activities, the Health and Safety rules and relevant regulations must be complied with. In addition, there are a number of definitive Company Safety Procedures and together these determine the minimum standards expected by the Company. In order to achieve this, close co-operation with representatives of the relevant enforcement agencies is ensured. To ensure that the Company's objectives are achieved, documented safety management systems are employed at site and within the central functions. These include a systematic identification of hazards, assessment of the risks and the development of safe systems of work to eliminate or reduce any risks to an acceptable level. Audits and Inspections are used to monitor standards of safety management, adherence to the law and Company procedures. Knauf plants are managed through ISO 14001, ISO 9001 and BS OHSAS 18001 certified systems.

4. LCA INFORMATION

Figure 2 shows a flow diagram of the system under study. The system boundary covers A1 - A3 product stages referred as 'Raw material supply', 'Transport' and 'Manufacturing'. In addition to the manufacturing phase (modules A1-A3), this EPD contains the transport from the manufacturing to the building site (A4) and the installation into the building site (A5) as well as the End-of-life stage (de-construction and demolition as C1; transport to waste processing as C2; waste processing for reuse, recovery and/or recycling as C3; disposal as C4). Accordingly, the EPD is a cradle-to-gate declaration with options.

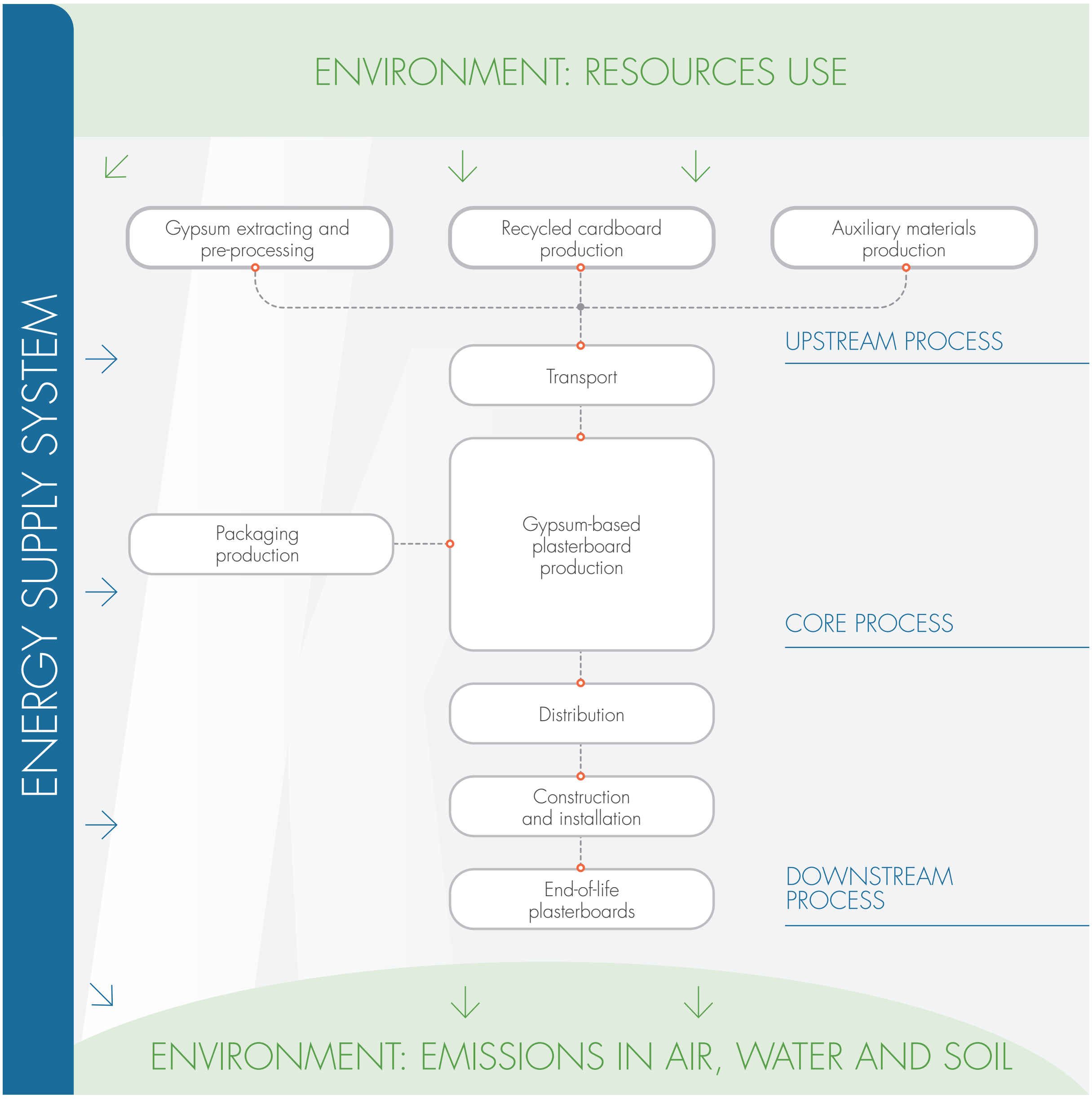


Figure 2 - Flow diagram of system boundary under assessment

The system boundaries in tabular form for all modules are shown in the Table 2 below.

Table 2 - System boundaries chosen for the LCA (X-module included in LCA. MND - module not included).

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufactoring	Transport from the gate to the site	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demo	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	MND

5. LCA CALCULATION RULES

LCA calculation rules are reported in Table 3.

Table 3 - LCA calculation rules.

5.1	**Functional unit/ declared unit**	The declared unit is 1 m^2 of gypsum-based plasterboard. Weights of finished gypsum-based boards: GKB® 9.5 mm: approx. 6.5 kg/m^2 GKB® 12.5 mm: approx. 8.5 kg/m^2 GKB® 15 mm: approx. 13.3 kg/m^2
5.2	**System boundaries**	Cradle to gate with option: A1-A3,A4,A5,C1-C4.
5.3	**Estimates and assumptions**	The use stage (module B1-B7) was assumed have no impacts.The GKB® product has a reference service life of 50 years. This assumes that the product will last in situ with no requirements for maintenance,repair,replacement or refurbishment throughout this period. For the production of additives and packaging materials (and their disposal), generic data have been used, since their mass flow in relation to the declared unit is limited. Furthermore, these materials are common to the different plasterboard systems (and gypsum sources) under assessment. Since there is no waste processing at the end of life, modules C3 and D are not applicable. The declared plasterboards are typically disposed of as construction waste which is declared in module C4.
5.4	**Cut-off rules**	All major raw materials and all the essential energy is included. General cut-off criteria are given in standard EN 15804:2014 Clause 6.3.5. In compliance with these criteria, the infrastructure of the manufacturing site, small parts of the packaging and personnel related activities (travel, office operations and supplies) are excluded from the study.

5.5	**Background data**	All primary product data was provided by Knauf S.r.l. S.a.s. - Castellina Marittima plant. All secondary data was retrieved using SIMAPRO 9 software, with Ecoinvent 3.5 Database.
5.6	**Data quality**	Primary data refer to 2018 and have been collected at Knauf S.r.l. S.a.s. plant located in Castellina Marittima (IT), whereas selected generic data have been retrieved from Ecoinvent 3.5 database and using the most updated datasets and – as far as possible- those representative for at least 5 years into the future. Moreover, as required by the General Programme Instructions, the environmental impacts associated to proxy data do not exceed 10% of the overall environmental impact from the product system. The energy mix of Knauf di Knauf S.r.l. S.a.s. Castellina Marittima plant is characterized by 61% of electricity self-produced by cogeneration and 39% by electricity purchased from an external energy company. The energy-related data from the energy supplier refer to the supplier energy mix, whereas for the production of raw materials a European energy mix has been accounted for.
5.7	**Period under review**	The data is representative of the manufacturing processes of 2018.
5.8	**Allocations**	Allocations were avoided in the calculation model.
5.9	**Comparability**	A comparison or an evaluation of EPD data is only possible where EN 15804 has been followed, the same building context and product-specific characteristics of performance are taken into account, and the same stages have been included in the system boundary. According to EN 15804, EPD of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPD might not be comparable if they are from different programmes.

Description of system boundaries

This EPD evaluates the environmental impacts of 1 m^2 of gypsum based plasterboard from cradle to gate with options. Within the Life Cycle Assessment of the declared boards, the following processes are considered:

Product stage, A1-A3

Description of the stage

The product stage of the plasterboard products is subdivided into three modules; A1, A2 and A3 respectively "raw material supply", "transport" and "manufacturing".

A1, raw material supply

This includes raw material extraction and processing and energy production. The declared Knauf gypsum boards consist of a gypsum core, which also contains additives for easier processing and/or a fine adjustment of the respective properties of the individual boards. The natural gypsum is mainly extracted from open-cast mining in close vicinity to the manufacturing site. Natural gypsum is calcinated to stucco prior to the mixing with other components. Board liner for the covering of gypsum core is produced from recycled waste paper.

A2, transport to the manufacturer

Natural gypsum is extracted from mines close to the manufacturing sites. Accordingly, transport distances are short and trucks can be used. Further raw materials are supplied by truck from manufacturers within Italy or from neighbouring countries. Only some exceptional additives are delivered from overseas via container ship and truck to the manufacturing plant.

A3, manufacturing

The module includes the manufacture of product. Stucco and additives are suspended in water and spread on a continuous sheet of board liner (visible face, lower layer). Beforehand, the board liner is cut at the sides for edge shaping. The slurry is covered with a second sheet of board liner (back surface) in the forming station and the edges of the visible face board liner are flipped upwards. On the subsequent board line the gypsum sets continuously and the boards are dried in a multi-level drier to the permitted residual moisture level. Drying is followed by the cutting of the boards to the desired lengths. Finally, gypsum boards are piled up on bearers or reusable pallets. Apart from the reusable pallets, all other packaging materials are externally recycled/disposed of (external recycling is beyond the applied system boundaries). When recycled materials are being used, such as post-consumer recycled cardboard, burdens associated with the collection, processing and transport of these materials were included in the assessment.

Construction process stage, A4-A5

Description of the stage
The construction process is divided into 2 modules: A4, transport to the building site and A5, installation into the building.

A4, transport to the building site
The Table 4 below quantifies the parameters for transporting the product from production gate to the building site. The distance quoted is a weighted average, calculated using company information and the quantity of product transported. For the distribution of the finished products, an average scenario with EURO 4, EURO 5 and EURO 6 articulated trucks has been accounted for, based on the sale figures in Italy and Europe in the reference year. Specific data was not available for capacity utilisation or fuel consumption, therefore generic European values from Ecoinvent database have been assumed.

Table 4 - Parameters for transporting the product from production gate to the building site.

Parameter	Value (expressed per functional/declared unit)
Type of vehicle	Truck 16-32 tons. EURO 4, EURO 5, EURO 6. Boat, freight ship
Distanceto central warehouse	356 km weighted average by truck to all markets 67 km weighted average by boat to all markets
Distance to construction site	15-34 km
Fuel/energy consumption	0.04L diesel fuel per tkm (truck) 0.0002L diesel fuel per tkm (boat)
Capacity utilization	70%
Bulk density of transported products	667-885 kg/m^3

A5, installation into the building
The plasterboard is considered installed when it is attached in its designated place in the building. The accompanying Table 5 quantifies the parameters for installing the product at the building site. All installation materials and their waste processing and packaging waste of plasterboards are included.

Table 5 - Parameters for installing the product at the building site.

Parameter	Value (expressed per functional/declared unit)
Ancillary materials for installation(specified by materials)	Jointing compound: 0.350 kg Jointing tape: 0.00065 kg (1.5 m) Screw: 0.013 kg
Water use	0.00165 m^3
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	None required
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	Knauf GKB® 9.5 mm (0.325 kg), Knauf GKB® 12.5 mm (0.325 kg), Knauf GKB® 15 mm (0.665 kg) Jointing compound: 0.0175 kg Bearers: 34.40 g (waste from packaging) Polyethylenefilm: 1.24 g (waste from packaging)
Output materials (specified by type) as results ofwaste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	Knauf GKB® 9.5 mm (0.325 kg), Knauf GKB® 12.5 mm (0.325 kg), Knauf GKB® 15 mm (0.665 kg) Jointing compound: 0.0175 kg to landfill Bearers: 34.40 g to landfill and to energy recovery Polyethylene film: 1.24 g to landfill and to energy recovery

Use stage (excluding potential savings), B1-B7

Description of the stage

The use stage is divided into the following:

B1, use or application of the installed product;
B2, maintenance;
B3, repair;
B4, replacement;
B5, refurbishment;
B6, operational energy use;
B7, operational water use.

Description of scenarios and additional technical information

The product has a reference service life of 50 years. This assumes that the product will last in situ with no requirements for maintenance, repair, replacement or refurbishment throughout this period. Knauf GKB® plasterboard is a passive building product; therefore, it has no impact at this stage.

End-of-life stage, C1-C4

Description of the End-of-life stage
The end-of-life stage includes:

C1, de-construction, demolition
Deconstruction includes dismantling or demolition of the product from the construction.
No on-site sorting of the materials occurs.
C2, transport to waste processing
Once the product is uninstalled, the construction mixed waste is transported for 40 km to the landfill disposal.
C3, waste processing for reuse, recovery and/or recycling
Since there is no waste processing at the end of life, modules C3 and D (expressed as net impacts and benefits) are not applicable.
C4, disposal
Product residues (e.g. plasterboard scraps, jointing tapes, jointing compound) are considered to be deposited in a landfill.

Table 6 - End-of-life stage.

Parameter	**Value (expressed per funcional/declared unit)**
C1) Collection process specified by type	6.5 kg (GKB® 9.5 mm), 8.5 kg (GKB® 12.5 mm) and 13.3 kg (GKB® 15 mm) collected and transported by truck for landfill
C2) Assumption for scenario development (e.g. transportation)	Diesel consumption 0.04L per tkm; 40 km from demolition site to waste handle
C3) Recovery system specified by type	None
C4) Disposal specified by type	100% of waste is landfilled

6. LCA RESULTS

In following tables the environmental impacts per declared unit are reported for the environmental categories recommended by the EPD's General Programme Instruction (version 2.5 May 2015) and those indicated in PCR 2012:01 version 2.3 for Construction Products and construction services. For clarity, the results are reported subdivided by panel's thickness. The LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. CML 2001 has been used as the impact model.

7. LCA RESULTS INTERPRETATION

The following interpretation of results is given in detail exemplarily for the Knauf GKB® 9,5mm plasterboard. Nevertheless, the statements in general are also valid for the other two board types with different thickness, declared in this EPD.
Product stage (modules A1-A3) is responsible for the biggest share of the environmental impact for most indicators (from 57% to 97%) except abiotic depletion potential for non-fossil resources 54%, radioactive waste disposed 39% and non-hazardous waste disposed 2%.
The distribution of finished product (transport in module A4) influence the LCA results with a medium percentage of 16%, except for global warming potential-biogenic 3%, global warming potential-land use 3%, non-hazardous waste disposed 4% and hazardous waste disposed 3%, abiotic depletion potential for non-fossil resources 35% and radioactive waste disposed 46%. By contrast, transports in modules A2 and C2 contribute only 7% at maximum.
The installation phase (module A5) has a negligible contribution to the impact categories, less than 5% (except for the global warming potential-biogenic origin where it contributes up to a maximum of 39%). With regard to total energy consumption, the product stage (modules A1 – A3) has the highest contribution to this indicator, with a maximum percentage of 94%. Energy consumption for drying phase of the plasterboards is the main contributor to this indicator.
The same trend of results is related to the use of fresh water, where A1 – A3 modules are the main responsible of impacts, with a contribution of 78%.
The effect of disposal life cycle stage has little effect (less than 8%) on life cycle impacts, except for non-hazardous waste where the contribution of plasterboard disposal (module C4) to the overall results is 91%.

ADDITIONAL INFORMATION

Greenhouse gas emission from the use of electricity in the manufacturing phase

Electricity used in the manufacturing processes has been accounted for using the electricity mix (22.96% renewables, 16.04% coal, 51.62% natural gas, 0.68% oil, 4.76% nuclear, 3.93% other sources) from energy supplier (for the year 2018):

Greenhouse gas emissions: 0.141 kg CO_2 eq/MJ

Table 7 - LCA results of potential environmental impact referred to the declared unit.

GKB® 9.5 mm - ENVIRONMENTAL IMPACTS																	
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage						
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operation energy use	B7 Operational water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	TOTAL
Global Warming Potential (GWP) TOT - kg CO_2 eq./DU	1.73E+00	4.18E-01	6.59E-02	-	-	-	-	-	-	-	2.15E-02	2.26E-02	0	3.47E-02	-	2.29E+00
	Global Warming Potential= Potential change in the earth's climate due to accumulation of greenhouse gases and subsequent trapping of heat from reflected sunlight that would otherwise have passed out of the earth's atmosphere. Greenhouse gas refers to several different gases including carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). For global warming potential, these gas emissions are tracked and their potencies reported in terms of equivalent units of CO_2. The impact category 'Global Warming' covers three sub-categories: fossil, biogenic, land use and land use change.															
Global Warming Potential (GWP) Fossil - kg CO_2 eq./DU	1.72E+00	4.18E-01	6.45E-02	-	-	-	-	-	-	-	2.15E-02	2.25E-02	0	3.47E-02	-	2.29E+00
	GWP-fossil covers greenhouse gas (GHG) emissions to any media originating from the oxidation and/or reduction of fossil fuels by means of their transformation or degradation (e.g. combustion, digestion, landfilling, etc.).															
Global Warming Potential (GWP) biogenic - kg CO_2 eq./DU	1.92E-03	9.41E-05	1.31E-03	-	-	-	-	-	-	-	2.18E-06	5.78E-06	0	1.69E-05	-	3.35E-03
	GWP-biogenic covers carbon emissions to air (CO_2, CO and CH_4) originating from the oxidation and/or reduction of aboveground biomass by means of its transformation or degradation (e.g. combustion, digestion, composting, landfilling) and CO_2 uptake from the atmosphere through photosynthesis during biomass growth - i.e. corresponding to the carbon content of products, biofuels or above ground plant residues such as litter and dead wood.															
Global Warming Potential (GWP) Land use - kg CO_2 eq./DU	5.20E-03	1.22E-04	3.25E-05	-	-	-	-	-	-	-	1.92E-06	4.85E-06	0	1.55E-05	-	5.38E-03
	GWP-land use and land use change accounts for carbon uptakes and emissions (CO_2, CO and CH_4) originating from carbon stock changes caused by land use change and land use. This sub-category includes biogenic carbon exchanges from deforestation, road construction or other soil activities (including soil carbon emissions).															
Ozone Depletion Potential (ODP) - kg CFC11 eq./DU	2.76E-07	7.74E-08	5.38E-09	-	-	-	-	-	-	-	3.88E-09	4.47E-09	0	1.15E-08	-	3.79E-07
	Ozone Depletion Potential= Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.															
Acidification Potential (AP) - kg SO_2 eq./DU	5.05E-03	1.48E-03	3.34E-04	-	-	-	-	-	-	-	2.08E-04	1.26E-04	0	2.96E-04	-	7.50E-03
	Acidification Potential = Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.															
Eutrophication Potential (EP) - kg PO_4^{3-} eq./DU	8.95E-04	2.04E-04	5.12E-05	-	-	-	-	-	-	-	3.51E-05	2.02E-05	0	4.41E-05	-	1.25E-03
	Eutrophication potential = Excessive enrichment of waters and continental surfaces with nutrients and the associated adverse biological effects.															
Photochemical Ozone Creation (POCP)- kg C_2H_4 eq./DU	2.18E-04	6.98E-05	2.26E-05	-	-	-	-	-	-	-	4.31E-06	3.85E-06	0	1.26E-05	-	3.32E-04
	Photochemical ozone creation potential= Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.															
Abiotic depletion potential for non-fossil resources (elements) kg Sb eq./DU	1.96E-06	1.26E-06	3.28E-07	-	-	-	-	-	-	-	7.22E-09	4.39E-08	0	3.97E-08	-	3.64E-06
	Abiotic depletion potential for non-fossil resources (ADP-elements)/ = Consumption of non-renewable resources, thereby lowering their availability for future generations.															
Abiotic depletion potential for fossil resources (ADP-fossil fuels) MJ, net calorific value/DU	2.56E+01	6.29E+00	7.57E-01	-	-	-	-	-	-	-	3.11E-01	3.56E-01	0	9.76E-01	-	3.42E+01
	Abiotic depletion potential for fossil resources (ADP-fossil fuels) =Consumption of non-renewable resources, thereby lowering their availability for future generations.															

Table 8 - LCA results of potential environmental impact referred to the declared unit.

GKB® 12.5 mm - ENVIRONMENTAL IMPACTS																
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling	TOTAL
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operation energy use	B7 Operational water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Disposal		
Global Warming Potential (GWP) TOT - kg CO_2 eq./DU	2.01E+00	5.56E-01	6.59E-02	-	-	-	-	-	-	-	2.82E-02	2.95E-02	0	4.54E-02	-	2.74E+00
	Global Warming Potential= Potential change in the earth's climate due to accumulation of greenhouse gases and subsequent trapping of heat from reflected sunlight that would otherwise have passed out of the earth's atmosphere. Greenhouse gas refers to several different gases including carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). For global warming potential, these gas emissions are tracked and their potencies reported in terms of equivalent units of CO_2. The impact category 'Global Warming' covers three sub-categories: fossil, biogenic, land use and land use change.															
Global Warming Potential (GWP) Fossil - kg CO_2 eq./DU	2.00E+00	5.55E-01	6.45E-02	-	-	-	-	-	-	-	2.82E-02	2.95E-02	0	4.54E-02	-	2.73E+00
	GWP-fossil covers greenhouse gas (GHG) emissions to any media originating from the oxidation and/or reduction of fossil fuels by means of their transformation or degradation (e.g. combustion, digestion, landfilling, etc.).															
Global Warming Potential (GWP) biogenic - kg CO_2 eq./DU	2.01E-03	1.25E-04	1.31E-03	-	-	-	-	-	-	-	2.85E-06	7.56E-06	0	2.21E-05	-	3.48E-03
	GWP-biogenic covers carbon emissions to air (CO_2, CO and CH_4) originating from the oxidation and/or reduction of aboveground biomass by means of its transformation or degradation (e.g. combustion, digestion, composting, landfilling) and CO_2 uptake from the atmosphere through photosynthesis during biomass growth - i.e. corresponding to the carbon content of products, biofuels or above ground plant residues such as litter and dead wood.															
Global Warming Potential (GWP) Land use - kg CO_2 eq./DU	9.16E-03	1.62E-04	3.25E-05	-	-	-	-	-	-	-	2.52E-06	6.34E-06	0	2.03E-05	-	9.38E-03
	GWP-land use and land use change accounts for carbon uptakes and emissions (CO_2, CO and CH_4) originating from carbon stock changes caused by land use change and land use. This sub-category includes biogenic carbon exchanges from deforestation, road construction or other soil activities (including soil carbon emissions).															
Ozone Depletion Potential (ODP) - kg CFC11 eq./DU	3.25E-07	1.03E-07	5.38E-09	-	-	-	-	-	-	-	5.07E-09	5.85E-09	0	1.50E-08	-	4.60E-07
	Ozone Depletion Potential= Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.															
Acidification Potential (AP) - kg SO_2 eq./DU	5.71E-03	1.90E-03	3.34E-04	-	-	-	-	-	-	-	2.72E-04	1.64E-04	0	3.87E-04	-	8.77E-03
	Acidification Potential = Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.															
Eutrophication Potential (EP) - kg PO_4^{3-} eq./DU	9.85E-04	2.65E-04	5.12E-05	-	-	-	-	-	-	-	4.59E-05	2.64E-05	0	5.76E-05	-	1.43E-03
	Eutrophication potential = Excessive enrichment of waters and continental surfaces with nutrients and the associated adverse biological effects.															
Photochemical Ozone Creation (POCP)- kg C_2H_4 eq./DU	2.45E-04	9.07E-05	2.26E-05	-	-	-	-	-	-	-	5.63E-06	5.03E-06	0	1.65E-05	-	3.85E-04
	Photochemical ozone creation potential = Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.															
Abiotic depletion potential for non-fossil resources (elements) kg Sb eq./DU	2.31E-06	1.69E-06	3.28E-07	-	-	-	-	-	-	-	9.44E-09	5.74E-08	0	5.19E-08	-	4.44E-06
	Abiotic depletion potential for non-fossil resources (ADP-elements)/ = Consumption of non-renewable resources, thereby lowering their availability for future generations.															
Abiotic depletion potential for fossil resources (ADP-fossil fuels) MJ, net calorific value/DU	2.97E+01	8.37E+00	7.57E-01	-	-	-	-	-	-	-	4.06E-01	4.66E-01	0	1.28E+00	-	4.09E+01
	Abiotic depletion potential for fossil resources (ADP-fossil fuels) =Consumption of non-renewable resources, thereby lowering their availability for future generations.															

Table 9 - LCA results of potential environmental impact referred to the declared unit.

GKB® 15 mm - ENVIRONMENTAL IMPACTS																
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling	TOTAL
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operation energy use	B7 Operational water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Disposal		
Global Warming Potential (GWP) TOT - kg CO_2 eq./DU	3.16E+00	8.93E-01	6.85E-02	-	-	-	-	-	-	-	4.41E-02	4.62E-02	0	7.11E-02	-	4.28E+00
	Global Warming Potential= Potential change in the earth's climate due to accumulation of greenhouse gases and subsequent trapping of heat from reflected sunlight that would otherwise have passed out of the earth's atmosphere. Greenhouse gas refers to several different gases including carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). For global warming potential, these gas emissions are tracked and their potencies reported in terms of equivalent units of CO_2. The impact category 'Global Warming' covers three sub-categories: fossil, biogenic, land use and land use change.															
Global Warming Potential (GWP) Fossil - kg CO_2 eq./DU	3.15E+00	8.92E-01	6.72E-02	-	-	-	-	-	-	-	4.41E-02	4.61E-02	0	7.10E-02	-	4.27E+00
	GWP-fossil covers greenhouse gas (GHG) emissions to any media originating from the oxidation and/or reduction of fossil fuels by means of their transformation or degradation (e.g. combustion, digestion, landfilling, etc.).															
Global Warming Potential (GWP) biogenic - kg CO_2 eq./DU	2.16E-03	1.98E-04	1.32E-03	-	-	-	-	-	-	-	4.46E-06	1.18E-05	0	3.46E-05	-	3.72E-03
	GWP-biogenic covers carbon emissions to air (CO_2, CO and CH_4) originating from the oxidation and/or reduction of aboveground biomass by means of its transformation or degradation (e.g. combustion, digestion, composting, landfilling) and CO_2 uptake from the atmosphere through photosynthesis during biomass growth - i.e. corresponding to the carbon content of products, biofuels or above ground plant residues such as litter and dead wood.															
Global Warming Potential (GWP) Land use - kg CO_2 eq./DU	5.31E-03	2.57E-04	3.38E-05	-	-	-	-	-	-	-	3.94E-06	9.92E-06	0	3.17E-05	-	5.64E-03
	GWP-land use and land use change accounts for carbon uptakes and emissions (CO_2, CO and CH_4) originating from carbon stock changes caused by land use change and land use. This sub-category includes biogenic carbon exchanges from deforestation, road construction or other soil activities (including soil carbon emissions).															
Ozone Depletion Potential (ODP) - kg CFC11 eq./DU	5.43E-07	1.66E-07	5.95E-09	-	-	-	-	-	-	-	7.94E-09	9.15E-09	0	2.35E-08	-	7.55E-07
	Ozone Depletion Potential= Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.															
Acidification Potential (AP) - kg SO_2 eq./DU	7.44E-03	2.86E-03	3.51E-04	-	-	-	-	-	-	-	4.25E-04	2.57E-04	0	6.06E-04	-	1.19E-02
	Acidification Potential = Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.															
Eutrophication Potential (EP) - kg PO_4^{3-} eq./DU	1.18E-03	4.12E-04	5.39E-05	-	-	-	-	-	-	-	7.18E-05	4.13E-05	0	9.02E-05	-	1.85E-03
	Eutrophication potential = Excessive enrichment of waters and continental surfaces with nutrients and the associated adverse biological effects.															
Photochemical Ozone Creation (POCP)- kg C_2H_4 eq./DU	3.43E-04	1.40E-04	2.33E-05	-	-	-	-	-	-	-	8.82E-06	7.87E-06	0	2.58E-05	-	5.49E-04
	Photochemical ozone creation potential = Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.															
Abiotic depletion potential for non-fossil resources (elements) kg Sb eq./DU	2.71E-06	2.74E-06	3.33E-07	-	-	-	-	-	-	-	1.48E-08	8.99E-08	0	8.12E-08	-	5.97E-06
	Abiotic depletion potential for non-fossil resources (ADP-elements)/ = Consumption of non-renewable resources, thereby lowering their availability for future generations.															
Abiotic depletion potential for fossil resources (ADP-fossil fuels) MJ, net calorific value/DU	4.78E+01	1.35E+01	8.09E-01	-	-	-	-	-	-	-	6.36E-01	7.29E-01	0	2.00E+00	-	6.55E+01
	Abiotic depletion potential for fossil resources (ADP-fossil fuels) =Consumption of non-renewable resources, thereby lowering their availability for future generations.															

Table 10 - LCA results of use of resources referred to the declared unit.

GKB® 9.5 mm - RESOURCES USE

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling	TOTAL
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operation energy use	B7 Operational water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Disposal		
Use of renewable primary energy excluding renewable primary energy resources used as raw materials MJ/DU	2.63E+00	9.54E-02	4.53E-02	-	-	-	-	-	-	-	1.81E-03	6.40E-03	0	2.54E-02	-	2.81E+00
Use of renewable primary energy used as raw materials MJ/DU	4.56E-04	2.48E-05	1.31E-05	-	-	-	-	-	-	-	3.76E-07	1.52E-06	0	1.22E-05	-	5.08E-04
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) MJ/DU	2.63E+00	9.55E-02	4.53E-02	-	-	-	-	-	-	-	1.81E-03	6.41E-03	0	2.54E-02	-	2.81E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - MJ/DU	2.67E+01	6.44E+00	7.97E-01	-	-	-	-	-	-	-	3.13E-01	3.67E-01	0	9.91E-01	-	3.56E+01
Use of non-renewable primary energy used as raw materials MJ/DU	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ/DU	2.67E+01	6.44E+00	7.97E01	-	-	-	-	-	-	-	3.13E01	3.67E01	0	9.91E01	-	3.56E+01
Use of secondary material kg/DU	3.04E01	0	0	-	-	-	-	-	-	-	0	0	0	0	-	3.04E01
Use of renewable secondary fuels- MJ/FU	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0
Use of non-renewable secondary fuels - MJ/DU	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0
Use of net fresh water m³/DU	1.08E02	1.33E03	4.75E04	-	-	-	-	-	-	-	4.78E05	8.39E05	0	1.11E03	-	1.39E02

Table 11 - LCA results of use of resources referred to the declared unit.

GKB® 12.5 mm - RESOURCES USE																		
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling	TOTAL
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operation energy use	B7 Operational water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Disposal		
Use of renewable primary energy excluding renewable primary energy resources used as raw materials MJ/DU	2.73E+00	1.26E-01	4.53E-02	-	-	-	-	-	-	-	2.37E-03	8.37E-03	0	3.32E-02	-	2.94E+00
Use of renewable primary energy used as raw materials MJ/DU	4.69E-04	3.30E-05	1.31E-05	-	-	-	-	-	-	-	4.92E-07	1.98E-06	0	1.60E-05	-	5.33E-04
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) MJ/DU	2.73E+00	1.26E-01	4.53E-02	-	-	-	-	-	-	-	2.37E-03	8.38E-03	0	3.32E-02	-	2.95E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - MJ/DU	3.10E+01	8.57E+00	7.97E-01	-	-	-	-	-	-	-	4.10E-01	4.80E-01	0	1.30E+00	-	4.25E+01
Use of non-renewable primary energy used as raw materials MJ/DU	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ/DU	3.10E+01	8.57E+00	7.97E01	-	-	-	-	-	-	-	4.10E01	4.80E01	0	1.30E+00	-	4.25E+01
Use of secondary material kg/DU	3.04E-01	0	0	-	-	-	-	-	-	-	0	0	0	0	-	3.04E-01
Use of renewable secondary fuels- MJ/FU	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0
Use of non-renewable secondary fuels - MJ/DU	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0
Use of net fresh water m³/DU	1.20E-02	1.76E-03	4.75E-04	-	-	-	-	-	-	-	6.25E-05	1.10E-04	0	1.45E-03	-	1.59E-02

Table 12 - LCA results of use of resources referred to the declared unit.

GKB® 15 mm - RESOURCES USE																	
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage						
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operation energy use	B7 Operational water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	TOTAL
Use of renewable primary energy excluding renewable primary energy resources used as raw materials MJ/DU	2.88E+00	2.02E-01	4.69E-02	-	-	-	-	-	-	-	3.70E-03	1.31E-02	0	5.20E-02	-	3.19E+00
Use of renewable primary energy used as raw materials MJ/DU	4.81E-04	5.31E-05	1.36E-05	-	-	-	-	-	-	-	7.69E-07	3.10E-06	0	2.50E-05	-	5.77E-04
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) MJ/DU	2.88E+00	2.02E-01	4.69E-02	-	-	-	-	-	-	-	3.71E-03	1.31E-02	0	5.20E-02	-	3.19E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - MJ/DU	4.93E+01	1.38E+01	8.52E-01	-	-	-	-	-	-	-	6.41E-01	7.51E-01	0	2.03E+00	-	6.73E+01
Use of non-renewable primary energy used as raw materials MJ/DU	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ/DU	4.93E+01	1.38E+01	8.52E01	-	-	-	-	-	-	-	6.41E01	7.51E01	0	2.03E+00	-	6.73E+01
Use of secondary material kg/DU	3.04E-01	0	0	-	-	-	-	-	-	-	0	0	0	0	-	3.04E-01
Use of renewable secondary fuels- MJ/DU	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0
Use of non-renewable secondary fuels – MJ/DU	0	0	0	-	-	-	-	-	-	-	0	0	0	0	-	0
Use of net fresh water m³/DU	1.57E-02	2.83E-03	5.21E-04	-	-	-	-	-	-	-	9.78E-05	1.72E-04	0	2.28E-03	-	2.16E-02

Table 13 - LCA results of waste categories referred to the declared unit.

GKB® 9.5 mm - WASTE CATEGORIES																
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling	TOTAL
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operation energy use	B7 Operational water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Disposal		
Hazardous waste disposed kg/DU	1.10E-04	3.78E-06	2.36E-06	-	-	-	-	-	-	-	1.40E-07	1.86E-07	0	6.99E-07	-	1.17E-04
Non-hazardous (excluding inert) waste disposed kg/DU	1.26E-01	3.03E-01	1.85E-01	-	-	-	-	-	-	-	3.39E-04	3.17E-02	0	6.50E+00	-	7.14E+00
Radioactive waste disposed kg/DU	3.70E-05	4.42E-05	2.36E-05	-	-	-	-	-	-	-	2.17E-06	2.58E-06	0	6.47E-06	-	9.48E-05

Table 14 - LCA results of waste categories referred to the declared unit.

GKB® 12.5 mm - WASTE CATEGORIES																
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling	TOTAL
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operation energy use	B7 Operational water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Disposal		
Hazardous waste disposed kg/DU	1.17E-04	5.03E-06	2.36E-06	-	-	-	-	-	-	-	1.83E-07	2.43E-07	0	9.14E-07	-	1.26E-04
Non-hazardous (excluding inert) waste disposed kg/DU	1.43E-01	4.06E-01	1.85E-01	-	-	-	-	-	-	-	4.44E-04	4.14E-02	0	8.50E+00	-	9.27E+00
Radioactive waste disposed kg/DU	4.12E-05	5.88E-05	2.36E-06	-	-	-	-	-	-	-	2.84E-06	3.38E-06	0	8.46E-06	-	1.17E-04

Table 15 - LCA results of waste categories referred to the declared unit.

GKB® 15 mm - WASTE CATEGORIES																
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling	TOTAL
	A1/A2/A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operation energy use	B7 Operational water use	C1 Deconstruction/ demolition	C2 Transport	C3 Waste processing	C4 Disposal		
Hazardous waste disposed kg/DU	1.46E-04	8.08E-06	2.40E-06	-	-	-	-	-	-	-	2.86E-07	3.80E-07	0	1.43E-06	-	1.58E-04
Non-hazardous (excluding inert) waste disposed kg/DU	1.51E-01	6.59E-01	3.34E-01	-	-	-	-	-	-	-	6.95E-04	6.48E-02	0	1.33E+01	-	1.45E+01
Radioactive waste disposed kg/DU	4.75E-05	9.46E-05	2.69E-06	-	-	-	-	-	-	-	4.44E-06	5.28E-06	0	1.32E-05	-	1.68E-04

The images below demonstrate the impact of each life cycle stage on 5 key parameters, producing a clear view of how each stage contributes to the overall environmental impacts of 9.5 mm, 12.5 mm, 15 mm Knauf GKB® plasterboards.

GKB® 9.5 mm	Unit	Product (A1-A3)	Transport (A4)	Installation (A5)	Use (B)	End-of-life (C)	Total environmental impact
GLOBAL WARMING	kg CO_2 eq/DU	1.73	0.42	0.07	0.00	0.08	2.29 kg CO_2 equiv/DU
NON RENEWABLE RESOURCES CONSUMPTION[1]	MJ/DU	25.55	6.29	0.76	0.00	1.64	34.24 MJ/DU
ENERGY CONSUMPTION[2]	MJ/DU	29.34	6.53	0.84	0.00	1.70	38.42 MJ/DU
WATER CONSUMPTION [3]	m^3/DU	0.0108	0.0013	0.0005	0.0000	0.0012	0.014 m^3/DU
WASTE PRODUCTION[4]	kg/DU	0.13	0.30	0.18		6.53	7.14 kg/DU

[1] This indicator corresponds to the abiotic depletion potential of fossil resources.

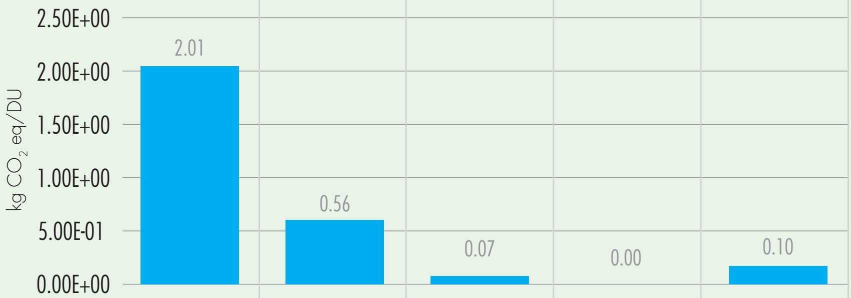
[2] This indicator corresponds to the total use of primary energy.

[3] This indicator corresponds to the net use of fresh water.

[4] This indicator corresponds to the sum of hazardous, non- hazardous and radioactive waste disposed.

GKB® 12.5 mm	Product (A1-A3)	Transport (A4)	Installation (A5)	Use (B)	End-of-life (C)	Total environmental impact

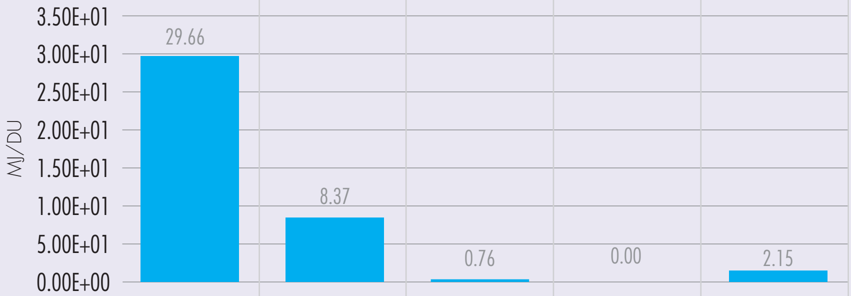
GLOBAL WARMING



2.74 kg CO_2 equiv/DU

NON RENEWABLE RESOURCES CONSUMPTION[1]

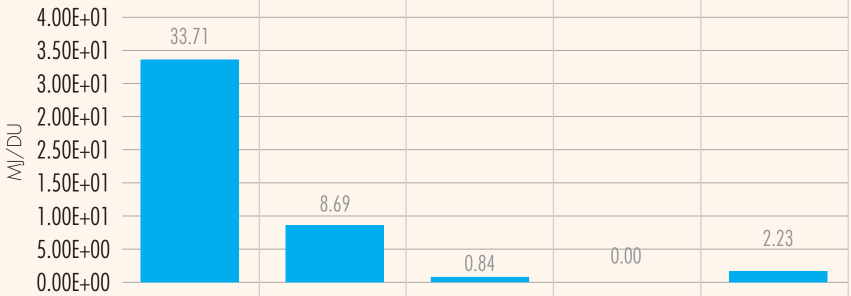
[1] This indicator corresponds to the abiotic depletion potential of fossil resources.



40.93 MJ/DU

ENERGY CONSUMPTION[2]

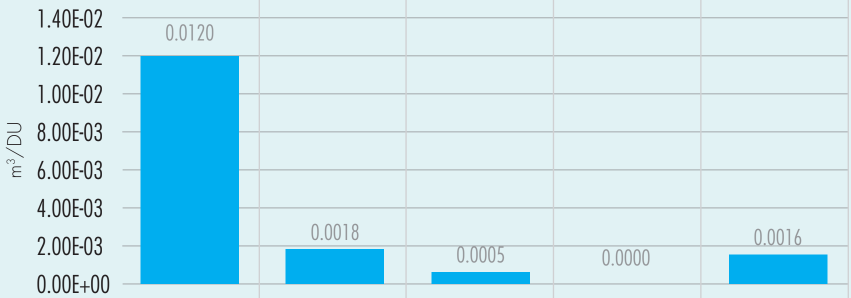
[2] This indicator corresponds to the total use of primary energy.



45.47 MJ/DU

WATER CONSUMPTION [3]

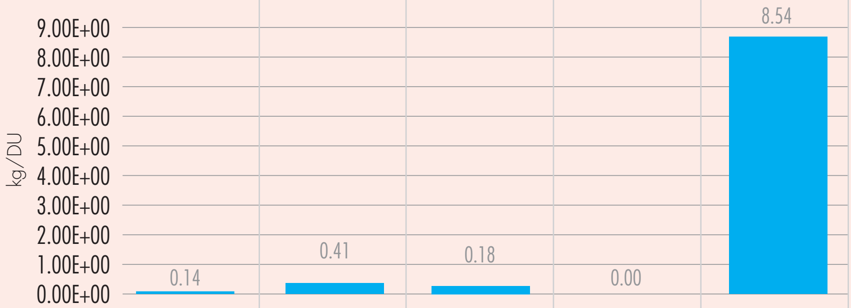
[3] This indicator corresponds to the net use of fresh water.



0.016 m^3/DU

WASTE PRODUCTION[4]

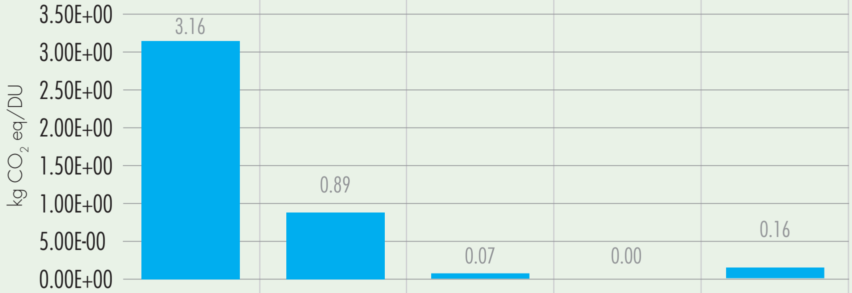
[4] This indicator corresponds to the sum of hazardous, non- hazardous and radioactive waste disposed.



9.27 kg/DU

GKB® 15 mm	Product (A1-A3)	Transport (A4)	Installation (A5)	Use (B)	End-of-life (C)	Total environmental impact

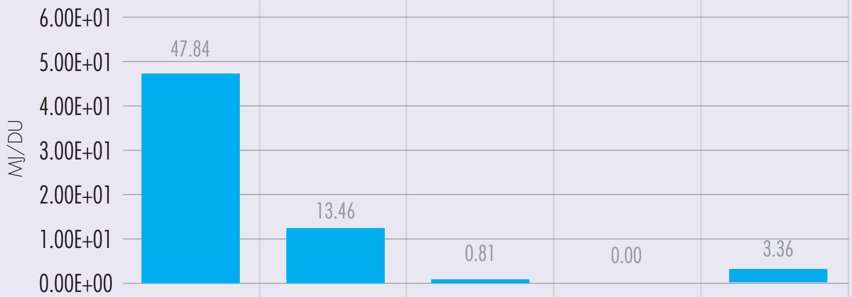
GLOBAL WARMING



4.28 kg CO_2 equiv/DU

NON RENEWABLE RESOURCES CONSUMPTION[1]

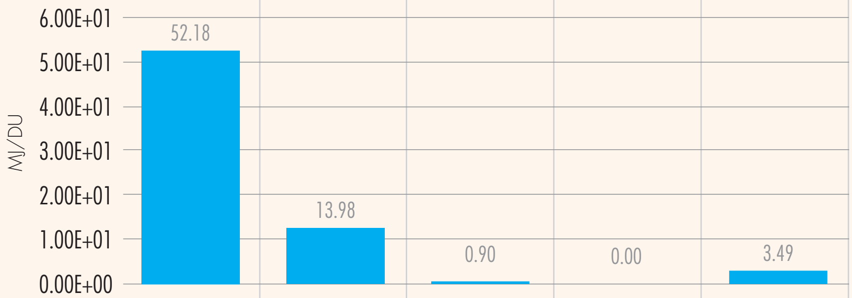
[1] This indicator corresponds to the abiotic depletion potential of fossil resources.



65.47 MJ/DU

ENERGY CONSUMPTION[2]

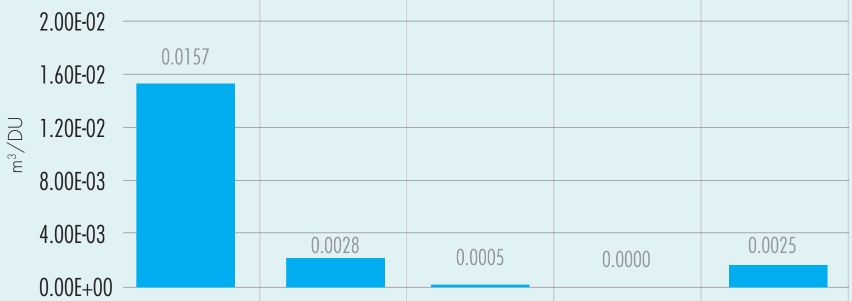
[2] This indicator corresponds to the total use of primary energy.



70.54 MJ/DU

WATER CONSUMPTION [3]

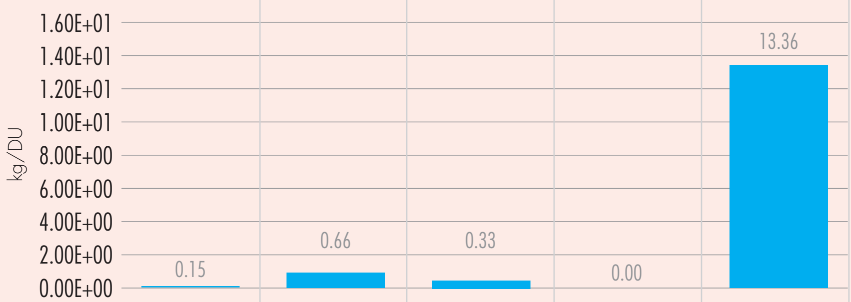
[3] This indicator corresponds to the net use of fresh water.



0.022 m^3/DU

WASTE PRODUCTION[4]

[4] This indicator corresponds to the sum of hazardous, non- hazardous and radioactive waste disposed.



14.50 kg/DU

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For the realisation of this EPD and the LCA study, which constitutes its scientific basis, Knauf di Knauf S.r.l. S.a.s., Castellina Marittima manufacturing plant availed itself of the technical and methodological support of a research and management consulting team of Ergo s.r.l., spin off company of the Scuola Superiore Sant'Anna, coordinated by Prof. Francesco Testa.

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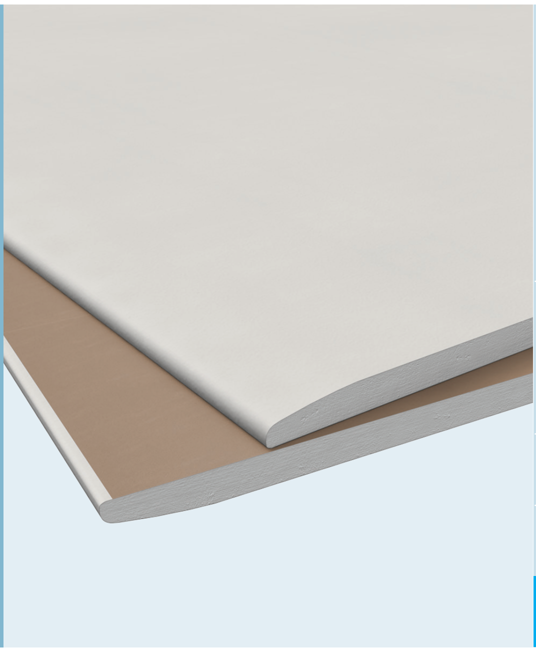

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04/2020

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ENVIRONMENTAL PRODUCT DECLARATION (EPD)

VALIDATION IN COMPLIANCE

WITH THE REQUIREMENTS GENERAL PROGRAMME INSTRUCTIONS FOR EPD V. 3.0

63

Laura Severino
Sustainability & Food Certification Compliance, Head

RINA Services S.p.A.

Genoa, 22/4/2020

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