



## ENVIRONMENTAL PRODUCT DECLARATION

**Nr 02-09/2023**



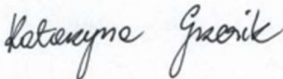
**Joint compound**

**Knauf sp. z o.o.**

Owner of the EPD: *Knauf sp. z o.o.*  
Programme owner: *Łukasiewicz Research Network - Institute of Ceramics and Building Materials*  
Name of programme: *Environmental Product Declaration – B2B*  
Issued: **25.09.2023**  
Valid until: **25.09.2028**

## 1. GENERAL INFORMATION

<p><b>Owner of the EPD:</b></p> <p>Knauf sp. z o.o.</p>	<p><b>Products covered by the EPD:</b></p> <p>Joint compound</p>
<p><b>Programme owner:</b> Łukasiewicz Research Network – Institute of Ceramics and Building Materials <b><a href="http://www.icimb.pl/opole/">http://www.icimb.pl/opole/</a></b></p>	<p><b>Owner of the EPD:</b> Knauf sp. z o.o. 25 Światowa str 02-229 Warszawa Telephone: +48 22 36 95 100 e-mail: <a href="mailto:biuro@knauf.pl">biuro@knauf.pl</a> <b><a href="https://www.knauf.pl/">https://www.knauf.pl/</a></b></p>
<p><b>Date of issuance:</b></p> <p>25.09.2023</p>	<p><b>Declared product/declared unit:</b> The declared unit (DU) for the products is 1 kg (1 kilogram) Knauf Fill&amp;Finish Light, Knauf Super Finish, Knauf ProSpray All Purpose, Knauf Roll&amp;Spray Max, Knauf Goldband Finish, Knauf Rotband Finish</p>
<p><b>EPD valid until:</b></p> <p>25.09.2028</p>	<p><b>Scope:</b> The declaration covers the following products: <b>Knauf Fill&amp;Finish Light, Knauf Super Finish, Knauf ProSpray All Purpose, Knauf Roll&amp;Spray Max, Knauf Goldband Finish, Knauf Rotband Finish</b> manufactured in the Knauf Bauprodukte Polska sp. z o.o.; 5 Gipsowa str, 97-427 Rogowiec.</p> <p>It contains information about the impact of the declared products on the environment. All data on the production cycle have been collected by Knauf sp. z o.o. from January 1,2022 to December 31, 2022 (12 months) and corresponded to the production’s technology of that time. All data are averaged for total production of – Knauf Fill&amp;Finish Light, Knauf Super Finish, Knauf ProSpray All Purpose, Knauf Roll&amp;Spray Max, Knauf Goldband Finish, Knauf Rotband Finish produced by Knauf Bauprodukte Polska sp. Z o.o. in Rogowcu.</p> <p>The life cycle assessment has been developed in accordance with the requirements of PN-EN ISO 15804+A2:2020, PN-EN ISO 14025 and PN-EN ISO 14040. The rules for product categorization have been adopted in accordance with the PN-EN 15804 standard.</p> <p>The declaration owner is responsible for the underlying information and evidence. Łukasiewicz Research Network – Institute of Ceramics and Building Materials Environmental Engineering Center in Opole is not responsible for the manufacturer’s information and data and evidence regarding the life cycle assessment.</p> <p>Declarations resulting from different programs or performed not in accordance with the standard may not be compared.</p>

<b>Product Category Rules (PCR)</b>	According to:  PN-EN 15804+A2:2020-03 Sustainability of construction works. Environmental product declarations. Basic principles of categorization of construction products.
<b>Representativeness:</b>	Polish product, year 2022
<b>Reference Service Life (RSL):</b>	20 years
<b>Reasons for performing LCA:</b>	B2B
<b>Life cycle Analysis (LCA):</b>	LCA covers modules A1-A3, C1-C4 and D according to PN-EN 15804+A2 standard (Cradle-to-Gate with options)
<b>Łukasiewicz Research Network – Institute of Ceramics and Building Materials, Environmental Engineering Center provides access to the type III EPD for joint compound produced by Knauf sp. z o.o. to the interested parties.</b>	
<p><b>Authors:</b></p> <p>Katarzyna Kiprian, MSc Eng. Ewa Głodek-Bucyk, PhD Eng.</p> <p><b>Approved by:</b> Joanna Poluszyńska, PhD </p> <p>Director of the environmental engineering center</p> <p>Ewa Głodek-Bucyk, PhD Eng. </p> <p>Leader of Process Engineering Research Group</p>	<p><b>Verification:</b></p> <p>CEN PN-EN 15804+A2 standard serves as main PCR. Independent EPD and data verification according to PN-EN ISO 14025:2010 standard.</p> <p><input type="checkbox"/> internal      <input checked="" type="checkbox"/> external</p> <p></p> <p>Katarzyna Grzesik, PhD Eng.</p>

## 2. MANUFACTURER AND PRODUCT DESCRIPTION

Knauf sp. z o. o. has been operating in Poland in the construction industry for 25 years. Obtaining during this time a leading position on the Polish market in the field of building materials. Knauf sp. z o. o. offers a wide range of products: for drywall based on gypsum cardboard, floor systems, insulation systems with facade plasters and paints, and plastering systems including joint compounds. Joint compounds consist mainly of dolomite powder and vinyl binder, as well as additives that improve the performance of the finished product. Knauf sp. z o. o. joint compounds are ready-to-use and are applied to the surface of walls and ceilings by floats, rollers, and aggregates.

Caring for the environment is one of the company's most important foundations. The company is ISO 14001, 9001 and GRCA certified. The quality of the products is confirmed by tests in accredited laboratories.

The company focuses on innovation, constantly looking for new ways of development and developing products in such a way that they best meet the needs of their users.

The group of products covered by the declaration are joint compounds:

- Knauf Fill&Finish Light, Knauf Super Finish, Knauf ProSpray All Purpose, Knauf Roll&Spray Max, Knauf Goldband Finish, Knauf Rotband Finish

The indicative composition of the products covered by the declaration is presented in the table below:

Material	Mass fraction [%]
Water	30-35
Fillers	60-70
Biocides	max. 0,2
Binders	1-5
Skimmers	~0,2
Thickeners	0,4-3

The technological process of production joint compound is carried out by weighing out the appropriate amount of dry ingredients stored in silos, dry ingredients stored in containers and liquid functional additives stored in containers, and then mixing all the ingredients in the DRY MIXER. Then, with the addition of the appropriate amount of water, liquid dispersion materials and liquid functional additives, mixing is carried out in the WET MIXER. The resulting product, using the W15 mixer, is standardized, and the finished product is packaged in appropriate packaging.

The technological of the production process of joint compounds is shown below:

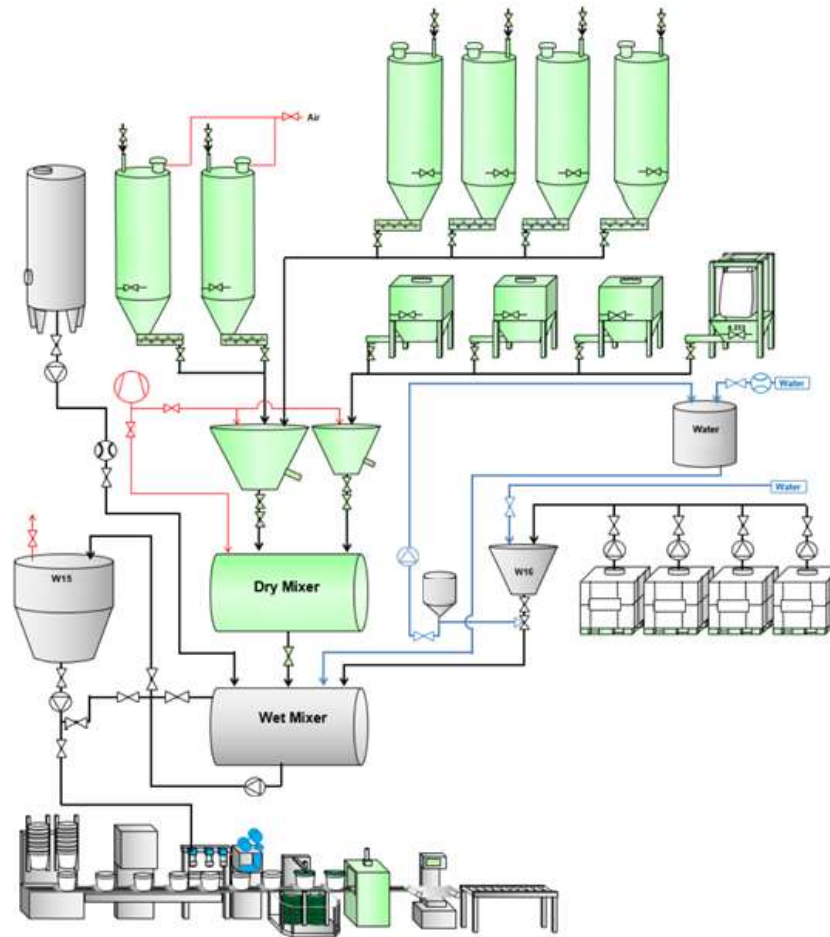


Fig. 1: The production diagram of joint compound by Knauf sp. z o.o.

**Knauf Fill&Finish Light** it is a ready mixed based on dolomite flour with vinyl binder and additives. A special formula, it has a reduced mass in relation to traditional joint compounds while maintaining standards. It has excellent adhesion, low shrinkage through this mass is dedicated primarily to finishing plasterboard systems but can also be used to finish mineral surfaces.



**Knauf Prospray All Purpose** is a ready mixed for finishing surfaces of walls and ceilings inside buildings, which has a consistency that allows it to be applied with aggregates without dilution. It consists of dolomite flour with a vinyl binder and additives that improve performance properties. The joint compound can be used for full-surface, thin-coat spray filling, is approved and meets the required standards for use in the food and similar industries, as well as in residential and public buildings.



**Knauf Roll&Spray Max** is a mass having very good levelling and filling properties, which it can be used for full-surface filling of mineral building surfaces such as: plaster, concrete surfaces, gypsum blocks/concrete and painted surfaces, painted with paint, finished with fiberglass wallpaper and cardboard-plaster panels. Application can be done with spray units, rollers and trowels in layers up to 5 mm thick.



**Knauf SUPER FINISH** is a ready-mixed prepared for distribution by roller, trowel or aggregate. It is a mixture of dolomite powder and vinyl binder, which also contains additives to improve the performance. The mass meets the requirements of standards and has the appropriate approvals, which allow it to be used in residential construction and public construction (nurseries, kindergartens and schools, health care facilities).



**Knauf Goldband Finish** is a ready-to-use polymer joint compound used for finishing the surface of walls and ceilings. The material can be applied manually or by machine with a layer up to 2 mm thick. It can be used on surfaces of mineral/resin plaster, gypsum cardboard and fiberglass wallpaper.



**Knauf Rotbando Finish** is a ready-to-use polymer joint compound. It is characterized by ease of application and spreading and is easy to work with after application. It is designed to create smooth and even thin-layer (up to 2 mm) interior surfaces. It is suitable for use on concrete surfaces, mineral also blocks, stable plaster, plasterboard.



### Technical data – joint compound:

Joint compound	Density [kg/m <sup>3</sup> ]	Average consumption per 1 mm thickness [kg/m <sup>2</sup> ]	Layer thickness [mm]
Knauf Fill&Finish Light	1,10	1,2	to 3
Knauf ProSpray All Purpose	1,55	1	to 3
Knauf Roll&Spray Max	1,50	1,3	to 5
Knauf Super Finish	1,65	1,5	to 3
Knauf Goldband Finish	1,65	1,5	to 2
Knauf Rotband Finish	1,65	1,5	to 2

### 3. LCA: CALCULATION RULES

#### System boundaries

The life cycle analysis of the tested products includes A1-A3, A4, A5, C1-C4 and D (Cradle to Gate with options) modules in accordance with PN-EN 15804. It includes the following modules:

- ◆ A1 – extraction and preparation of raw materials, generation of electricity and Energy carriers for auxiliary processes,
- ◆ A2 – transport raw materials to the gate of the production plant,
- ◆ A3 – production, including ancillary processes and emissions,
- ◆ A4 – transport to the building site,
- ◆ A5 – installation into the building,
- ◆ C1 – deconstruction/demolition,
- ◆ C2 – transport to the waste processing facility,
- ◆ C3 – processing of waste material,
- ◆ C4 – treatment of waste material,
- ◆ D – re-use potential.

#### Data collection period

Data on the production process was collected in the years 2022 (in the period 01.01.22 to 31.12.22).

**Declared unit (DU)**

Due to negligible differences between the two groups of products, the declared unit of 1 kg joint compounds – **Knauf Fill&Finish Light, Knauf Super Finish, Knauf ProSpray All Purpose, Knauf Roll&Spray Max, Knauf Goldband Finish, Knauf Rotband Finish** produced by **Knauf Bauprodukte Polska sp. z o.o.** in Rogowcu.

**Assumptions**

**A1** – extraction and consumption of raw materials refers to specific mass shares in the production process per declared unit of the product.

**A2** – distances from the place of obtaining raw materials to the production plant individual for each raw material, means of transport differentiated due to the method of raw materials delivery.

**A3** – values of CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, dust and other emissions from the production process obtained as a result of measurements carried out at the plant, other estimated on the basis of fuel consumption.

**A4** - transportation of materials to the site is carried out according to a developed scenario. It assumes the method of transportation and the distance over which materials are transported

**A5** - consumption of energy and other raw materials in this module due to negligible values has been omitted.

**C1** - demolition/demolition of the material. Data is collected based on the developed scenario. At the demolition site, the initial sorting of the material takes place. Dismantling of joint compound does not require energy and material expenditures, manual or power tool demolition is possible. The impact of these operations is so small that the environmental impact of the from the C1 module is ignored.

**C2** – for module C2, it is assumed that pre-sorted demolition waste containing joint compounds is always transported to a recovery plant (recycling plant). Data is collected based on the developed scenario.

**C3** – module C3 takes into account the environmental impact during the processing of construction and demolition waste containing joint compounds at a waste recovery facility. Data is collected based on the developed scenario.

**C4** – module C4 should take into account the impact of landfilled construction debris containing joint compounds. In the developed scenario, landfilling operations are not taken into account, as construction rubble is not a worthless waste, is recyclable and should not be sent to municipal landfills.

**D** – module D deals with the impact and effects of using secondary material. Thermal disposal of packaging materials is assumed. Calculations are made based on the developed scenario.

**Cut-off criteria**

99% of all mass flows involved in the production process were taken into account.

All the energy used in the process has been taken into account in the EPD.

**General data**

The main source of general and auxiliary data is the EcoInvent 3.8 database and manufacturer's reports.

**Allocation**

All data provided by the manufacturer have been referred to the declared unit (DU) of the product – 1 kg of joint compounds produced by company Knauf Bauprodukte sp. z o.o.

#### **4. LCA: SCENARIOS AND ADDITIONAL TECHNICAL DATA**

For the life cycle analysis of the products covered by the “Cradle to gate with options” environmental declaration, scenarios were developed for modules A4-A5, C1-C4 and D:

##### **Module A4:**

- Transportation is carried out using trucks with a load capacity of 3.5-7.5 tons, meeting EURO 6 emission standards,
- The average distance from the company to the customer 100 km.

##### **Module A5:**

Consumption of energy and other raw materials in this module due to negligible values has been ignored.

##### **Module C1:**

Demolition/demolition of walls is considered part of the process of demolishing the entire building. Plaster mortar as a wall covering is a small percentage of the masonry wall mass. Therefore, the contribution of joint compounds to the demolition of the entire building can be ignored and the impact of this module can be assumed to be zero.

##### **Module C2:**

In order to calculate the impact of this module, the following assumptions were made:

- 100% waste is transported to a recovery plant as part of waste 17 01 01 or 17 01 02 (construction rubble),
- Transport is carried out using self-unloading trucks with a load capacity 7.5 - 16 tons, meeting EURO 6 emission standards
- The materials are transported to a waste treatment site 100 km from the demolition site.

##### **Module C3:**

Waste containing joint compounds intended for recovery is classified as “non-hazardous waste” with code 17 01 01 or 17 01 02. The recycling process includes crushing and screening. There is no pre-treatment, additional fraction screening or post treatment. Recycling takes place at the waste treatment plant. Only coarse crushing is used to obtain the appropriate classification. Group of waste (17 01 02) is usually recovered during backfilling. Electricity consumption per 1 kg of waste is 0.03 kWh/kg, and energy for internal transport vehicles is 0.3 MJ.

##### **Module D:**

Module D - There is a great deal of uncertainty in the development of scenarios for Module D, that makes modeling and calculations difficult. The recycled 0/63 mm aggregate fraction of construction debris 17 01 01, which contains joint compounds, contributes to the savings of natural resources. However, their low share in the total fraction makes the positive impacts

resulting from the reuse of the declared material insignificant. When processed rubble with code 17 01 02 containing the analyzed product is used to fill pits, this also contributes to saving natural resources.

## 5. LCA: RESULTS

The table below shows the LCA modules included in the calculation of the environmental impact categories for the products covered by the declaration.

SYSTEM BOUNDARIES (X –MODULE INCLUDED IN LCA, MND – MODULE NOT DECLARED)																
Products stage			Construction process stage		Use stage							End-of-life stage				Benefits and loads beyond the system boundary
Raw material supply	Transport	Production	Transport	Construction process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction	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	X

The following tables present the results of the LCA analysis for joint compound. Explanations of the abbreviations used to describe the impact categories are given below:

<b>GWP-total</b>	Global warming potential
<b>GWP-fossil</b>	Global warming potential fossil fuel
<b>GWP-biogenic</b>	Global warming potential biogenic
<b>GWP-luluc</b>	Global warming potential land use and land change
<b>ODP</b>	Depletion potential of the stratospheric ozone layer
<b>AP</b>	Acidification potential of land and water
<b>EP-freshwater</b>	Eutrophication potential, fraction of nutrients reaching freshwater end compartment
<b>EP-marine</b>	Eutrophication potential, fraction of nutrients reaching marine end compartment
<b>EP-terrestrial</b>	Eutrophication potential, Accumulated Exceedance
<b>POCP</b>	Formation potential of tropospheric ozone photochemical oxidants
<b>ADP-minerals&amp;metals</b>	Abiotic depletion potential for nonfossil resources
<b>ADP-fossil</b>	Abiotic depletion potential for fossil resources

<b>WDP</b>	Water (user) deprivation potential
<b>PM</b>	Potential incidence of disease due to PM emissions
<b>IRP</b>	Potential Human exposure efficiency relative to U235
<b>ETP-fw</b>	Potential comparative Toxic Unit for ecosystems
<b>HTP-c</b>	Potential comparative Toxic Unit for humans (cancerogenic)
<b>HTP-nc</b>	Potential comparative Toxic Unit for humans (non-cancerogenic)
<b>SQP</b>	Potential soil quality index
<b>PERE</b>	Use of renewable primary energy excluding renewable primary energy resources used as raw materials
<b>PERM</b>	Use of renewable primary energy resources used as raw materials
<b>PERT</b>	Total use of renewable primary energy resources
<b>PEN-RE</b>	Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as raw materials
<b>RE</b>	Use of non-renewable primary energy resources used as raw materials
<b>PENRT</b>	Total use of non-renewable primary energy resources
<b>SM</b>	Use of secondary material
<b>RSF</b>	Use of renewable fuels
<b>NRSF</b>	Use of non-renewable secondary fuels
<b>FW</b>	Use of net fresh water

CORE ENVIRONMENTAL IMPACT INDICATORS 1 kg Knauf Fill&Finish Light											
Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> eq.	1,44E-01	3,78E-02	3,56E-03	5,11E-02	0,00E+00	0,00E+00	2,13E-02	3,55E-02	0,00E+00	-2,15E-03
GWP-fossil	kg CO <sub>2</sub> eq.	1,43E-01	3,78E-02	3,54E-03	5,10E-02	0,00E+00	0,00E+00	2,13E-02	3,54E-02	0,00E+00	-2,14E-03
GWP-biogenic	kg CO <sub>2</sub> eq.	5,54E-04	2,83E-05	1,43E-05	5,19E-05	0,00E+00	0,00E+00	1,94E-05	7,85E-05	0,00E+00	-6,51E-06
GWP-luluc	kg CO <sub>2</sub> eq.	1,27E-04	1,82E-05	8,42E-07	3,05E-05	0,00E+00	0,00E+00	1,01E-05	5,96E-06	0,00E+00	-2,13E-07
ODP	kg CFC11 eq.	1,29E-08	8,47E-09	4,68E-11	1,11E-08	0,00E+00	0,00E+00	4,81E-09	3,95E-09	0,00E+00	-4,39E-10
AP	mol H <sup>+</sup> eq.	6,50E-04	2,66E-04	2,58E-05	1,47E-04	0,00E+00	0,00E+00	6,04E-05	3,10E-04	0,00E+00	-2,18E-05
EP-freshwater	kg PO <sub>4</sub> eq.	4,65E-05	2,49E-06	4,40E-06	4,74E-06	0,00E+00	0,00E+00	1,61E-06	2,28E-05	0,00E+00	-9,84E-08
EP-marine	kg N eq.	1,25E-04	6,11E-05	3,64E-06	2,71E-05	0,00E+00	0,00E+00	1,18E-05	9,85E-05	0,00E+00	-9,45E-06
EP-terrestrial	mol N eq.	1,32E-03	6,75E-04	3,14E-05	2,95E-04	0,00E+00	0,00E+00	1,28E-04	1,04E-03	0,00E+00	-1,03E-04
POCP	kg NMVOC eq.	4,70E-04	2,00E-04	8,80E-06	1,14E-04	0,00E+00	0,00E+00	4,92E-05	2,85E-04	0,00E+00	-2,88E-05
ADP-minerals & metals	kg Sb eq.	1,27E-06	1,41E-07	1,13E-08	3,17E-07	0,00E+00	0,00E+00	9,76E-08	1,70E-08	0,00E+00	-1,10E-09
ADP-fossil	MJ	3,99E+00	5,57E-01	3,87E-02	7,60E-01	0,00E+00	0,00E+00	3,19E-01	4,36E-01	0,00E+00	-2,88E-02
WDP	WDP (m <sup>3</sup> ) świat. ekw	1,04E-01	1,69E-03	4,87E-04	2,94E-03	0,00E+00	0,00E+00	1,06E-03	2,82E-03	0,00E+00	-4,54E-05
ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS: 1 kg Knauf Fill&Finish Light											
Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	1,94E-08	2,58E-09	4,16E-11	2,94E-09	0,00E+00	0,00E+00	1,46E-09	5,04E-09	0,00E+00	-5,73E-10
IRP	kBq U235 eq.	2,30E-02	2,87E-03	1,01E-04	4,23E-03	0,00E+00	0,00E+00	1,70E-03	1,59E-03	0,00E+00	-1,28E-04
ETP-fw	CTUe	4,65E-05	2,49E-06	4,40E-06	4,74E-06	0,00E+00	0,00E+00	1,61E-06	2,28E-05	0,00E+00	-9,84E-08
HTP-c	CTUh	5,92E-11	1,67E-11	1,29E-12	2,77E-11	0,00E+00	0,00E+00	9,41E-12	1,10E-11	0,00E+00	-6,76E-13
HTP-nc	CTUh	1,75E-09	4,16E-10	5,66E-11	6,32E-10	0,00E+00	0,00E+00	2,52E-10	3,63E-10	0,00E+00	-1,90E-11
SQP	-	6,93E-01	3,23E-01	7,39E-03	3,70E-01	0,00E+00	0,00E+00	1,89E-01	6,71E-02	0,00E+00	-3,77E-03
PARAMETERS DESCRIBING RESOURCE: 1 kg Knauf Fill&Finish Light											
Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2,76E-01	8,20E-03	2,91E-03	1,61E-02	0,00E+00	0,00E+00	5,41E-03	1,59E-02	0,00E+00	-1,79E-04
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,76E-01	8,20E-03	2,91E-03	1,61E-02	0,00E+00	0,00E+00	5,41E-03	1,59E-02	0,00E+00	-1,79E-04
PEN-RE	MJ	3,89E+00	5,80E-01	5,08E-02	7,87E-01	0,00E+00	0,00E+00	3,31E-01	5,09E-01	0,00E+00	-3,04E-02
RE	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	0,00E+00
PENRT	MJ	3,89E+00	5,80E-01	5,08E-02	7,87E-01	0,00E+00	0,00E+00	3,31E-01	5,09E-01	0,00E+00	-3,04E-02
SM	kg	0,00E+00	0,00E+00	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,00E-01	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	4,18E-07
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	0,00E+00
FW	m <sup>3</sup>	4,35E-03	9,09E-05	2,85E-03	2,01E-04	0,00E+00	0,00E+00	6,39E-05	1,46E-02	0,00E+00	-4,53E-06
ENVIRONMENTAL INFORMATION DESCRIBING WASTE AND OUTPUT FLOWS: 1 kg Knauf Fill&Finish Light											
Life Cycle Stage											
Indicator	Unit (expressed per DU)	A1	A2	A3	A4	A5	C1	C2	C3	C4	D

Hazardous waste	kg	WN	WN	3,23E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste	kg	WN	WN	4,00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Components for re-use	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	WN	WN	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,00E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	WN	WN	6,10E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ/energy carrier	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,18E-07

### CARBON ORGANIC

Contents organic carbon in product (kg C <sub>org</sub> )	1,32E-03
Contents organic carbon in packaging (kg C <sub>org</sub> )	6,80E-07

CORE ENVIRONMENTAL IMPACT INDICATORS 1 kg Knauf Super Finish											
Indicator	Unit	Life Cycle Stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> eq.	8,57E-02	3,82E-02	3,56E-03	5,11E-02	0,00E+00	0,00E+00	2,13E-02	4,27E-02	0,00E+00	-2,59E-03
GWP-fossil	kg CO <sub>2</sub> eq.	8,79E-02	3,82E-02	3,54E-03	5,10E-02	0,00E+00	0,00E+00	2,13E-02	4,26E-02	0,00E+00	-2,58E-03
GWP-biogenic	kg CO <sub>2</sub> eq.	-2,27E-03	2,62E-05	1,43E-05	5,19E-05	0,00E+00	0,00E+00	1,94E-05	9,45E-05	0,00E+00	-7,84E-06
GWP-luluc	kg CO <sub>2</sub> eq.	1,21E-04	1,95E-05	8,42E-07	3,05E-05	0,00E+00	0,00E+00	1,01E-05	7,18E-06	0,00E+00	-2,57E-07
ODP	kg CFC11 eq.	1,06E-08	8,47E-09	4,68E-11	1,11E-08	0,00E+00	0,00E+00	4,81E-09	4,76E-09	0,00E+00	-5,29E-10
AP	mol H+ eq.	4,69E-04	3,49E-04	2,58E-05	1,47E-04	0,00E+00	0,00E+00	6,03E-05	3,74E-04	0,00E+00	-2,62E-05
EP-freshwater	kg PO <sub>4</sub> eq.	4,74E-05	2,45E-06	4,40E-06	4,74E-06	0,00E+00	0,00E+00	1,61E-06	2,75E-05	0,00E+00	-1,18E-07
EP-marine	kg N eq.	8,39E-05	8,17E-05	3,64E-06	2,71E-05	0,00E+00	0,00E+00	1,18E-05	1,19E-04	0,00E+00	-1,14E-05
EP-terrestrial	mol N eq.	8,74E-04	9,04E-04	3,14E-05	2,95E-04	0,00E+00	0,00E+00	1,28E-04	1,25E-03	0,00E+00	-1,25E-04
POCP	kg NMVOC eq.	3,09E-04	2,57E-04	8,80E-06	1,14E-04	0,00E+00	0,00E+00	4,92E-05	3,44E-04	0,00E+00	-3,46E-05
ADP-minerals & metals	kg Sb eq.	9,61E-07	1,39E-07	1,13E-08	3,17E-07	0,00E+00	0,00E+00	9,76E-08	2,05E-08	0,00E+00	-1,33E-09
ADP-fossil	MJ	2,11E+00	5,57E-01	3,87E-02	7,60E-01	0,00E+00	0,00E+00	3,19E-01	5,24E-01	0,00E+00	-3,47E-02
WDP	WDP (m <sup>3</sup> ) świat. ekw	7,10E-02	1,65E-03	4,87E-04	2,94E-03	0,00E+00	0,00E+00	1,06E-03	3,40E-03	0,00E+00	-5,47E-05
ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS: 1 kg Knauf Super Finish											
Indicator	Unit	Life Cycle Stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	2,11E-08	2,49E-09	4,16E-11	2,94E-09	0,00E+00	0,00E+00	1,46E-09	6,07E-09	0,00E+00	-6,90E-10
IRP	kBq U235 eq.	2,42E-02	2,85E-03	1,01E-04	4,23E-03	0,00E+00	0,00E+00	1,70E-03	1,91E-03	0,00E+00	-1,54E-04

ETP-fw	CTUe	4,74E-05	2,45E-06	4,40E-06	4,74E-06	0,00E+00	0,00E+00	1,61E-06	2,75E-05	0,00E+00	-1,18E-07
HTP-c	CTUh	5,06E-11	1,76E-11	1,29E-12	2,77E-11	0,00E+00	0,00E+00	9,40E-12	1,32E-11	0,00E+00	-8,14E-13
HTP-nc	CTUh	1,55E-09	4,05E-10	5,66E-11	6,32E-10	0,00E+00	0,00E+00	2,52E-10	4,37E-10	0,00E+00	-2,29E-11
SQP	-	6,92E-01	3,05E-01	7,39E-03	3,70E-01	0,00E+00	0,00E+00	1,89E-01	8,08E-02	0,00E+00	-4,54E-03

**PARAMETERS DESCRIBING RESOURCE: 1 kg Knauf Super Finish**

Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2,58E-01	8,01E-03	2,91E-03	1,61E-02	0,00E+00	0,00E+00	5,41E-03	1,91E-02	0,00E+00	-2,15E-04
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,58E-01	8,01E-03	2,91E-03	1,61E-02	0,00E+00	0,00E+00	5,41E-03	1,91E-02	0,00E+00	-2,15E-04
PEN-RE	MJ	1,93E+00	5,80E-01	5,08E-02	7,87E-01	0,00E+00	0,00E+00	3,31E-01	6,13E-01	0,00E+00	-3,66E-02
RE	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	0,00E+00
PENRT	MJ	1,93E+00	5,80E-01	5,08E-02	7,87E-01	0,00E+00	0,00E+00	3,31E-01	6,13E-01	0,00E+00	-3,66E-02
SM	kg	0,00E+00	0,00E+00	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,23E-01	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	4,18E-07
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	0,00E+00
FW	m <sup>3</sup>	4,28E-03	8,71E-05	2,85E-03	2,01E-04	0,00E+00	0,00E+00	6,39E-05	1,76E-02	0,00E+00	-5,45E-06

**ENVIRONMENTAL INFORMATION DESCRIBING WASTE AND OUTPUT FLOWS: 1 kg Knauf Super Finish**

Life Cycle Stage											
Indicator	Unit (expressed per DU)	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	WN	WN	3,23E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste	kg	WN	WN	4,00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Components for re-use	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	WN	WN	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,23E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	WN	WN	6,10E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ/energy carrier	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,18E-07

**CARBON ORGANIC**

**Contents organic carbon in product (kg C<sub>org</sub>)**

**1,46E-03**

**Contents organic carbon in packaging (kg C<sub>org</sub>)**

**6,80E-07**

CORE ENVIRONMENTAL IMPACT INDICATORS: 1 kg Knauf Pro Spray All Purpose											
Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> eq.	9,74E-02	2,76E-02	3,56E-03	5,12E-02	0,00E+00	0,00E+00	2,11E-02	4,06E-02	0,00E+00	-2,46E-03
GWP-fossil	kg CO <sub>2</sub> eq.	1,04E-01	2,75E-02	3,54E-03	5,11E-02	0,00E+00	0,00E+00	2,11E-02	4,05E-02	0,00E+00	-2,45E-03
GWP-biogenic	kg CO <sub>2</sub> eq.	-6,81E-03	1,94E-05	1,43E-05	5,20E-05	0,00E+00	0,00E+00	1,92E-05	8,99E-05	0,00E+00	-7,45E-06
GWP-luluc	kg CO <sub>2</sub> eq.	1,72E-04	1,35E-05	8,42E-07	3,05E-05	0,00E+00	0,00E+00	9,96E-06	6,82E-06	0,00E+00	-2,44E-07
ODP	kg CFC11 eq.	1,12E-08	6,15E-09	4,68E-11	1,12E-08	0,00E+00	0,00E+00	4,75E-09	4,52E-09	0,00E+00	-5,03E-10
AP	mol H+ eq.	5,41E-04	2,28E-04	2,58E-05	1,47E-04	0,00E+00	0,00E+00	5,97E-05	3,55E-04	0,00E+00	-2,49E-05
EP-freshwater	kg PO <sub>4</sub> eq.	5,05E-05	1,75E-06	4,40E-06	4,75E-06	0,00E+00	0,00E+00	1,59E-06	2,62E-05	0,00E+00	-1,13E-07
EP-marine	kg N eq.	1,03E-04	5,32E-05	3,64E-06	2,72E-05	0,00E+00	0,00E+00	1,17E-05	1,13E-04	0,00E+00	-1,08E-05
EP-terrestrial	mol N eq.	1,06E-03	5,88E-04	3,14E-05	2,95E-04	0,00E+00	0,00E+00	1,27E-04	1,18E-03	0,00E+00	-1,18E-04
POCP	kg NMVOC eq.	3,59E-04	1,70E-04	8,80E-06	1,14E-04	0,00E+00	0,00E+00	4,87E-05	3,27E-04	0,00E+00	-3,29E-05
ADP-minerals & metals	kg Sb eq.	1,12E-06	9,76E-08	1,13E-08	3,17E-07	0,00E+00	0,00E+00	9,65E-08	1,95E-08	0,00E+00	-1,26E-09
ADP-fossil	MJ	2,60E+00	4,04E-01	3,87E-02	7,61E-01	0,00E+00	0,00E+00	3,15E-01	4,99E-01	0,00E+00	-3,30E-02
WDP	WDP (m <sup>3</sup> ) świat. ekw	8,96E-02	1,19E-03	4,87E-04	2,95E-03	0,00E+00	0,00E+00	1,05E-03	3,23E-03	0,00E+00	-5,20E-05
ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS: 1 kg Knauf Pro Spray All Purpose											
Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidency	2,16E-08	1,87E-09	4,16E-11	2,95E-09	0,00E+00	0,00E+00	1,44E-09	5,77E-09	0,00E+00	-6,56E-10
IRP	kBq U235 eq.	2,52E-02	2,07E-03	1,01E-04	4,24E-03	0,00E+00	0,00E+00	1,68E-03	1,82E-03	0,00E+00	-1,46E-04
ETP-fw	CTUe	5,05E-05	1,75E-06	4,40E-06	4,75E-06	0,00E+00	0,00E+00	1,59E-06	2,62E-05	0,00E+00	-1,13E-07
HTP-c	CTUh	5,51E-11	1,23E-11	1,29E-12	2,78E-11	0,00E+00	0,00E+00	9,30E-12	1,26E-11	0,00E+00	-7,74E-13
HTP-nc	CTUh	1,75E-09	2,97E-10	5,66E-11	6,33E-10	0,00E+00	0,00E+00	2,49E-10	4,15E-10	0,00E+00	-2,18E-11
SQP	-	7,63E-01	2,32E-01	7,39E-03	3,71E-01	0,00E+00	0,00E+00	1,87E-01	7,68E-02	0,00E+00	-4,32E-03
PARAMETERS DESCRIBING RESOURCE: 1 kg Knauf Pro Spray All Purpose											
Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	3,17E-01	5,73E-03	2,91E-03	1,62E-02	0,00E+00	0,00E+00	5,35E-03	1,82E-02	0,00E+00	-2,05E-04
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	3,17E-01	5,73E-03	2,91E-03	1,62E-02	0,00E+00	0,00E+00	5,35E-03	1,82E-02	0,00E+00	-2,05E-04
PEN-RE	MJ	2,43E+00	4,21E-01	5,08E-02	7,88E-01	0,00E+00	0,00E+00	3,28E-01	5,82E-01	0,00E+00	-3,48E-02
RE	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	0,00E+00
PENRT	MJ	2,43E+00	4,21E-01	5,08E-02	7,88E-01	0,00E+00	0,00E+00	3,28E-01	5,82E-01	0,00E+00	-3,48E-02
SM	kg	0,00E+00	0,00E+00	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,87E-01	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	4,18E-07
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	0,00E+00
FW	m <sup>3</sup>	4,50E-03	6,22E-05	2,85E-03	2,01E-04	0,00E+00	0,00E+00	6,32E-05	1,67E-02	0,00E+00	-5,18E-06
ENVIRONMENTAL INFORMATION DESCRIBING WASTE AND OUTPUT FLOWS: 1 kg Knauf Pro Spray All Purpose											
Life Cycle Stage											
Indicator	Unit (expressed per DU)	A1	A2	A3	A4	A5	C1	C2	C3	C4	D

Hazardous waste	kg	WN	WN	3,23E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste	kg	WN	WN	4,00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Components for re-use	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	WN	WN	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,87E-01	0,00E+00
Materials for energy recovery	kg	WN	WN	6,10E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ/energy carrier	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,18E-07

**CARBON ORGANIC**

**Contents organic carbon in product (kg C<sub>org</sub>)** **2,26E-03**

**Contents organic carbon in packaging (kg C<sub>org</sub>)** **6,80E-07**

<b>CORE ENVIRONMENTAL IMPACT INDICATORS: 1 kg Knauf Roll&amp;Spray Max</b>											
Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> eq.	1,21E-01	1,74E-01	3,56E-03	5,13E-02	0,00E+00	0,00E+00	1,98E-02	3,91E-02	0,00E+00	-2,37E-03
GWP-fossil	kg CO <sub>2</sub> eq.	1,23E-01	1,73E-01	3,54E-03	5,12E-02	0,00E+00	0,00E+00	1,97E-02	3,90E-02	0,00E+00	-2,37E-03
GWP-biogenic	kg CO <sub>2</sub> eq.	-1,24E-03	1,63E-04	1,43E-05	5,21E-05	0,00E+00	0,00E+00	1,80E-05	8,66E-05	0,00E+00	-7,18E-06
GWP-luluc	kg CO <sub>2</sub> eq.	1,15E-04	9,28E-05	8,42E-07	3,06E-05	0,00E+00	0,00E+00	9,33E-06	6,58E-06	0,00E+00	-2,35E-07
ODP	kg CFC11 eq.	1,61E-08	3,85E-08	4,68E-11	1,12E-08	0,00E+00	0,00E+00	4,45E-09	4,36E-09	0,00E+00	-4,85E-10
AP	mol H+ eq.	6,62E-04	6,02E-04	2,58E-05	1,47E-04	0,00E+00	0,00E+00	5,59E-05	3,43E-04	0,00E+00	-2,40E-05
EP-freshwater	kg PO <sub>4</sub> eq.	4,81E-05	1,43E-05	4,40E-06	4,76E-06	0,00E+00	0,00E+00	1,49E-06	2,52E-05	0,00E+00	-1,09E-07
EP-marine	kg N eq.	1,19E-04	1,21E-04	3,64E-06	2,73E-05	0,00E+00	0,00E+00	1,09E-05	1,09E-04	0,00E+00	-1,04E-05
EP-terrestrial	mol N eq.	1,28E-03	1,33E-03	3,14E-05	2,96E-04	0,00E+00	0,00E+00	1,19E-04	1,14E-03	0,00E+00	-1,14E-04
POCP	kg NMVOC eq.	4,42E-04	4,71E-04	8,80E-06	1,15E-04	0,00E+00	0,00E+00	4,56E-05	3,15E-04	0,00E+00	-3,17E-05
ADP-minerals & metals	kg Sb eq.	2,63E-06	9,09E-07	1,13E-08	3,18E-07	0,00E+00	0,00E+00	9,04E-08	1,88E-08	0,00E+00	-1,22E-09
ADP-fossil	MJ	2,38E+00	2,59E+00	3,87E-02	7,63E-01	0,00E+00	0,00E+00	2,96E-01	4,81E-01	0,00E+00	-3,18E-02
WDP	WDP (m <sup>3</sup> ) świat. ekw	7,51E-02	9,19E-03	4,87E-04	2,95E-03	0,00E+00	0,00E+00	9,80E-04	3,11E-03	0,00E+00	-5,01E-05
<b>ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS: 1 kg Knauf Roll&amp;Spray Max</b>											
Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	1,62E-08	1,11E-08	4,16E-11	2,95E-09	0,00E+00	0,00E+00	1,35E-09	5,56E-09	0,00E+00	-6,33E-10
IRP	kBq U235 eq.	2,14E-02	1,40E-02	1,01E-04	4,25E-03	0,00E+00	0,00E+00	1,57E-03	1,75E-03	0,00E+00	-1,41E-04

ETP-fw	CTUe	4,81E-05	1,43E-05	4,40E-06	4,76E-06	0,00E+00	0,00E+00	1,49E-06	2,52E-05	0,00E+00	-1,09E-07
HTP-c	CTUh	9,33E-11	8,52E-11	1,29E-12	2,78E-11	0,00E+00	0,00E+00	8,71E-12	1,21E-11	0,00E+00	-7,46E-13
HTP-nc	CTUh	3,07E-09	2,09E-09	5,66E-11	6,35E-10	0,00E+00	0,00E+00	2,33E-10	4,00E-10	0,00E+00	-2,10E-11
SQP	-	7,68E-01	1,41E+00	7,39E-03	3,72E-01	0,00E+00	0,00E+00	1,75E-01	7,41E-02	0,00E+00	-4,17E-03

**PARAMETERS DESCRIBING RESOURCE: 1 kg Knauf Roll&Spray Max**

Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2,53E-01	4,84E-02	2,91E-03	1,62E-02	0,00E+00	0,00E+00	5,01E-03	1,75E-02	0,00E+00	-1,97E-04
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,53E-01	4,84E-02	2,91E-03	1,62E-02	0,00E+00	0,00E+00	5,01E-03	1,75E-02	0,00E+00	-1,97E-04
PEN-RE	MJ	5,27E-01	2,25E-01	4,72E-02	7,90E-01	0,00E+00	0,00E+00	3,07E-01	5,62E-01	0,00E+00	-3,36E-02
RE	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	0,00E+00
PENRT	MJ	5,27E-01	2,25E-01	4,72E-02	7,90E-01	0,00E+00	0,00E+00	3,07E-01	5,62E-01	0,00E+00	-3,36E-02
SM	kg	0,00E+00	0,00E+00	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,62E-01	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	4,18E-07
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	0,00E+00
FW	m <sup>3</sup>	3,65E-03	5,83E-04	2,85E-03	2,02E-04	0,00E+00	0,00E+00	5,92E-05	1,61E-02	0,00E+00	-5,00E-06

**ENVIRONMENTAL INFORMATION DESCRIBING WASTE AND OUTPUT FLOWS: 1 kg Knauf Roll&Spray Max**

Life Cycle Stage											
Indicator	Unit (expressed per DU)	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	WN	WN	3,23E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste	kg	WN	WN	4,00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Components for re-use	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	WN	WN	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,62E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	WN	WN	6,10E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ/energy carrier	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,18E-07

**CARBON ORGANIC**

**Contents organic carbon in product (kg C<sub>org</sub>)** **1,35E-03**

**Contents organic carbon in packaging (kg C<sub>org</sub>)** **6,80E-07**



Non-hazardous waste	kg	WN	WN	4,00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Components for re-use	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	WN	WN	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,98E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	WN	WN	6,10E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ/energy carrier	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,18E-07

### CARBON ORGANIC

Contents organic carbon in product (kg C <sub>org</sub> )	1,42E-03
Contents organic carbon in packaging (kg C <sub>org</sub> )	6,80E-07

### CORE ENVIRONMENTAL IMPACT INDICATORS: 1 kg Knauf Rotband Finish

Indicator	Unit	Life Cycle Stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> eq.	1,04E-01	2,31E-02	3,56E-03	5,11E-02	0,00E+00	0,00E+00	2,13E-02	4,12E-02	0,00E+00	-2,50E-03
GWP-fossil	kg CO <sub>2</sub> eq.	1,06E-01	2,31E-02	3,54E-03	5,10E-02	0,00E+00	0,00E+00	2,13E-02	4,11E-02	0,00E+00	-2,49E-03
GWP-biogenic	kg CO <sub>2</sub> eq.	-2,13E-03	2,05E-05	1,43E-05	5,19E-05	0,00E+00	0,00E+00	1,94E-05	9,13E-05	0,00E+00	-7,57E-06
GWP-luluc	kg CO <sub>2</sub> eq.	9,23E-05	9,99E-06	8,42E-07	3,05E-05	0,00E+00	0,00E+00	1,01E-05	6,93E-06	0,00E+00	-2,48E-07
ODP	kg CFC11 eq.	5,99E-09	5,29E-09	4,68E-11	1,11E-08	0,00E+00	0,00E+00	4,81E-09	4,59E-09	0,00E+00	-5,11E-10
AP	mol H <sup>+</sup> eq.	4,33E-04	6,56E-05	2,58E-05	1,47E-04	0,00E+00	0,00E+00	6,04E-05	3,61E-04	0,00E+00	-2,53E-05
EP-freshwater	kg PO <sub>4</sub> eq.	3,98E-05	1,62E-06	4,40E-06	4,74E-06	0,00E+00	0,00E+00	1,61E-06	2,66E-05	0,00E+00	-1,14E-07
EP-marine	kg N eq.	8,10E-05	1,31E-05	3,64E-06	2,71E-05	0,00E+00	0,00E+00	1,18E-05	1,15E-04	0,00E+00	-1,10E-05
EP-terrestrial	mol N eq.	8,17E-04	1,43E-04	3,14E-05	2,95E-04	0,00E+00	0,00E+00	1,28E-04	1,20E-03	0,00E+00	-1,20E-04
POCP	kg NMVOC eq.	2,75E-04	5,50E-05	8,80E-06	1,14E-04	0,00E+00	0,00E+00	4,92E-05	3,32E-04	0,00E+00	-3,34E-05
ADP-minerals & metals	kg Sb eq.	5,30E-07	9,23E-08	1,13E-08	3,17E-07	0,00E+00	0,00E+00	9,76E-08	1,98E-08	0,00E+00	-1,28E-09
ADP-fossil	MJ	2,15E+00	3,49E-01	3,87E-02	7,60E-01	0,00E+00	0,00E+00	3,19E-01	5,06E-01	0,00E+00	-3,35E-02
WDP	WDP (m <sup>3</sup> ) świat. ekw.	6,13E-02	1,11E-03	4,87E-04	2,94E-03	0,00E+00	0,00E+00	1,06E-03	3,28E-03	0,00E+00	-5,28E-05

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS: 1 kg Knauf Rotband Finish

Indicator	Unit	Life Cycle Stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	2,25E-08	1,76E-09	4,16E-11	2,94E-09	0,00E+00	0,00E+00	1,46E-09	5,86E-09	0,00E+00	-6,67E-10
IRP	kBq U235 eq.	2,03E-02	1,82E-03	1,01E-04	4,23E-03	0,00E+00	0,00E+00	1,70E-03	1,85E-03	0,00E+00	-1,48E-04
ETP-fw	CTUe	3,98E-05	1,62E-06	4,40E-06	4,74E-06	0,00E+00	0,00E+00	1,61E-06	2,66E-05	0,00E+00	-1,14E-07
HTP-c	CTUh	3,94E-11	9,45E-12	1,29E-12	2,77E-11	0,00E+00	0,00E+00	9,40E-12	1,28E-11	0,00E+00	-7,86E-13

HTP-nc	CTUh	1,10E-09	2,78E-10	5,66E-11	6,32E-10	0,00E+00	0,00E+00	2,52E-10	4,22E-10	0,00E+00	-2,21E-11
SQP	-	5,88E-01	2,30E-01	7,39E-03	3,70E-01	0,00E+00	0,00E+00	1,89E-01	7,80E-02	0,00E+00	-4,39E-03

**PARAMETERS DESCRIBING RESOURCE: 1 kg Knauf Rotband Finish**

Life Cycle Stage											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2,28E-01	5,40E-03	2,91E-03	1,61E-02	0,00E+00	0,00E+00	5,41E-03	1,85E-02	0,00E+00	-2,08E-04
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,28E-01	5,40E-03	2,91E-03	1,61E-02	0,00E+00	0,00E+00	5,41E-03	1,85E-02	0,00E+00	-2,08E-04
PEN-RE	MJ	1,98E+00	3,62E-01	5,08E-02	7,87E-01	0,00E+00	0,00E+00	3,31E-01	5,92E-01	0,00E+00	-3,54E-02
RE	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	0,00E+00
PENRT	MJ	1,98E+00	3,62E-01	5,08E-02	7,87E-01	0,00E+00	0,00E+00	3,31E-01	5,92E-01	0,00E+00	-3,54E-02
SM	kg	0,00E+00	0,00E+00	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,98E-01	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	4,18E-07
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	0,00E+00
FW	m <sup>3</sup>	3,73E-03	6,17E-05	2,85E-03	2,01E-04	0,00E+00	0,00E+00	6,39E-05	1,70E-02	0,00E+00	-5,27E-06

**ENVIRONMENTAL INFORMATION DESCRIBING WASTE AND OUTPUT FLOWS: 1 kg Knauf Rotband Finish**

Life Cycle Stage											
Indicator	Unit (expressed per DU)	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	WN	WN	3,23E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste	kg	WN	WN	4,00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Components for re-use	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	WN	WN	1,34E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,98E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	WN	WN	6,10E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ/energy carrier	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,18E-07

**CARBON ORGANIC**

**Contents organic carbon in product (kg C<sub>org</sub>)**

**1,42E-03**

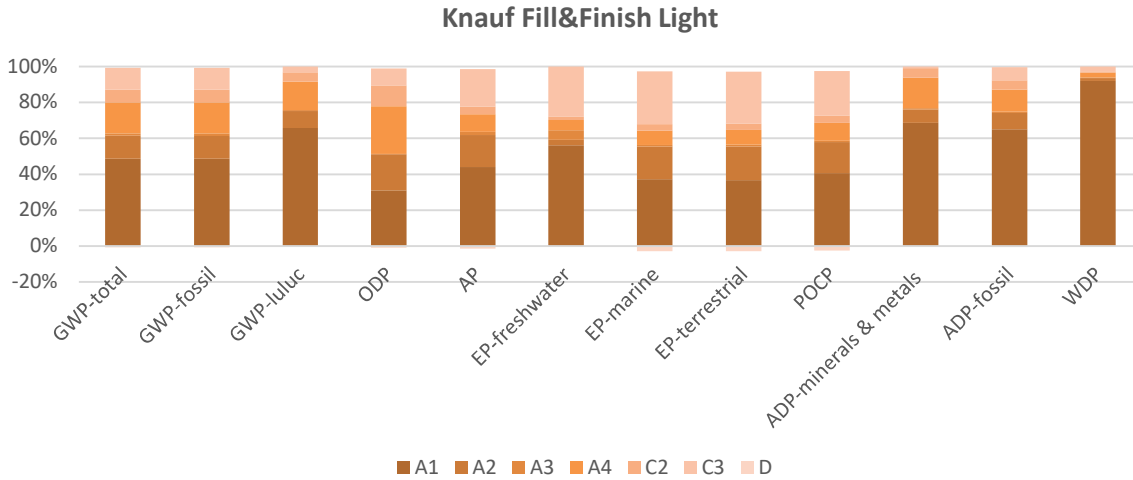
**Contents organic carbon in packaging (kg C<sub>org</sub>)**

**6,80E-07**

**6. INTERPRETATION OF LCA**

Figures 2, 3, 4, 5, 6 and 7 show contributions of the each life cycl module to the basic impact categories for joint compound [Knauf Fill&Finish Light](#), [Knauf Super Finish](#), [Knauf ProSpray All Purpose](#), [Knauf Roll&Spray Max](#), [Knauf Goldband Finish](#), [Knauf Rotband Finish](#).

*Fig. 2 Shares of life cycle modules on main categories of influence - Fill&Finish Light.*



*Fig. 3 Shares of life cycle modules on main categories of influence -Super Finish.*

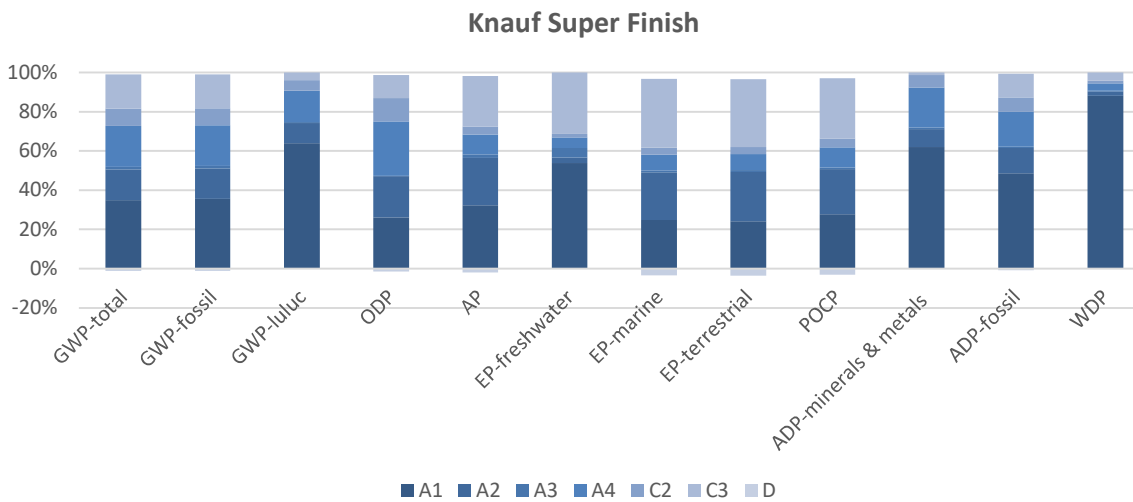


Fig. 4 Shares of life cycle modules on main categories of influence - Pro Spray All Purpose.

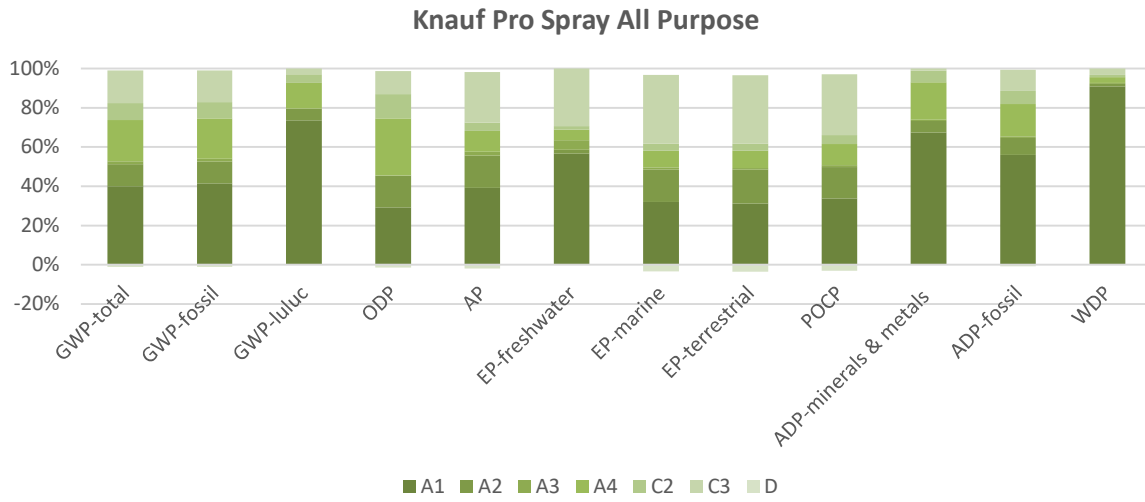


Fig. 5 Shares of life cycle modules on main categories of influence - Roll&Spray Max.

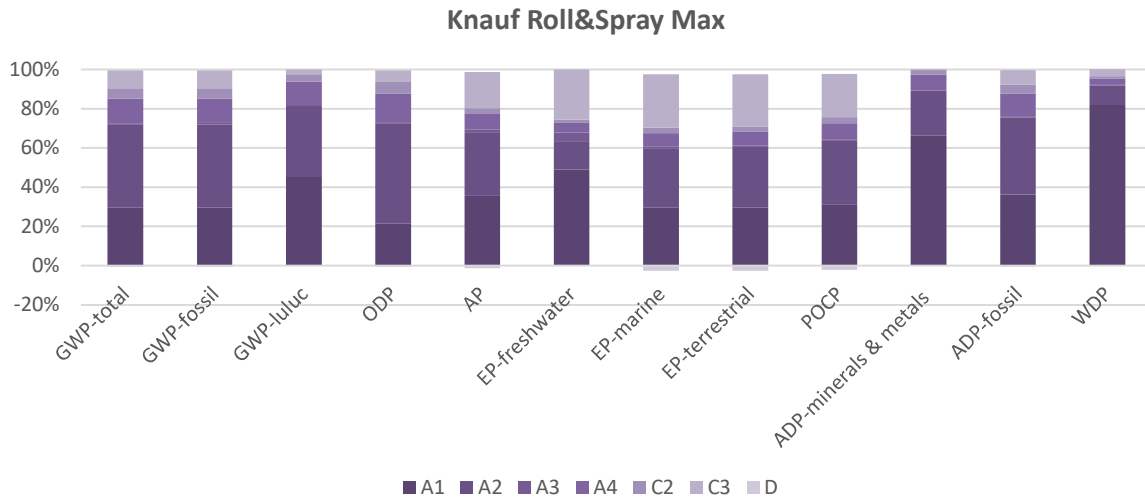


Fig. 6 Shares of life cycle modules on main categories of influence - Goldband Finish.

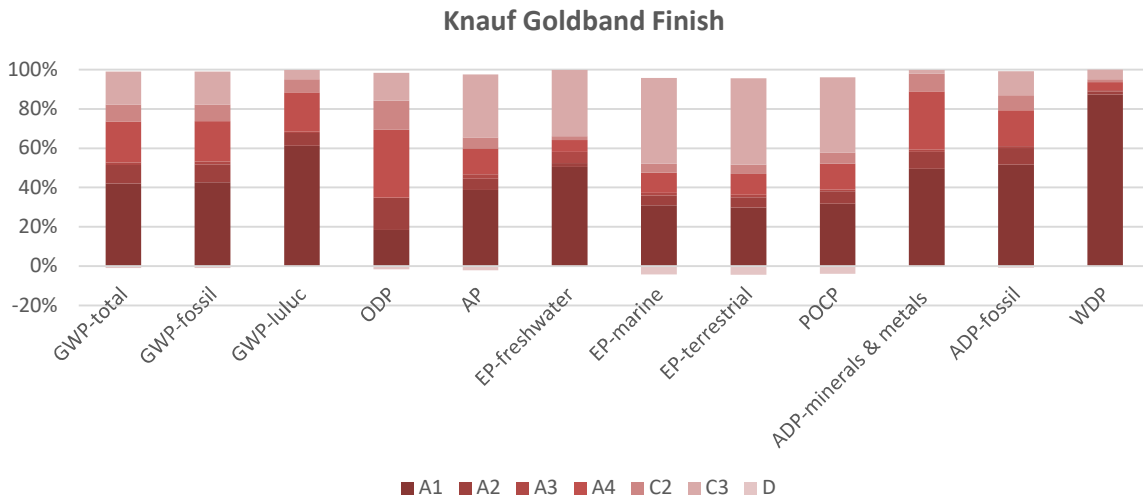
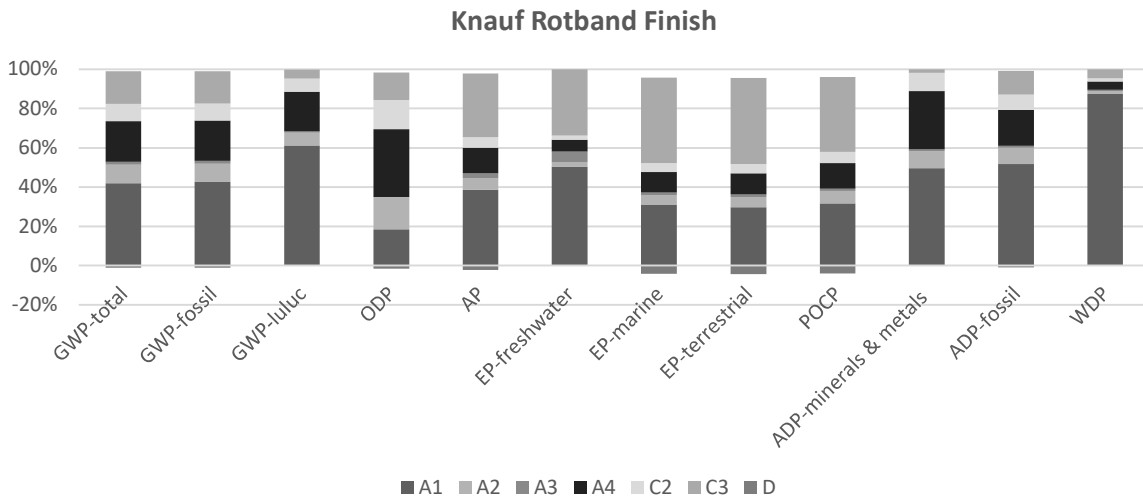


Fig. 7 Shares of life cycle modules on main categories of influence - Rotband Finish.



- ◆ The LCA analysis proved that the processes related to the acquisition of raw materials and semi-finished products (A1) have the greatest impact on the value of environmental impact indicators, however, the distribution between the modules of the production stage (A1-A3) is relatively homogeneous. Partial processes related to the acquisition of raw materials and energy affect the individual categories of impact to a different extent.
- ◆ Transport to the waste treatment site (module C2) has relatively minor impact on the final values of the LCIA analysis.
- ◆ The waste processing process (construction rubble containing the products covered by the declaration) also does not significantly affect the final result.
- ◆ Taking into account the above conclusions, the owner of the declaration has a moderate influence on the values of the environmental impact indicators, because it depends on external entities. It can only try to change suppliers to ones that are closer to the production plant and reduce consumption at the level of the production process.

#### **LITERATURE**

- ✓ PN-EN ISO 14025:2014-04, Environmental labels and declarations – Type III environmental declarations – Rules and procedures.
- ✓ PN-EN 15804+A2:2020, Sustainability of construction works – Environmental product declarations – Basic rules for categorizing construction products.
- ✓ PN-EN ISO 14040:2009 Environmental management. Life Cycle Assessment. Principles and structure.
- ✓ PN-EN ISO 14044:2009, Environmental management. Life Cycle Assessment. Requirements and guidelines.
- ✓ EN 15942:2012, Sustainability of construction works – Environmental product declarations – Communication format business-to-business.
- ✓ Explanatory materials can be found on the manufacturers website: **[www.knauf.pl](http://www.knauf.pl)**



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**PROCESS ENGINEERING RESEARCH GROUP**

## TYPE III ENVIRONMENTAL DECLARATION CERTIFICATE

**no. 02-09/2023**

**Products:**

**Joint compound**

**Owner:**

**Knauf**

**25 Światowa Str.  
02-229 Warszawa**

The declaration was developed in accordance with the requirements of the standard:

**PN-EN 15804+A2: 2020-03**

Sustainability of construction works  
Environmental product declarations  
Core rules for the product category of construction products

The declaration was verified in accordance with the requirements of the standard:

**PN-EN ISO 14025:2010**

Environmental labels and declarations  
Type III environmental declarations. Principles and procedures

The certificate was issued for the first time on **September, 25 2023** and is valid for 5 years or until the said EPD is amended.

**Process Engineering  
Research Group Leader**

*Ewa Głodek-Bucyk*

Ewa Głodek-Bucyk, PhD Eng.



**Director of  
Center Of Environmental  
Engineering**

*Joanna Poluszyńska*

Joanna Poluszyńska, PhD

**Opole, September 2023**