

ENVIRONMENTAL PRODUCT DECLARATION
no. 01-12/2024

Lamella mat
r.Flow[®] A
r.Flow[®] AG



Declaration owner:	Rohhe Sp. z o.o.
Program owner:	Lukasiewicz Research Network – Institute of Ceramic and Building Material Environmental Engineering Center
Name of program:	Environmental Product Declaration – B2B
Date of issue:	03.12.2024
Declaration valid until:	03.12.2029









**ENVIRONMENTAL
PRODUCT
DECLARATION
no. 01-12/2024**



1. OVERVIEW

Product of declaration:	Lamella mat: <ul style="list-style-type: none">• r.Flow® A,• r.Flow® AG
Program owner: Łukasiewicz Research Network – Institute of Ceramics and Building Materials Environmental Engineering Center in Opole. http://www.icimb.pl/opole/	Declaration owner: Rohhe Sp. z o.o. Al. Krakowska 19A, 05-555 Tarczyn Telephone: +48 22 299 88 33 Address e-mail: biuro@rohhe.pl https://www.rohhe.pl/
Declared unit:	1 m ²
Date of issue:	03.12.2024
Declaration valid until:	03.12.2029
Life Cycle Analysis (LCA):	A1-A3, A4, A5, C1-C4 and D according to standard PN-EN 15804+A2 (cradle-to-gate with options)
Product Categorization (PCR) Rules	PN-EN 15804+A2:2020-03 Sustainability of construction works. Environmental Product Declarations. Basic principles of categorization of construction products, ICIMB-PCR A
Representatives:	Polish product, year 2023
Declared durability:	50 years
Reasons for performing LCA:	B2B
Standardy produktu	PN-EN 14303:2009+A1:2013
Declarations that are the result of different programs or are not performed in accordance with the standard may not be comparable.	
The Łukasiewicz – Institute of Ceramics and Building Materials Environmental Engineering Center provides access to the Type III environmental declaration for lamella mat r. Flow® A i r.Flow® AG to interested parties.	
The declaration owner is responsible for the information and the base evidence. Łukasiewicz Research Network - Institute of Ceramics and Building Materials Center for Environmental Engineering is not responsible for the manufacturer's information and data and evidence regarding the life cycle assessment.	
Authors' team: Katarzyna Kiprian, M.Sc. Ewa Głodek-Bucyk, Ph.D. Patrik Okoń, M.Sc. Approved:  Joanna Poluszyńska, PhD Director of the Environmental Engineering Center  Ewa Głodek-Bucyk, Ph.D. Leader of the Process Engineering Research Group	Review: CEN standard PN-EN 15804+A2 serves as the main PCR document. Independent verification of declarations and data according to EN ISO 14025:2010 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External   Katarzyna Grzesik, PhD, DSc

2. MANUFACTURE AND PRODUCT INFORMATION



Figure 1. The headquarters of Rohhe Sp. z o.o. in Tarczyn.

Rohhe Sp. z o.o. specializes in the production of technical thermal insulation, the purpose of which is thermal insulation of heating, ventilation, air conditioning, water, sewage systems, installed in all types of buildings. The company is active on the domestic and European markets. Rohhe products are currently offered in 18 countries.

The innovation and quality of Rohhe products has been appreciated by independent experts by awarding the "Teraz Polska" and "Lauru klienta" emblems for several years.

Rohhe is the only company on the HVAC thermal insulation market with 100% Polish capital. The company's headquarters, including office, production and warehouse parts, is in Tarczyn. Rohhe products have a CPR certificate for compliance with PN-EN 14303+A1:2013-07, as well as certificates applicable to the maritime market according to Directive 2014/90/EU on marine equipment (MED) and Commission Implementing Regulation (EU) 2023/1667.

The implemented Integrated Management System is the basis for the functioning of the entire organization. The system integrates three main components: FPC, ISO 14001 and ISO 9001. Rohhe takes special care to control and minimize the negative impact on the environment by applying effective preventive measures, optimizing the use of packaging and checking technological processes through systematic environmental measurements. Currently, all electricity consumed comes from renewable energy sources and production itself is zero-emission, i.e. it does not generate any technological wastewater, solid hazardous waste or gases resulting from combustion.

PRODUCT DESCRIPTION AND APPLICATION

r.Flow® A

Lamella mat made of mineral wool with lining. The mat has a lamella arrangement of mineral wool fibers, thanks to which the thickness of the insulation remains unchanged over the entire surface. This is especially important in corners and folds of insulated elements. Thanks to its structure, the mat is resistant to compression, maintaining excellent flexibility and resilience.

Purpose: as thermal and acoustic insulation and fire protection. ventilation equipment and installations, air conditioning, heating, cooling and technical equipment in residential, hotel, office, industrial, sports, healthcare and food processing facilities, as well as pipelines, tanks, technical equipment and cylindrical surfaces.

Cladding: aluminum foil reinforced with fiberglass mesh

Product thickness: 12 – 100 mm

Reaction to fire class: **A1**

Maximum application temperature: 250 °C

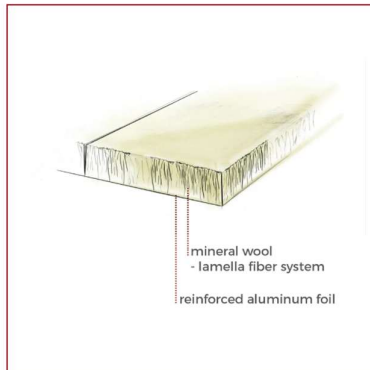
Trace amounts of water-soluble ions CL10 ≤ 10 ppm (10 mg/1 kg)



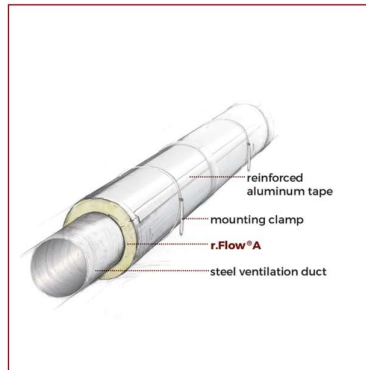
Table 1 – The value of declared thermal conductivity – λ_D

t_{sr} [°C]	10	40	50	150	250
λ_D [W/m·K]	0,038	0,044	0,047	0,072	0,112

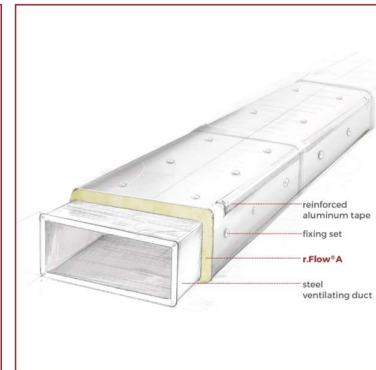
Product structure



Round ventilation duct



Rectangular ventilation duct



r.Flow® AG



Self-adhesive mineral wool lamella mat with cladding. It has a layer of evergreen glue applied to mineral wool and protected with foil. The adhesive used makes the mat permanently and firmly adhere to the insulated elements. The mat has a lamella arrangement of mineral wool fibers, thanks to which the thickness of the insulation remains unchanged over the entire surface. This is especially important in corners and folds of insulated elements. Thanks to its structure, the mat is resistant to compression, maintaining excellent flexibility and resilience.

Purpose: thermal, acoustic and fire insulation of ventilation, air conditioning, heating, cooling and technical equipment and installations in residential, hotel, office, industrial, sports, health care and food processing facilities as well as pipelines, tanks, technical equipment and cylindrical surfaces.

Cladding: aluminum foil reinforced with fiberglass mesh
Product thickness: 12 – 100 mm

Fire reaction class: **A2-s1, d0**

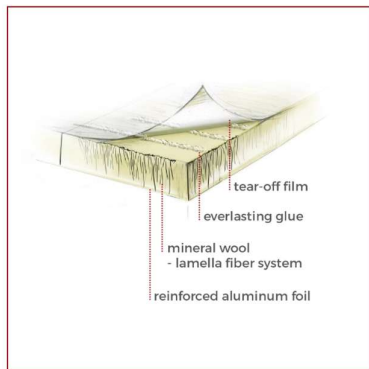
Maximum application temperature: 50 °C

Trace amounts of water-soluble ions CL10 ≤ 10 ppm (10 mg/1 kg)

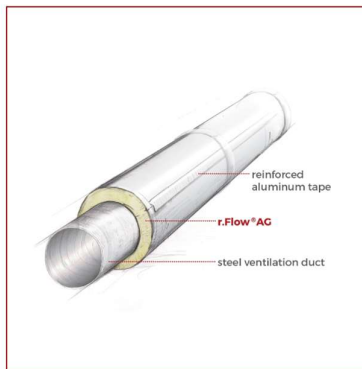
Table 2 – The value of declared thermal conductivity - λ_D

t_{sr} [°C]	10	40	50
λ_D [W/m·K]	0,038	0,044	0,047

Product structure



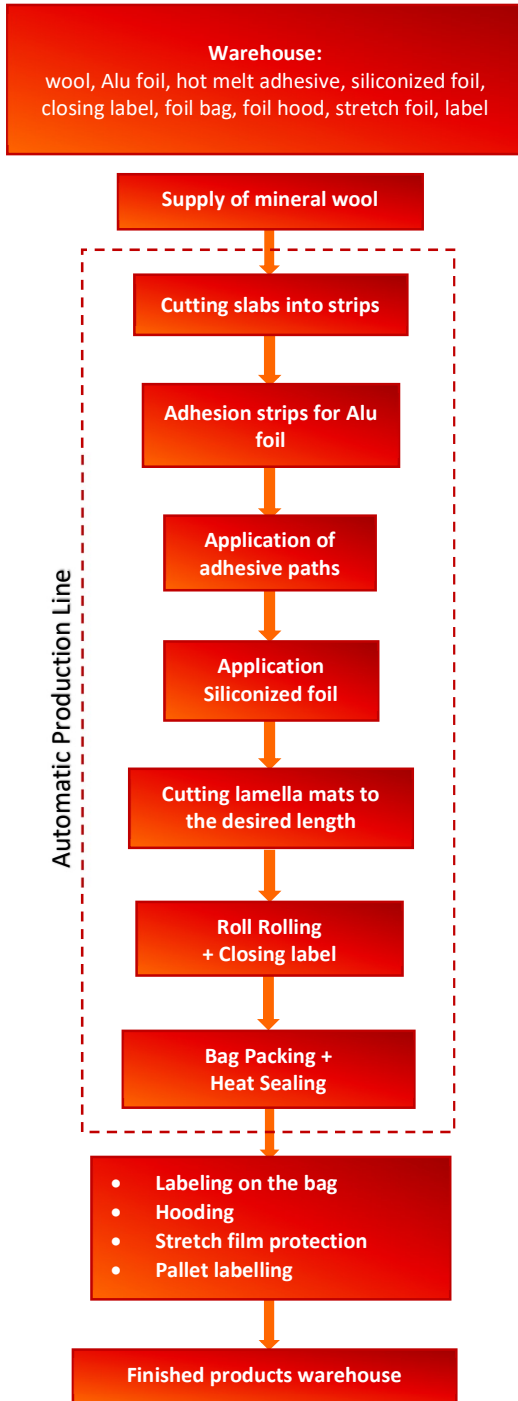
Round ventilation duct



Rectangular ventilation duct



r.Flow® AG



r.Flow® A

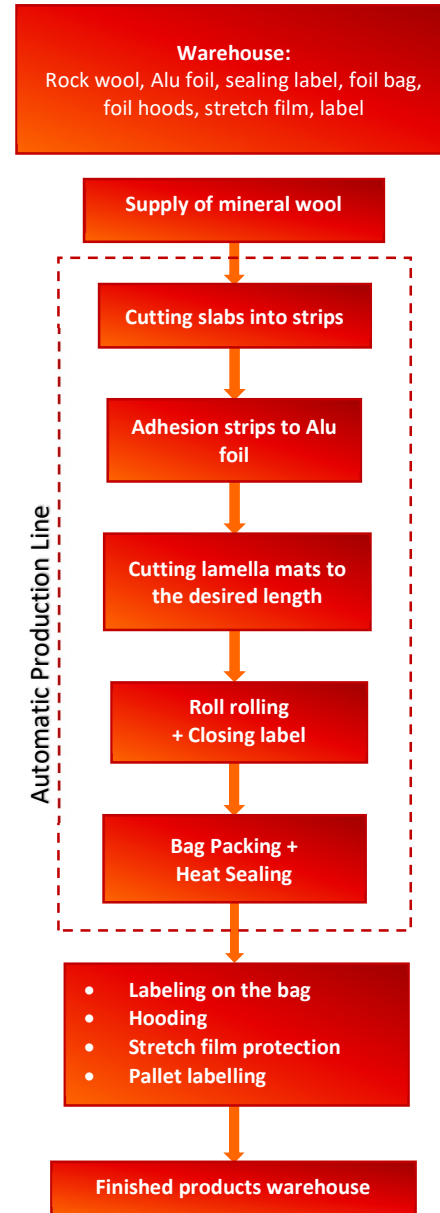


Figure 2. The production process of lamella mats in the plant of Rohhe Sp. z o.o.

3. BASIC DATA

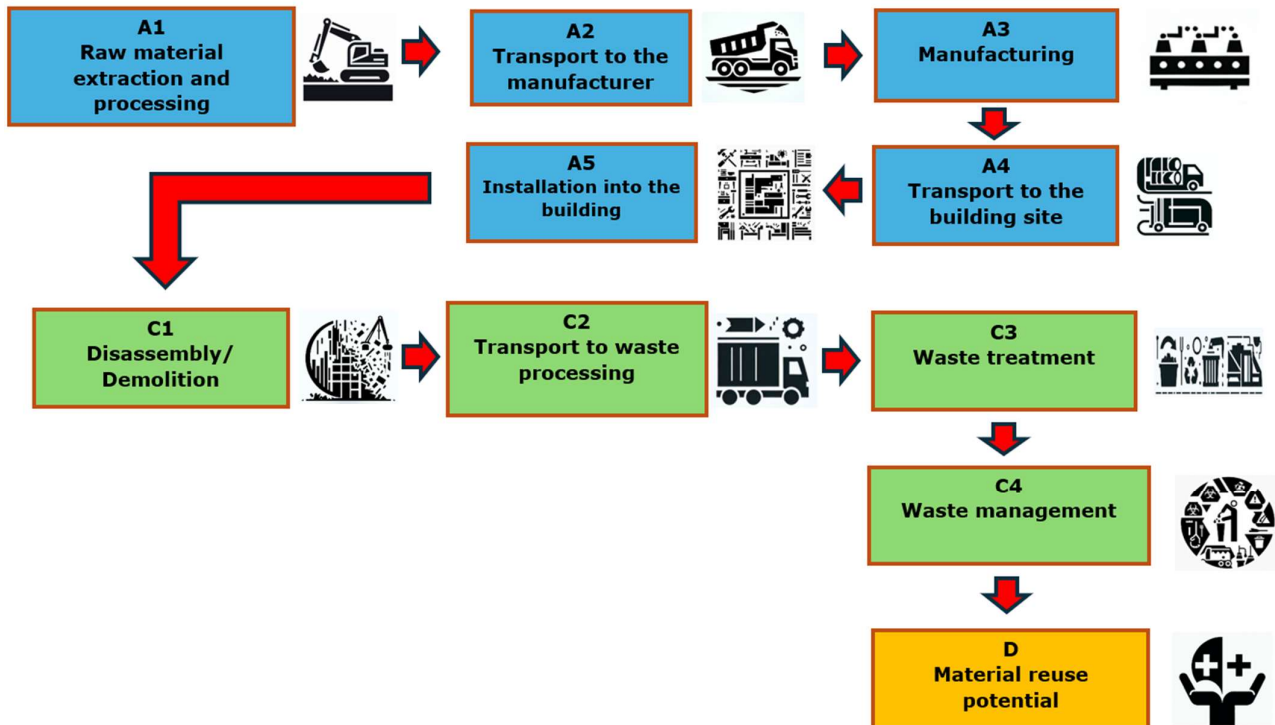
The environmental declaration is based on data provided by Rohhe Sp. z o.o. The products covered by the declaration are manufactured in one production plant. The values of the input and output streams have been calculated on the basis of the data provided by the manufacturer for the individual lamella mats (r.Flow® A and r.Flow® AG) with a thickness of 30 mm from 01.01.2023 to 31.12.2023. They were delivered to the program owner in a summary form.

The consumption of raw materials, energy and emissions are given for individual types of lamella mats. The allocation was made on the basis of data provided by the manufacturer.

4. LCA: CALCULATION AND RULES

System limitations

The life cycle analysis of the tested products includes modules A1-A3, A4, A5C1-C4 and D (Cradle to Gate with options) in accordance with EN 15804.



Data collection period

Data on the production process were provided in 2024 for the period 01.01.2023 - 31.12.2023 (12 months) and correspond to the production technology of the time.

Declared unit

1 m²

Assumptions

A1 – extraction and consumption of raw materials refer to specific mass shares in the production process, per unit declared 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 delivery of raw materials,

A3 – CO₂, NO_x, SO₂ and particulate matter emissions from production process received from the manufacturer.

A4 – transport of lamella mats to the construction site is carried out according to a developed scenario. It assumes the method of transport and the distance over which the materials are transported.

A5 – the installation of lamella mats is carried out according to a developed scenario. It determines the consumption of energy and materials and the amount of waste generated as a result of the assembly process.

C1 – describes the procedure during the disassembly/demolition of lamella mats. The calculations are performed on the basis of the developed scenario.

C2 – refers to the transport of construction waste to a recovery or disposal plant. The calculations are performed on the basis of the developed scenario.

C3 – takes into account the environmental impact during the processing of construction and demolition waste containing elements of lamella mats in a waste recovery plant. The calculations are performed on the basis of the developed scenario.

C4 – takes into account the environmental impact of storage and recycling of lamella mat elements. The calculations are performed on the basis of the developed scenario.

D – refers to the impact and effects of the use of secondary material. The calculations are performed based on the developed scenario.

Cut-off-criteria

99% of all bulk streams involved in the production process were taken into account. All the energy used in the process was taken into account in the environmental declaration.

General data

The data for the calculations come from Ecoinvent v. 3.10, KOBiZE, and the Guarantee of Origin (GO) certificate. The emission factors for the electricity used in the scenarios were determined using the actual KOBiZE data. The Polish electricity emission factor (Ecoinvent supplemented with current national data from KOBiZE) is 0.685 kg CO₂/kWh. The electricity taken into account in production (A3) is modelled in accordance with the energy mix presented in the Guarantee of Origin (GO) certificate. The amount of electricity purchased from the GO covers 100% of the electricity consumption for production. A detailed analysis of data quality was part of an external audit.

Allocation

All data on components manufactured in the plant of Rohhe Sp. z o.o. have been provided by the manufacturer and have been referred to the declared unit of the product – **1 m²** (thickness 30 mm).

The allocation rules used in this EPD are based on the general ICIMB-PCR A principles.

5. LCA: SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

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.

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

Module A4 - Transport to the construction site - Transport is carried out using appropriately adapted vehicles, with a load capacity of 16-32 tonnes, meeting the EURO 6 emission standard; according to customer requirements or order specifics. The mats are carefully secured on the pallets with stretch film to prevent damage during transport. The average distance from the plant to the customer is 270 km. Transport with 100% load capacity was assumed for the calculations.

Module A5 – Assembly - The lamella mat is installed manually, which eliminates the need to use heavy equipment or power tools. As a result, emissions related to electricity or fuel consumption do not occur. Manual assembly makes this stage low-carbon, and the environmental impact is mainly focused on waste management and the use of auxiliary materials.

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

	Packaging waste:
Product	Stretch foil
Means of transportation	Truck
Load capacity (Mg)	32
Average distance from the recycling plant (km)	150

Module C1 - Demolition/Demolition – Manual demolition, and initial sorting of waste on site is assumed. Manual demolition is a process with a low environmental impact due to the lack of energy demand.

Module C2 – Transport – After initial segregation at the demolition site, waste is directed to further processes.

- Transport is carried out by trucks with a load capacity of 16-32 tons, meeting the EURO 6 emission standards,
- Transport to the recycling plant takes place at a distance of 150 km from the demolition site.
- Transport to the landfill takes place over a distance of 100 km.

Module C3 - Waste treatment - All waste goes to the waste treatment plant. Electricity consumption per 1 kg of waste is 0.03 kWh/kg, and energy consumption for internal transport vehicles is 0.3 MJ/kg.

Module C4 – Waste management – It has been assumed that 100% of waste separated in the treatment process will be landfilled (module C3).

Module D - Material reuse potential - the benefits of packaging waste processing are included.

6. LCA: RESULTS

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

DESCRIPTION OF SYSTEM BOUNDARIES (X – INCLUDED IN LCA, MND – UNDECLARED MODULE)																
Production stage			Construction phase		Stage of use							End of life stage				Benefits and flows beyond the system boundaries
Mining & Sourcing	Transport	Production	Transport	Construction Process	Usufruct	Maintenance	Repair	Exchange	Renovation	Energy consumption	Water consumption	Demolition	Transport	Waste Treatment	Waste management	Potential for reuse
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 products– **1 m² lamella mat r.Flow® A, and lamella mat r.Flow® AG** with a thickness of 30 mm.

Explanations of the abbreviations used to describe the impact category are provided below:

GWP-total	Global warming potential
GWP-fossil	Global warming potential fossil fuel
GWP-biogenic	Global warming potential biogenic
GWP-luluc	Global warming potential land use and land change
ODP	Depletion potential of the stratospheric ozone layer
AP	Acidification potential of land and water
EP-freshwater	Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine	Eutrophication potential, fraction of nutrients reaching marine end compartment
EP-terrestrial	Eutrophication potential, Accumulated Exceedance
POCP	Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals	Abiotic depletion potential for nonfossil resources
ADP-fossil	Abiotic depletion potential for fossil resources
WDP	Water (user) deprivation potential
PM	Potential incidence of disease due to PM emissions
IRP	Potential Human exposure efficiency relative to U235
ETP-fw	Potential comparative Toxic Unit for ecosystems
HTP-c	Potential comparative Toxic Unit for humans (cancerogenic)
HTP-nc	Potential comparative Toxic Unit for humans (non-cancerogenic)
SQP	Potential soil quality index

PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM	Use of renewable primary energy resources used as raw materials
PERT	Total use of renewable primary energy resources
PEN-RE	Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as raw materials
RE	Use of non-renewable primary energy resources used as raw materials
PENRT	Total use of non-renewable primary energy resources
SM	Use of secondary material
RSF	Use of renewable fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water

**MAIN IMPACT INDICATORS: 1 m² lamella mat r.Flow® A
thickness: 30 mm**

Indicator	Unit	Life cycle stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	1,50E+00	1,82E-01	1,37E-01	5,77E-02	9,68E-04	0,00E+00	2,14E-02	6,45E-02	6,26E-03	-9,82E-02
GWP-fossil	kg CO ₂ eq.	1,53E+00	1,81E-01	1,39E-01	5,76E-02	9,67E-04	0,00E+00	2,13E-02	6,32E-02	6,25E-03	-9,82E-02
GWP-biogenic	kg CO ₂ eq.	-3,43E-02	1,24E-04	-1,72E-03	3,99E-05	6,70E-07	0,00E+00	1,48E-05	1,25E-03	8,62E-07	-9,58E-06
GWP-luluc	kg CO ₂ eq.	6,19E-04	6,35E-05	1,10E-04	1,91E-05	3,21E-07	0,00E+00	7,08E-06	2,85E-05	3,22E-06	-1,18E-06
ODP	kg CFC11 eq.	2,49E-08	3,60E-09	4,13E-09	1,15E-09	1,92E-11	0,00E+00	4,24E-10	5,90E-10	1,81E-10	-6,59E-11
AP	mol H+ eq.	1,31E-02	3,74E-04	5,29E-04	1,20E-04	2,01E-06	0,00E+00	4,44E-05	4,51E-04	4,43E-05	-6,17E-05
EP-freshwater	kg PO ₄ eq.	4,31E-04	1,31E-05	3,82E-05	3,90E-06	6,55E-08	0,00E+00	1,45E-06	3,55E-05	5,19E-07	-3,75E-07
EP-marine	kg N eq.	1,40E-03	8,72E-05	1,04E-04	2,88E-05	4,84E-07	0,00E+00	1,07E-05	1,74E-04	1,69E-05	-2,07E-04
EP-terrestrial	mol N eq.	2,27E-02	9,41E-04	1,06E-03	3,11E-04	5,22E-06	0,00E+00	1,15E-04	1,84E-03	1,84E-04	-3,01E-04
POCP	kg NMVOC eq.	5,82E-03	6,12E-04	6,29E-04	1,99E-04	3,35E-06	0,00E+00	7,38E-05	5,44E-04	6,60E-05	-9,95E-05
ADP-minerals & metals	kg Sb eq.	3,03E-05	6,59E-07	1,67E-06	1,87E-07	3,15E-09	0,00E+00	6,94E-08	3,87E-08	9,77E-09	-8,67E-09
ADP-fossil	MJ	2,01E+01	2,54E+00	3,04E+00	8,10E-01	1,36E-02	0,00E+00	3,00E-01	7,64E-01	1,53E-01	-4,38E-02
WDP	WDP (m ³) świat. ekw	2,92E-01	1,07E-02	7,53E-02	3,36E-03	5,65E-05	0,00E+00	1,25E-03	2,35E-03	6,70E-03	3,88E-03

**ADDITIONAL IMPACT INDICATORS: 1 m² lamella mat r.Flow® A
thickness: 30 mm**

Indicator	Unit	Life cycle stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	7,49E-08	1,20E-08	5,12E-09	4,24E-09	7,12E-11	0,00E+00	1,57E-09	9,56E-09	1,01E-09	-4,74E-10
IRP	kBq U235 eq.	1,17E-01	3,82E-03	1,11E-02	1,05E-03	1,76E-05	0,00E+00	3,89E-04	4,38E-04	9,78E-05	-6,19E-05
ETP-fw	CTUe	2,68E-04	8,13E-06	2,38E-05	2,43E-06	4,08E-08	0,00E+00	8,99E-07	2,21E-05	3,23E-07	-2,34E-07
HTP-c	CTUh	3,03E-07	1,32E-09	4,81E-10	4,09E-10	6,86E-12	0,00E+00	1,51E-10	1,66E-10	2,82E-11	-1,46E-10
HTP-nc	CTUh	1,98E-08	1,57E-09	1,54E-09	5,09E-10	8,54E-12	0,00E+00	1,88E-10	4,01E-10	2,62E-11	-8,44E-10
SQP	-	1,12E+01	1,37E+00	5,52E-01	4,90E-01	8,22E-03	0,00E+00	1,81E-01	8,26E-02	3,02E-01	-7,65E-02

**INDICATORS DESCRIPTIONS RESOURCE CONSUMPTION: 1 m² lamella mat r.Flow® A
thickness: 30 mm**

Indicator	Unit	Life cycle stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	2,76E+00	4,98E-02	7,53E-01	1,39E-02	2,34E-04	0,00E+00	5,17E-03	2,90E-02	1,44E-03	-1,06E-03
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+00	4,98E-02	7,53E-01	1,39E-02	2,34E-04	0,00E+00	5,17E-03	2,90E-02	1,44E-03	-1,06E-03
PEN-RE	MJ	2,12E+01	2,55E+00	3,05E+00	8,14E-01	1,37E-02	0,00E+00	3,01E-01	8,58E-01	1,55E-01	-4,47E-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	2,12E+01	2,55E+00	3,05E+00	8,14E-01	1,37E-02	0,00E+00	3,01E-01	8,58E-01	1,55E-01	-4,47E-02

SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,31E-02	5,92E-04	1,60E-03	1,50E-04	2,51E-06	0,00E+00	5,55E-05	5,76E-04	7,82E-06	-6,49E-06

**INDICATORS DESCRIBING OUTPUT STREAMS AND WASTE:
1 m² lamella mat r.Flow® A
thickness: 30 mm**

Indicator	Unit (referenced to DU)	Life cycle stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
Amount of hazardous 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
Amount of non-hazardous waste	kg	WN	WN	1,44E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Amount of 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
Reusable components	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
Recyclable materials	kg	WN	WN	1,55E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Energy Recovery Materials	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
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	0,00E+00

BIOGENIC CARBON

Biogenic carbon content in the product (kg C_{org})	0,00E+00
Biogenic carbon content per package (kg C_{org})	0,00E+00

**MAIN IMPACT INDICATORS: 1 m² lamella mat r.Flow® AG
thickness: 30 mm**

Indicator	Unit	Life cycle stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	1,93E+00	1,82E-01	1,64E-01	6,34E-02	9,68E-04	0,00E+00	2,35E-02	7,15E-02	6,26E-03	-1,88E-01
GWP-fossil	kg CO ₂ eq.	1,96E+00	1,81E-01	1,66E-01	6,34E-02	9,67E-04	0,00E+00	2,35E-02	7,01E-02	6,25E-03	-1,88E-01
GWP-biogenic	kg CO ₂ eq.	-3,12E-02	1,24E-04	-2,15E-03	4,39E-05	6,70E-07	0,00E+00	1,63E-05	1,39E-03	8,62E-07	-1,84E-05
GWP-luluc	kg CO ₂ eq.	8,96E-04	6,35E-05	1,56E-04	2,10E-05	3,21E-07	0,00E+00	7,79E-06	3,16E-05	3,22E-06	-2,27E-06
ODP	kg CFC11 eq.	7,98E-08	3,60E-09	5,23E-09	1,26E-09	1,92E-11	0,00E+00	4,67E-10	6,54E-10	1,81E-10	-1,26E-10
AP	mol H+ eq.	1,49E-02	3,74E-04	6,73E-04	1,32E-04	2,01E-06	0,00E+00	4,89E-05	5,00E-04	4,43E-05	-1,18E-04
EP-freshwater	kg PO ₄ eq.	5,46E-04	1,31E-05	5,25E-05	4,29E-06	6,55E-08	0,00E+00	1,59E-06	3,94E-05	5,19E-07	-7,20E-07
EP-marine	kg N eq.	1,73E-03	8,72E-05	1,29E-04	3,17E-05	4,84E-07	0,00E+00	1,17E-05	1,93E-04	1,69E-05	-3,97E-04
EP-terrestrial	mol N eq.	2,61E-02	9,41E-04	1,32E-03	3,42E-04	5,22E-06	0,00E+00	1,27E-04	2,03E-03	1,84E-04	-5,78E-04
POCP	kg NMVOC eq.	7,41E-03	6,12E-04	7,51E-04	2,19E-04	3,35E-06	0,00E+00	8,13E-05	6,03E-04	6,60E-05	-1,91E-04
ADP-minerals & metals	kg Sb eq.	3,44E-05	6,59E-07	2,30E-06	2,06E-07	3,15E-09	0,00E+00	7,64E-08	4,29E-08	9,77E-09	-1,66E-08
ADP-fossil	MJ	2,78E+01	2,54E+00	3,68E+00	8,92E-01	1,36E-02	0,00E+00	3,30E-01	8,47E-01	1,53E-01	-8,40E-02
WDP	WDP (m ³) świat. ekw	5,07E-01	1,07E-02	9,34E-02	3,70E-03	5,65E-05	0,00E+00	1,37E-03	2,61E-03	6,70E-03	7,44E-03

**ADDITIONAL IMPACT INDICATORS: 1 m² lamella mat r.Flow® AG
thickness: 30 mm**

Indicator	Unit	Life cycle stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	9,32E-08	1,20E-08	6,26E-09	4,67E-09	7,12E-11	0,00E+00	1,73E-09	1,06E-08	1,01E-09	-9,10E-10
IRP	kBq U235 eq.	1,50E-01	3,82E-03	1,77E-02	1,16E-03	1,76E-05	0,00E+00	4,28E-04	4,86E-04	9,78E-05	-1,19E-04
ETP-fw	CTUe	3,40E-04	8,13E-06	3,27E-05	2,67E-06	4,08E-08	0,00E+00	9,90E-07	2,45E-05	3,23E-07	-4,48E-07
HTP-c	CTUh	3,08E-07	1,32E-09	6,10E-10	4,50E-10	6,86E-12	0,00E+00	1,67E-10	1,84E-10	2,82E-11	-2,80E-10

HTP-nc	CTUh	2,41E-08	1,57E-09	2,09E-09	5,60E-10	8,54E-12	0,00E+00	2,07E-10	4,45E-10	2,62E-11	-1,62E-09
SQP	-	1,27E+01	1,37E+00	7,34E-01	5,39E-01	8,22E-03	0,00E+00	2,00E-01	9,16E-02	3,02E-01	-1,47E-01

**WSKAŹNIKI OPISUJĄCE ZUŻYCIE ZASOBÓW: 1 m² lamella mat r.Flow® AG
thickness: 30 mm**

Indicator	Unit	Life cycle stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	3,73E+00	4,98E-02	1,15E+00	1,53E-02	2,34E-04	0,00E+00	5,67E-03	3,22E-02	1,44E-03	-2,04E-03
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	3,73E+00	4,98E-02	1,15E+00	1,53E-02	2,34E-04	0,00E+00	5,67E-03	3,22E-02	1,44E-03	-2,04E-03
PEN-RE	MJ	2,89E+01	2,55E+00	3,62E+00	8,95E-01	1,37E-02	0,00E+00	3,32E-01	9,52E-01	1,55E-01	-8,58E-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	2,89E+01	2,55E+00	3,62E+00	8,95E-01	1,37E-02	0,00E+00	3,32E-01	9,52E-01	1,55E-01	-8,58E-02
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,31E-02	5,23E-03	3,47E-03	1,65E-04	2,51E-06	0,00E+00	6,11E-05	6,39E-04	4,88E-06	3,43E-08

**INDICATORS DESCRIBING OUTPUT STREAMS AND WASTE: 1 m² lamella mat r.Flow® AG
thickness: 30 mm**

Indicator	Unit (referenced to DU)	Life cycle stage									
		A1	A2	A3	A4	A5	C1	C2	C3	C4	D
Amount of hazardous 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
Amount of non-hazardous waste	kg	WN	WN	1,73E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Amount of 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
Reusable components	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
Recyclable materials	kg	WN	WN	2,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Energy Recovery Materials	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
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	0,00E+00

BIOGENIC CARBON

Biogenic carbon content in the product (kg C_{org})	0,00E+00
Biogenic carbon content per package (kg C_{org})	0,00E+00

All results shown in the tables refer to r.Flow®A and r.Flow®AG lamella mats with a thickness of 30 mm. In order to obtain environmental parameters for other thicknesses, the appropriate multiplication factors in the table below should be used.

Lamella mat: - r.Flow®A - r.Flow®AG	Thickness of the lamella mat [mm]						
	20	30	40	50	60	80	100
Conversion rate	0,67	1	1,33	1,67	2	2,67	3,33

7. INTERPRETATION OF RESULTS

Figures 3 and 4 show the diagram of the contributions of individual life cycle modules to the basic categories of impact of lamella mats:

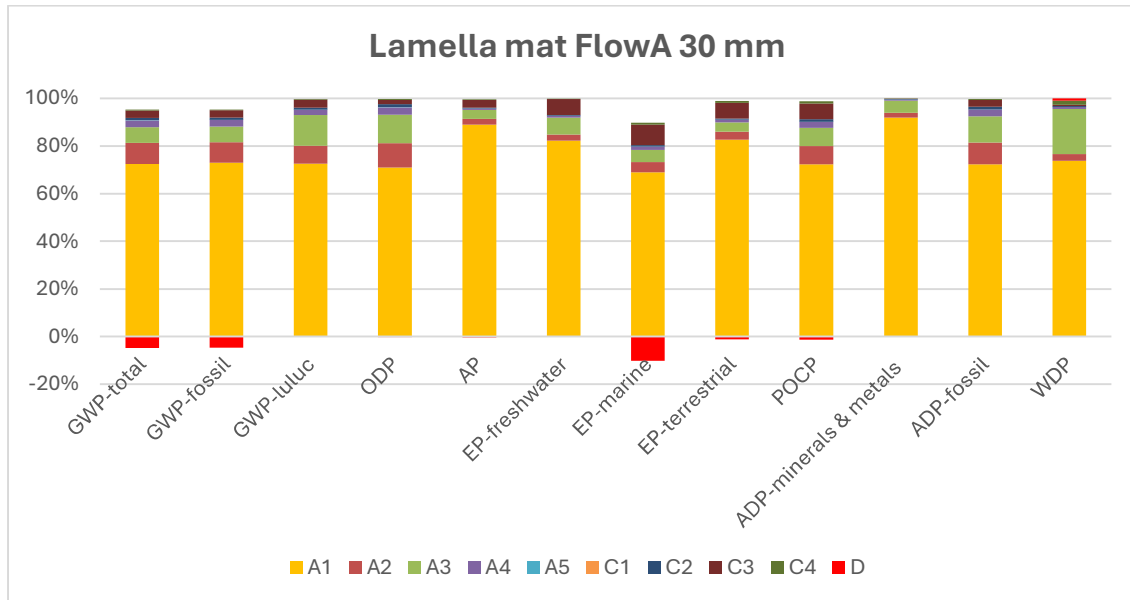


Figure 3 Shares of life cycle modules on the main categories of influence – lamella mat r.Flow® A.

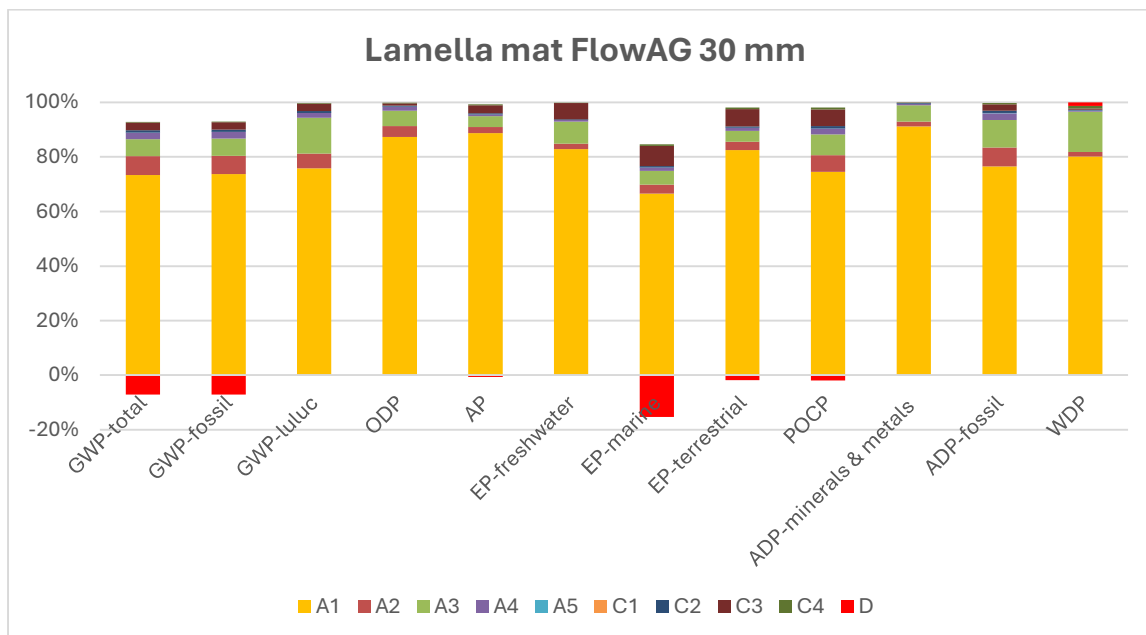


Figure 4 Shares of life cycle modules on the main categories of influence – lamella mat r.Flow® AG.

LITERATURE

- ✓ ICIMB-PCR A. General Product Category Rules for Construction Products.
- ✓ PN-EN 15804+A2:2020, Sustainability of building structures -- Environmental product declarations -Basic principles of categorization of construction products.
- ✓ PN-EN ISO 14025:2014-04, Environmental labels and declarations -- Type III environmental declarations -- Rules and procedures.
- ✓ 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.
- ✓ ISO 21930:2017 - Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services
- ✓ ISO 15686-1:2011, Buildings and constructed assets – Service life planning – Part 1: General principles and framework.
- ✓ ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation.
- ✓ PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business.
- ✓ KOBiZE CO₂, SO₂, NO_x, CO and total particulate matter emission factors for electricity, December 2023.
- ✓ The Act of 14 December 2012 on Waste, Journal of Laws. 2013, item 21.
- ✓ Act of 27 April 2001. Environmental Protection Law Journal of Laws 2024.54, consolidated text.
- ✓ Data from the company's website: <https://www.rohhe.pl/>.

Explanatory material can be obtained by contacting the representative directly Rohhe Sp. z o.o.



Łukasiewicz
Institute
of Ceramics
and Building
Materials

Łukasiewicz Research Network – Institute of Ceramics and Building Materials
31-983 Kraków, Cementowa 8 Str., Poland

CENTER OF ENVIRONMENTAL ENGINEERING

45-641 Opole, Oświęcimska 21 Str., Poland
Phone: +48 77 456 32 01

www.icimb.lukasiewicz.gov.pl
info.opole@icimb.lukasiewicz.gov.pl

PROCESS ENGINEERING RESEARCH GROUP

TYPE III ENVIRONMENTAL DECLARATION CERTIFICATE

no. 1-12/2024

Products:

Lamella mat

r.Flow® A, r.Flow® AG

Owner:

Rohhe Sp. z o.o.

05-555 Tarczyn, al. Krakowska 19A

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:

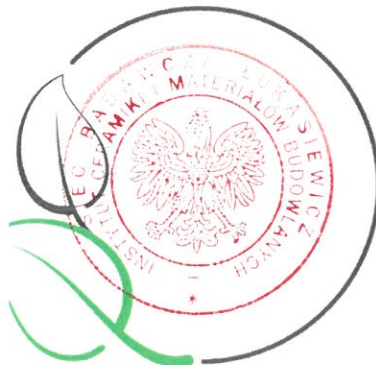
PN-EN ISO 14025:2010

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

The certificate was issued for the first time on **December 3, 2024** and is valid for 5 years or until the said EPD is amended.

**Process Engineering
Research Group Leader**

Ewa Głodek-Bucyk, PhD Eng.



**Director of
Environmental
Engineering Center**

Joanna Poluszyńska, PhD

Opole, December 2024