

MP 75

Spray plaster in bags



ENVIRONMENTAL PRODUCT DECLARATION

Based on NBN EN 15804+A1 (2014)
and its Belgian national supplement (NBN/DTD B 08-001, 2017)



THINK GREEN. BUILD BLUE.

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NB:

The information contained in this Environmental Product Declaration is provided under the responsibility of **N. et B. Knauf & Cie s.c.s.**, Engis. It is produced according to the specifications of ISO 14025[1], NBN EN 15804+A1[2], *the Belgian Royal Decree determining the minimum requirements for environmental labelling on construction products for the recording of environmental product declarations* [3] and DTD B 08-001 [4].

The use of all or part of the information provided in this document must, as a minimum, be accompanied by a full reference to the original EPD and its author, who will be able to provide a copy of the full document.

The results of the study are based on facts, circumstances and assumptions which have been submitted during the course of the study. If these are different, the results are likely to change. Consequently the results of the study should be considered as a whole, on the basis of the assumptions, and not viewed in isolation.

Guide to this document

In the following tables, 4.62E-03 should be read as 4.62×10^{-3} . (scientific notation)

Abbreviations:

- EPD: Environmental product declaration
- NCV: net calorific value
- NDM: non-declared module
- LCA: life cycle analysis
- DU: Declared unit
- PCR: Product category rules

Warning on use of the environmental declaration for comparing products

The EPDs for construction products may not be comparable if they are not compliant with the NBN EN 15804+A1 standard [2]. In § 5.3, this standard defines the conditions under which construction products can be compared based on the information provided in the EPD:

“Comparison of the environmental performance of construction products using the information from EPDs should be based on use of the products and their impacts on the building, and should take into account the whole life cycle (all the information modules)”.

General information

Manufacturer and owner of the declaration
N. et B. Knauf & Cie. s.c.s Rue du Parc Industriel, 1 B4480 Engis
Product name
Knauf MP 75 Plaster
Production site for which the EPD is representative
Knauf -Engis
Geographical representativeness
Belgian market
Programme used
B-EPD  www.environmentalproductdeclarations.be
EPD according to
ISO 14025 (2010), NBN 15804+A1 (2014), B-PCR v4.1 (February 2017)
Verification date
12-09-2018
Validity end date
28-06-2023
Verification
The EN 15804 standard is the “core” PCR
Independent verification of the declaration in accordance with EN ISO 14025:2010
<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
Independent verifier: Evert Vermaut, Vincotte


Description of the product and functional (or declared) unit

General description

Knauf - MP 75 is a factory premixed plaster-based coating suitable for use as a finishing coating on interior walls and ceilings. This plaster corresponds to group B 4 in accordance with NBN EN 13279-1 and is compliant with ATG 01/1617a. After mixing with water, it is applied using a spray machine such as the Knauf PFT G 4 or G 5. The resulting compound sets due to the effects of a chemical reaction and drying in fresh air.

Description of the use of the product (in construction)

MP 75 is applied as a single layer to all rough, absorbent mineral surfaces in new buildings or buildings undergoing renovation, hotels or administrative buildings, but not in private and public swimming pools or in areas with high levels of humidity such as public showers, dairies, butcher's shops etc. It can also be used as a base coating when applied in two layers. In that situation it is scraped during setting and then covered with the finishing coating "Knauf Fix & Finish" or "Knauf Finish 2".

Functional or declared unit

The declared unit is 1kg of MP 75 plaster, which may be applied in an 8 to 10mm layer on a vertical surface (wall) or horizontal surface (ceiling) consisting of rough, absorbent mineral materials.

Main components and packaging

MP 75 is presented in the form of a white powder, consisting of plaster ($\text{CaSO}_4, \frac{1}{2} \text{H}_2\text{O}$), hydrated lime, expanded perlite and additives (<1%). It contains no substances on the "Candidate list of substances of very high concern for authorisation" of the ECHA (European Chemicals agency).

It is marketed in bulk or in 25kg bags. This declaration refers to the latter case (which is more common). The bags are transported on wooden pallets, packaged under polyethylene film (45 x 25 kg bags per pallet).

Description of packaging per declared unit	Value (kg/kg of plaster)
Wooden pallet	2.22E-02
Plastic cover (HDPE)	5.60E-04
bag (component 1 - paper)	6.80E-03
bag (component 2 - plastic)	4.00E-04

Reference service life (RSL)

The technical characteristics of the coating are estimated to be maintained for more than 60 years. However, since residential buildings in Belgium usually undergo major renovations every 60 years, the reference service life of the coating is estimated to be 60 years. This service life applies if the stated conditions concerning packaging, transportation, storage, installation and use are respected.

Technical characteristics

MP 75 is manufactured in accordance with the EN-13279:2008 specification. Its main technical characteristics are set out in Table 1.

Table 1: technical data

Group of plaster-based coatings for construction in accordance with EN 13279-1	-	B4
Density of the powder	kg/m ³	± 700
Density of the dry coating	kg/m ³	± 1000
Bending strength according to EN 13279-2	N/mm ²	≥ 1.0
Compression strength according to EN 13279-2	N/mm ²	≥ 2.0
Water vapour diffusion resistance coefficient (μ) according to EN 12524	-	10
Thermal conductivity (λ) according to EN 12524	W/(mK)	0.3
Fire behaviour (Euroclasse)	-	A1

Production process

As mentioned previously, MP 75 is made of calcined gypsum ("stucco"), lime, expanded perlite and additives. Since the stucco and expanded perlite are manufactured at the Engis site, production of the plaster can be divided into two steps:

1. Production of calcined gypsum ($\text{CaSO}_4, \frac{1}{2} \text{H}_2\text{O}$) from phosphogypsum (a by-product from phosphoric acid production) and REA gypsum (a by-product from desulphurisation of coal-fired electric power stations) and production of expanded perlite from raw perlite.

- Mixture of calcined gypsum, expanded perlite with hydrated lime, and additives and packaging of the finished product.

This process is shown diagrammatically in figure 1

Information for calculating the life cycle analysis

PCR used	NBN EN 15804:2014 NBN / DTD B 08-001 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products - National supplement to NBN EN 15804+A1:2014 (2017).
Type of EPD and phases in the life cycle omitted	Cradle-to-gate with options. The use phase (module B1-B6) is omitted because it is not considered relevant for the product
Geographical and temporal representativeness of the primary data	The specific data were provided by Knauf Engis and taken from production data for 2013.
Secondary database and software used	The generic data come from the ecoinvent v3.3 database. Calculations were carried out using the SimaPro v 8.3.0.0 software (2016)
Allocation	The factory at Engis produces various types of plaster. The data collected take into account the specific composition of MP 75. Only resources that cannot be specifically attributed were allocated on a weight basis between the different types of plaster produced at Engis.

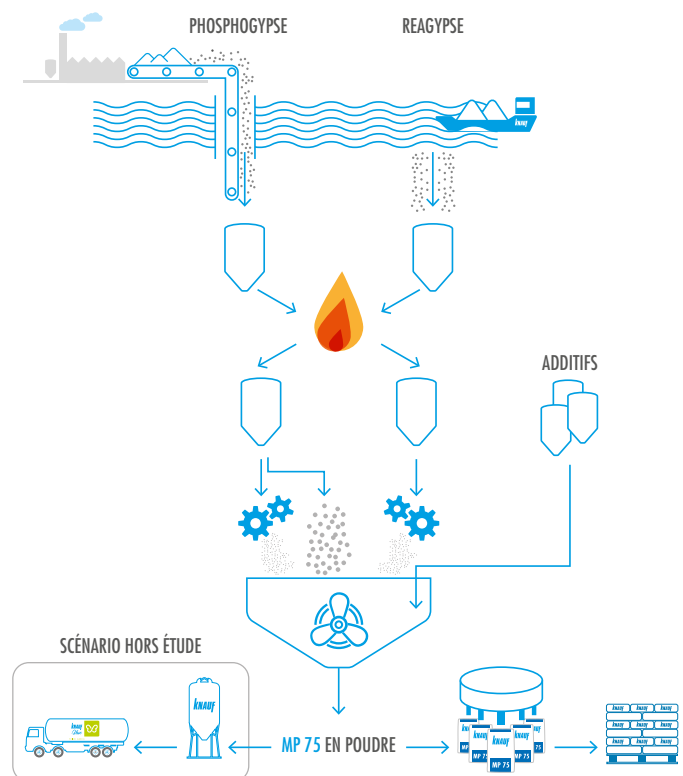
Cut-off criteria

The cut-off criteria prescribed by EN 15804 are complied with. Thus all inward and outward flows to and from the process for which data are available were included in the analysis. The missing data were replaced with approximate data as far as possible. The processes omitted represent less than 1% in weight and energy terms per process and less than 5% in weight and energy terms per module. Furthermore, no substances were omitted that were likely to have a significant impact on the indicators under consideration.

Key assumptions and estimates

For some additives included in the composition of the plaster (<1% by weight) alternative chemical substances had to be used due to a lack of inventory data for the substances in question.

Figure 1: production diagram



Approximate data were also used for modelling infrastructures and some consumables. These did not, however, have a significant impact on the results and represent clearly less than one percent by weight of the production phase.

Scenarios and additional technical information

Production phase (module A1-A3)

This step includes:

- production and transportation of all raw materials (gypsum, perlite, hydrate lime, additives) and packaging (cover, bag, pallet)
- the use of energy sources for operating kilns, mixing and packaging and the resulting emissions (combustion)
- internal transportation and storage of products
- the impact of the main infrastructures and consumables required for production of the plaster
- treatment of waste generated during production
- consumption of water and treatment of waste water

Transportation of personnel and the administration department are excluded from the study.

Construction phase (module A4-A5)

Module A4 Transportation to the site

The scenario used for the transportation to the site phase (A4) corresponds to the default scenario of DTD B 08-001 for the product category “finishing materials - coatings on inert materials”.

Table 2: scenario for calculating module A4 (transportation to the site)

Parameter	Value
Type of fuel and consumption of the vehicle or vehicle type used for transportation, for example long-distance truck, boat etc.	Journey from factory-reseller: >32 tonne truck (EURO5) Journey from reseller-site: 50% 16-32 tonne truck (EURO5), 50% 7.5-16 tonne truck (EURO5) Direct journey from factory to site: 50% 16-32 tonne truck (EURO5), 50% 7.5-16 tonne truck (EURO5)
Mean distance to the construction site	60% delivered through a reseller: 100 km from the factory to the reseller + 35km from the reseller to the site 40% delivered directly to the site: 100km from the factory to the site
Capacity utilisation (including empty returns)	The default utilisation rates from theecoinvent database were used; these assume (including empty returns), a mean load of <ul style="list-style-type: none"> ➤ 3.29 tonnes per 7.5-16 tonne truck ➤ 5.79 tonnes per 16-32 tonne truck ➤ 19.2 tonnes per >32 tonne truck
Bulk density of products transported	700 kg/m ³
Volume capacity utilisation coefficient	1

Module A5 Installation

Table 3: scenario for calculating module A5 (Installation)

Parameter	Value (expressed per functional or declared unit)
Auxiliary inward flows during installation (specified by material)	No additional material is required
Use of water	0.75 litres
Use of other resources	no
Quantitative description of the energy type (regional mix) and consumption during the installation process	6.3U-3 kWh Belgian electricity mix
Product waste on the construction site before treatment of waste generated by the product installation (specified by type)	Waste plaster: 0.02kg (wastage rate=2%) Packaging waste: Wooden pallet 2.22E-2 kg+2% [1] Cover (HDPE) : 5.60E-4 kg+2% [1] Bag (component 1 - paper) 6.81E-3 kg+2% [1] Bag (component 2 - plastic) 4.00E-4 kg+2% [1]
Materials (specified by type) produced by treatment of waste on the construction site, for example collection for recycling, energy recovery, disposal (specified by route)	Waste plaster: 95% recycling, 5% landfill Wooden pallet 90% reuse, 10% disposal (incineration) Cover: 35% recycling, 60% incineration, 5% landfill Bag: 100% disposal (incineration)
Direct emissions into atmospheric air, soil and water	0.001% in dust released into the air during mixing

[1] +2% to account for the packaging of installation waste

Use phase, B1-B7

Module B1 Use of the product

The product does not generate emissions into the soil or water during its use lifetime.

Table 4 Emissions into indoor air

Characteristics	Results measured according to ISO 16000-9
R value	2 significant figures
TVOC content	≤ 120 µgm ³
TVOC content	µg/m ³ with 2 significant figures
Carcinogenic substances	≤ 0.001mg/m ³
Formaldehyde	< 3 µg/m ³

Modules B2-B7

The plaster does not require specific maintenance, repair, replacement or renovation activities to maintain its technical performance during the declared reference service life. It is therefore estimated that modules B2-B7 are not relevant to this product.

End of life phase C1-C4

The end of life scenario corresponds to the scenario for “finishing materials, plasters” in DTD B 08-001 [4].

Table 5: Module C scenario

Parameter	Value
Collection process specified by type	100% collected mixed with inert waste
Recovery process specified by type	0 kg for reuse 0.95 kg recycled (with the inert substrate, recycled as aggregate/sand for road building) 0 kg used for energy generation
Disposal, specified by type	0.05 kg to landfill
Assumptions used in developing scenarios (for example transport)	Waste coatings are transported using 16-32 tonne trucks (EURO5) over a distance of 30 km to a sorting centre. 0.05 kg/kg of plaster is transported over a distance of 50 km from the sorting centre to a landfill site Broken plaster together with its substrate is not considered as a secondary material that can be used to replace virgin material because it is tolerated (in limited quantities) but not desired in secondary aggregates.

Potential for recycling / reuse / recovery beyond the limits of the system, module D

Module D comprises benefits linked to export of energy (heat and electricity) following incineration of the packaging in module A5: the HDPE cover, bag (paper and plastic components), 10% of pallets that are not reused. Calculation of these benefits assumes that the energy generated makes it possible to reduce consumption of electricity from the Belgian grid (Belgian mix including imports) and generation of heat from natural gas (Table 6).

Table 6: benefits declared in module D

Incinerated material	MJ heat exported/DU	MJ electricity exported/DU
Wood	6.12E-03	2.95E-03
Polyethylene (plastic component of the bag +% cover)	7.53E-03	3.76E-03
Paper (bag)	2.76E-02	1.39E-02
Total	4.13E-02	2.06E-02

Additional information about the contribution from biogenic sources to the global warming indicator

Absorption and emissions associated with the biogenic carbon content (kg CO _{2eq} /DU)	Manu- facturing step	Installation step									End of life step				D Benefits and changes beyond the limits of the system						
	Total A1-A3 Production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Restoration	B6 Energy use	B7 Water use	C1 Dismantling/ Demolition	C2 Transport	C3 Treatment of waste	C4 Landfill							
product:	0	0	0	NDM							0	0	0	0	0						
packaging:																					
➤ pallet	-0.034	0	+0.034																		
➤ paper component of the bag	-0.01	0	+0.01																		

Reference service life

Parameter	Value
Reference service life	60 years
Declared properties	See technical data
Installation	Ambient temperature and substrate temperature: min. + 5°C, max. + 30°C, for at least 48 hours after application. The substrate must not be frozen before or during application of the coating. Ventilate the areas adequately during and after application of the coating.
Assumed quality based on installation in accordance with the manufacturer's instructions	The coating should have a flat, smooth surface, white in colour, and a consistent thickness of 8 to 10 mm.
Interior environment and conditions for use	The conditions for use set out on the technical sheet must be respected. The essential factor is to maintain the plaster in an atmosphere with a relative air humidity below 70% and away from shocks and other forms of mechanical damage.
Maintenance	No maintenance operations are necessary if the conditions of use are respected.

Results from the life cycle analysis

Table 7: parameters describing the environmental impacts (indicators required by EN 15804)

Environmental impacts	Unit/DU	Manufacturing step	Installation step							End of life step				D Benefits and changes beyond the limits of the system		
		Total A1-A3 Production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Restoration	B6 Energy use	B7 Water use	C1 Disassembly / Demolition	C2 Transport		C3 Treatment of waste	C4 Landfill
Global warming ^[2]	kg CO ₂ eq	1.25E-01	1.66E-02	5.18E-02	NDM							0.00E+00	5.30E-03	1.22E-03	2.14E-04	-4.56E-03
Ozone layer depletion	kg CFC 11 eq	3.11E-08	3.14E-09	1.28E-09								0.00E+00	9.96E-10	2.59E-10	8.63E-11	-8.45E-10
Soil and water acidification	kg SO ₂ eq	4.13E-04	5.38E-05	1.76E-05								0.00E+00	1.71E-05	5.83E-06	1.60E-06	-6.47E-06
Eutrophication	kg (PO4) ³ eq	1.27E-04	8.74E-06	4.35E-06								0.00E+00	2.79E-06	1.18E-06	3.02E-07	-7.07E-07
Eutrophication Emissions >100 years	kg (PO4) ³ eq	0.00E+00	4.51E-04	3.16E-06								0.00E+00	9.80E-07	4.65E-07	4.10E-08	-1.10E-06
Photochemical ozone formation	Ethene eq	2.32E-05	4.77E-06	1.16E-06								0.00E+00	1.46E-06	3.75E-07	1.18E-07	-5.80E-07
Abiotic resource depletion (elements)	kg Sb eq	1.67E-07	5.09E-08	1.06E-08								0.00E+00	1.60E-08	1.86E-09	2.25E-10	-7.48E-10
Abiotic resource depletion (fossil)	MJ	2.36E+00	2.53E-01	9.05E-02								0.00E+00	8.00E-02	1.75E-02	6.93E-03	-7.59E-02

[2] Including the contribution from biogenic carbon

Table 8: parameters describing the environmental impacts (additional indicators required by DTD B 08-001)

Environmental impacts	Unit/DU	Manufacturing step	Installation step							End of life step				D Benefits and changes beyond the limits of the system		
		Total A1-A3 Production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Restoration	B6 Energy use	B7 Water use	C1 Disassembly / Demolition	C2 Transport		C3 Treatment of waste	C4 Landfill
Human toxicity (non-cancer effects)	CTUh	2.63E-08	2.55E-09	1.21E-09	NDM							0.00E+00	7.79E-10	8.49E-11	1.14E-11	-1.49E-10
Human toxicity (non-cancer effects) >100 years	CTUh	0.00E+00	3.21E-08	1.33E-09								0.00E+00	4.17E-10	1.44E-10	9.16E-12	-1.75E-10
Human toxicity (cancer effects)	CTUh	7.41E-10	1.26E-10	1.03E-10								0.00E+00	3.88E-11	2.72E-11	2.07E-12	-9.19E-12
Human toxicity (cancer effects) >100 years	CTUh	0.00E+00	1.09E-08	3.82E-10								0.00E+00	1.18E-10	7.47E-11	5.69E-12	-4.77E-11
Particle formation	kg PM2.5 eq	4.64E-05	8.11E-06	3.77E-06								5.54E-05	2.50E-06	9.10E-07	2.45E-07	-6.33E-07
Ionising radiation (effect on human health)	kBq U235 eq	6.37E-03	1.20E-03	8.84E-04								0.00E+00	3.75E-04	2.63E-04	3.26E-05	-6.36E-04
Ionising radiation (effect on human health) > 100 years	kBq U235 eq	1.23E-02	2.86E-04	2.02E-03								0.00E+00	8.11E-05	5.76E-04	6.77E-06	-1.51E-03
Ecotoxicity (fresh water)	CTUe	4.38E-02	4.37E-02	5.40E-03								0.00E+00	1.32E-02	4.64E-04	1.09E-04	-3.83E-04
Ecotoxicity (fresh water) >100 years		1.13E+00	5.73E-02	1.42E-01								0.00E+00	1.75E-02	2.13E-02	3.85E-04	-5.33E-03
Land use (SOM)	kg C deficit	1.91E-01	1.64E-02	6.55E-03								0.00E+00	4.34E-03	1.68E-03	7.63E-04	-1.40E-03
Land transformation (SOM)	kg C deficit	1.06E-01	5.15E-02	6.44E-03								0.00E+00	1.59E-02	1.03E-02	8.32E-03	-2.40E-03
Water resource depletion	m ³ water eq	3.00E-04	2.16E-06	2.17E-03								0.00E+00	6.74E-07	1.99E-06	3.03E-07	-4.89E-06

Table 9: parameters describing the use of resources

Environmental impacts	Unit/DU	Manufacturing step	Installation step									End of life step				D Benefits and changes beyond the limits of the system					
		Total A1-A3 Production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Restoration	B6 Energy use	B7 Water use	C1 Disassembly / Demolition	C2 Transport	C3 Treatment of waste	C4 Landfill						
Use of primary renewable energy, to the exclusion of primary renewable energy sources used as raw materials	MJ PCI	3.60E-01	3.72E-03	1.78E-02	NDM							0.00E:+00	1.10E-03	2.48E-03	8.36E-05	-5.91E-03					
Use of primary renewable energy sources as raw materials	MJ PCI	4.19E-01	0	-2.80E-01								0	0	0	0	0	0	0	0	0	0
Total use of primary renewable energy sources (primary energy and primary energy sources used as raw materials)	MJ PCI	7.80E-01	3.72E-03	-2.62E-01								0.00E:+00	1.10E-03	2.48E-03	8.36E-05	-5.91E-03					
Use of primary non-renewable energy, to the exclusion of primary non-renewable energy sources used as raw materials	MJ PCI	2.64E:+00	2.60E-01	1.43E-01								0.00E:+00	8.22E-02	3.24E-02	7.12E-03	-1.15E-01					
Use of primary non-renewable energy sources as raw materials	MJ PCI	4.09E-02	0	0								0	0	0	0	0					
Total use of primary non-renewable energy sources (primary energy and primary energy sources used as raw materials) MJ/FU	MJ PCI	2.68E:+00	2.60E-01	1.43E-01								0.00E:+00	8.22E-02	3.24E-02	7.12E-03	-1.15E-01					
Use of secondary materials	kg	1.26E:+00	0.00E:+00	2.58E-02								0.00E:+00	0.00E:+00	0.00E:+00	0.00E:+00	0.00E:+00					
Use of renewable secondary fuels	kg	0	0	0								0	0	0	0	0					
Use of non-renewable secondary fuels	kg	0	0	0								0	0	0	0	0					
Net use of fresh water	m³	1.52E-03	5.05E-05	8.18E-04								0.00E:+00	1.53E-05	8.01E-06	8.36E-06	-2.05E-05					

Table 10: parameters describing categories of waste

Environmental impacts	Unit/DU	Manufacturing step	Installation step									End of life step				D Benefits and changes beyond the limits of the system
		Total A1-A3 Production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Restoration	B6 Energy use	B7 Water use	C1 Disassembly / Demolition	C2 Transport	C3 Treatment of waste	C4 Landfill	
Hazardous waste	kg	2.37E-06	1.47E-07	1.19E-07	NDM							0.00E+00	4.60E-08	2.40E-08	2.33E-09	-7.90E-08
Non-hazardous waste	kg	5.90E-03	1.47E-02	2.38E-03								0.00E+00	3.85E-03	4.44E-05	5.00E-02	-5.92E-05
Radioactive waste	kg	6.56E-06	1.82E-06	8.28E-07								0.00E+00	5.73E-07	2.56E-07	5.00E-08	-5.72E-07

Table 11: parameters describing outward flows

Environmental impacts	Unit/DU	Manufacturing step	Installation step									End of life step				D Benefits and changes beyond the limits of the system
		Total A1-A3 Production	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Restoration	B6 Energy use	B7 Water use	C1 Disassembly / Demolition	C2 Transport	C3 Treatment of waste	C4 Landfill	
Components intended for reuse	kg	0.00E+00	0.00E+00	2.04E-02	NDM							0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials destined for recycling	kg	1.00E-05	0.00E+00	1.96E-02								0.00E+00	0.00E+00	9.50E-01	0.00E+00	0.00E+00
Materials destined 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
Energy exported (heat)	MJ	4.57E-04	0.00E+00	4.13E-02								0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Energy exported (electricity)	MJ	2.22E-04	0.00E+00	2.06E-02								0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

References

- [1] International Standardisation Organisation (ISO), ISO 14025:2006 - Environmental labels and declarations - Type III declarations - Principles and procedures. 2006.
- [2] Nationaal Bureau voor Normalisatie (Belgian Standards Body), NBN EN 15804+A1 - Sustainability of Construction works - Environmental Product Declarations - Core rules for the product category of construction products. 2014, p. 49.
- [3] FPS Public Health, Royal Decree determining the minimum requirements for environmental messages on construction products and for registration of environmental product declarations in the federal database (Koninklijk besluit tot vaststelling van de minimumeisen voor het aanbrengen van milieuboodschappen op bouwproducten en voor het registreren van milieuproductverklaringen in de federale databank). 2014, p. 9.
- [4] NBN / DTD B 08-001 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products - National supplement to NBN EN 15804+A1:2014, 2017.



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Do you have any questions about Knauf products or systems? Do not hesitate to consult our technical department. They will make every effort to find the right answer for you.

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