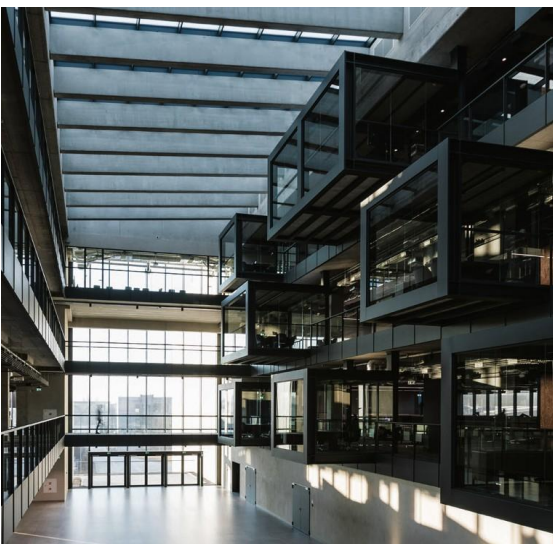


ENVIRONMENTAL PRODUCT DECLARATION

no. 01-03/2025

Insulated glazing units Wiśniowski

Wiśniowski Sp. z o.o. S.K.A.



*Owner of the declaration:
Programm owner:*

*Wiśniowski Sp. z o.o. S.K.A.
Łukasiewicz Research Network– Institute of Ceramics and
Building Materials*

Program name:

Environmental product declaration

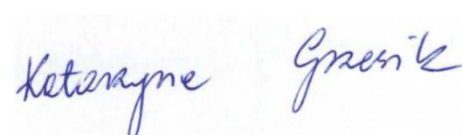
Data of issue:

21.03.2025

Declaration valid until:

21.03.2030

1. GENERAL INFORMATION

Product of declaration:	Insulated glazing units Wiśniowski: - package 4/18/4/18/4 with a glass weight of 30 kg/m², - package 55.1/24/6/24/55.1 with a glass weight of 65 kg/m².
Program owner: Łukasiewicz Research Network– Institute of Ceramics and Building Materials Environmental Engineering Center in Opole. http://www.icimb.pl/opole/	Declaration owner: Wiśniowski Sp. z o.o. S.K.A. 33-311 Wielogłowy 153 Telefon: +48 18 44 77 111 https://www.wisniowski.pl//
Declared unit:	1 kg
Date of issue:	21.03.2025
Declaration valid until:	21.03.2030
Life Cycle Analysis (LCA):	A1-A3, C1-C4 and D according to 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:	25 years
Reasons for performing LCA:	Sieć B2B
Standard of product	PN-EN 1279:2018
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 insulated glazing units Wiśniowski 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. Patryk 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 ☐ Internal ☒ External  Katarzyna Grzesik, PhD, DSc

2. MANUFACTURER AND PRODUCT INFORMATION

WIŚNIEWSKI is a Polish manufacturer of sectional garage doors, steel and aluminium doors and windows (including external and internal doors), as well as property and industrial fences, established in 1989. The company consists of three plants located in Wielogłowy, dealing with the production of garage doors, fences and joinery. WIŚNIEWSKI has nearly 2,500 sales outlets throughout Europe, 27,000 m² of production space, and employs as many as 2,000 people.

WIŚNIEWSKI insulated glazing units are a solution used in WIŚNIEWSKI windows and doors, consisting of two or more panes of glass separated by a spacer and hermetically sealed. The space between the panes is filled with a noble gas such as argon or krypton, depending on the order, which improves the thermal insulation properties. In addition, the use of low-E coatings on the glass surface allows for the reflection of thermal radiation, reducing energy losses in winter and reducing heating of rooms in summer.

WIŚNIEWSKI's offer includes products that use insulated glazed units in aluminium systems, e.g. CREO aluminium doors, facades or windows, as well as in PVC systems and steel joinery in NOVA doors. Triple insulated glazing units or more are used in these systems. It is possible to use insulated glazing units with a thickness of 5 mm to 76 mm.

Thanks to this design, insulated glazing units provide excellent thermal and acoustic insulation as well as increased strength and safety, making them an ideal choice for both residential and commercial construction.

The calculations were carried out for two different insulated glazing units packages:

- package 4/18/4/18/4 with a glass weight of 30 kg/m², - glass thickness 4 mm,
- Package 55.1/24/6/24/55.1 with a glass weight of 65 kg/m². - This is the most unfavorable variant of the manufactured glazing units that do not meet the parameters of the 4/18/4/18/4 package.

The construction of the Wiśniowski insulated glazing unit with a 4/18/4/18/4 package with a glass weight of 30 kg/m² is shown in the figure below:

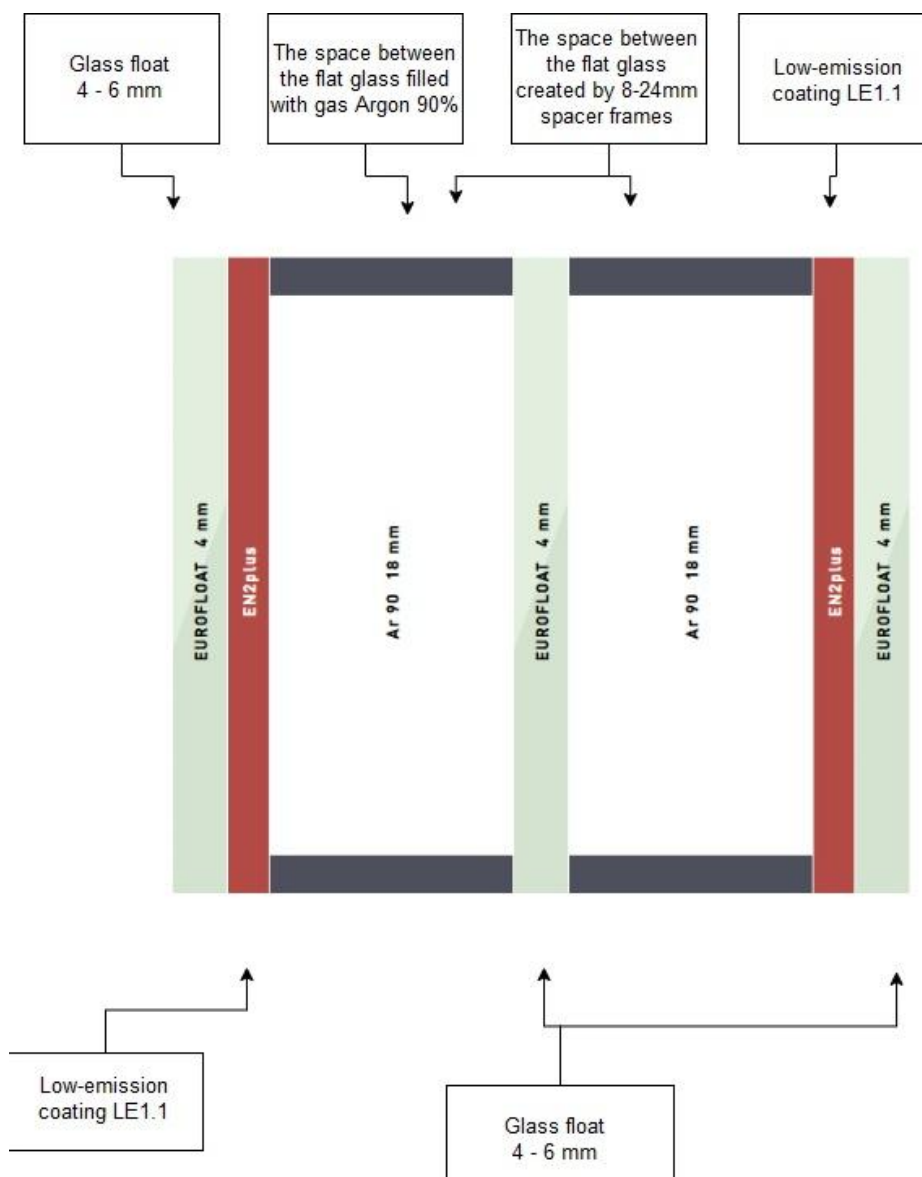


Figure 1: Diagram of the construction of a Wiśniowski insulated glazing unit with a 4 /18/4/18/4 package with a glass weight of 30 kg/m² manufactured by Wiśniowski Sp. z o.o. S.K.A.

The construction of the Wiśniowski insulated glazing unit with the 55.1/24/6/24/55.1 package with a glass weight of 65 kg/m² is shown in the figure below:

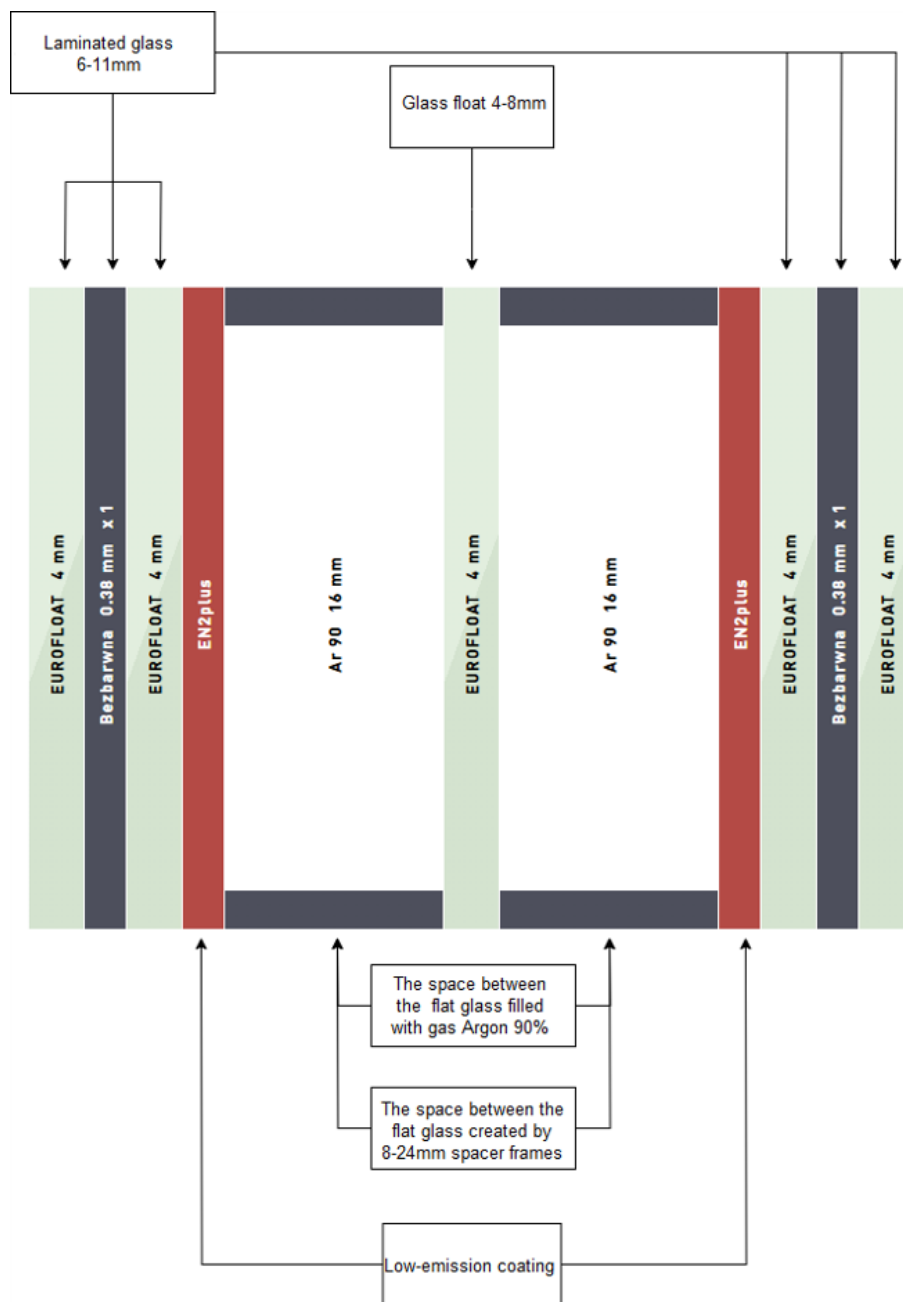


Figure 2: Diagram of the construction of Wiśniowski insulated glazing unit with package 55.1/24/6/24/55.1 with a glass weight of 65 kg/m² manufactured by Wiśniowski Sp. z o.o. S.K.A.

The indicative composition of the products covered by the declaration is given in the table below. The percentage share depends on the type of product.

Table 1 Indicative composition of the products covered by the declaration

Material	Mass fraction [%]
Glass	91-97
Frame	1-3
Seal	1-3
Site	1-2
Fill - gas	0-1

The production of insulating glass units begins with the receipt and storage of large-format glass panes. They are then precisely cut to the required dimensions using automatic cutting systems. After cutting, the edges of the glass are ground and beveled, and if the design requires it – the glass is tempered or subjected to other thermal processes.

The next stage is washing and drying the windows, which ensures their perfect cleanliness before further operations. At the same time, the spacers are cut and formed into the right shape. Then they are filled with a molecular sieve, and a layer of butyl is applied to their edges, which increases the tightness of the set. The spacers prepared in this way are glued to the glass surface.

The set of glass goes to the chamber, where the space between the panes is filled with gas.

Depending on the order specifications, the glass is joined into sets by means of a press, and their edges are sealed with thiocoll, which ensures durability and resistance to weather conditions.

The finished insulating glass units are placed on stands and sent to the warehouse or for further processing. Ultimately, they are used in windows and doors manufactured by Wiśniowski.

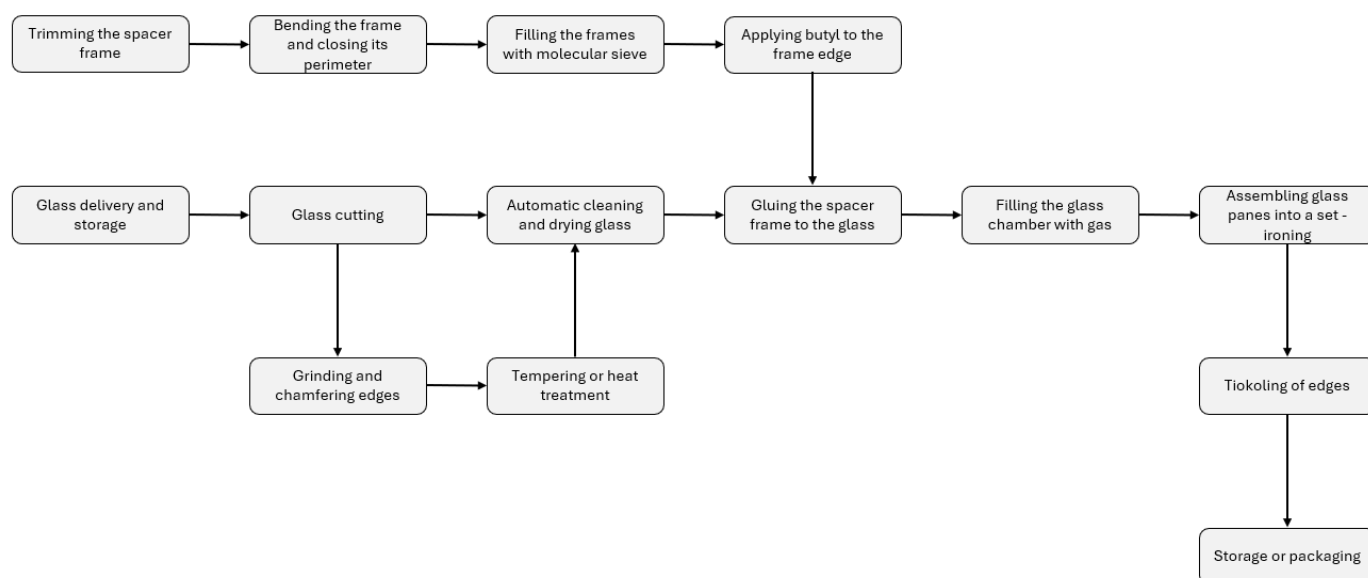


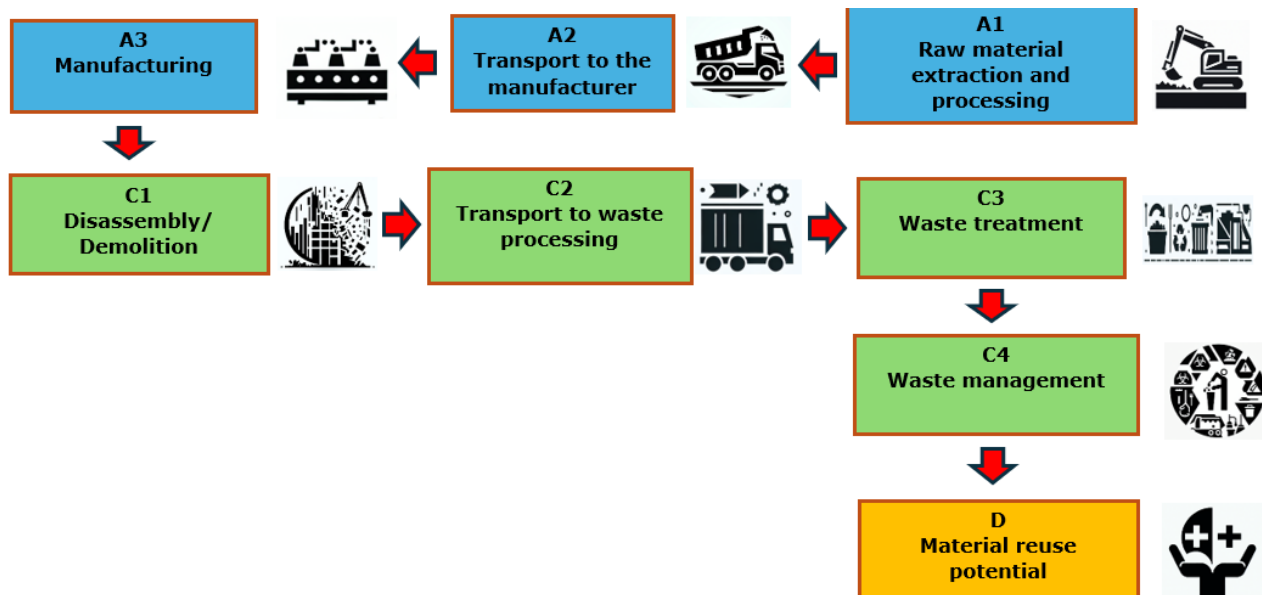
Figure 3: Production diagram of Wiśniowski insulated glazing units manufactured by Wiśniowski Sp. z o.o. S.K.A.

3. LCA: CALCULATION RULES

The environmental declaration is based on data provided by the owner of the declaration, Wiśniowski Sp. z o.o. S.K.A., for the production plant located in Wielogłowy.

System limitations

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



Data colleration 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 kg

Assumptions

A1 – extraction and consumption of raw materials refers 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 dust emission values from the production process obtained as a result of estimation based on fuel consumption,

C1 - describes the handling of Wiśniowski insulated glazing units during disassembly/demolition. Calculations are made on the basis of the developed scenario,

C2 – refers to the transport of construction waste to a recovery or disposal plant. Calculations are made on the basis of the developed scenario,

C3 – takes into account the environmental impact during the processing of demolition waste containing elements of Wiśniowski insulated glazing units at the waste recovery plant. Calculations are made on the basis of the developed scenario,

C4 – takes into account the environmental impact of storage and recycling of Wiśniowski insulated glazing units. Calculations are made 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 and have been supplemented with KOBiZE *CO₂, SO₂, NO_x, CO and total particulate matter emission factors for electricity, December 2024*. Emission factors for electricity were determined using the actual KOBiZE data. The Polish electricity emission factor used (Ecoinvent supplemented with current national data from KOBiZE) is 0.597 kg CO₂/kWh. A detailed analysis of data quality was part of an external audit.

Allocation

All data on components manufactured at the plant were provided by the owner of the declaration, Wiśniowski Sp. z o.o S.K.A., and were referred to the declared unit of the product – 1 kg. The allocation rules used in this EPD are based on the general ICIMB-PCR A principles.

4. 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 environmental statement in the field of "cradle to gate with options", scenarios for modules C1-C4 and D have been developed:

Module C1 - Demolition/Demolition – Manual demolition and initial sorting of waste on site were adopted. The consumption of energy and other raw materials in this module has been omitted due to negligible values. The separated fractions from the insulating glass separation are sent to the waste treatment plant. The modulus is zero.

Module C2 – Transport – Waste is transported to the treatment plant, where, after separating the recyclable fraction and the fraction intended for landfill, the appropriate quantities are directed to further processes.

- 100% of the waste constituting used insulated glazing units is transported to a recovery plant. It is assumed that 70% of glass is recycled and 30% is landfilled.
- 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 100 km from the demolition site.

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 fuel consumption is 0.315 MJ/kg. The following processes were assumed for the calculations: unloading (loader), crushing (crusher.)

Module C4 – Waste management – It has been assumed that waste that can no longer be used in any other way is sent to the landfill. These are wastes separated in the processing process (module C3). It was assumed that 30% of the glass and 100% of the frames and sealants are deposited in a landfill.

Module D - Material reuse potential - for insulating glass, it is assumed that 70% of the product is recycled.

5. 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.

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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

The following tables present the results of the LCA analysis for Wiśniowski insulated glazing units. 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
RSF
NRSF
FW

Use of secondary material
Use of renewable fuels
Use of non-renewable secondary fuels
Use of net fresh water

MAIN IMPACT INDICATORS: 1 kg insulated glazing units Wiśniowski with 4 /18/4/18/4 package with a glass weight of 30 kg/m ²									
	Life Cycle Stage								
Indicator	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	1,26E+00	6,43E-02	1,58E-03	0,00E+00	1,90E-02	7,17E-02	9,42E-04	-2,03E-02
GWP-fossil	kg CO ₂ eq.	1,25E+00	6,42E-02	1,57E-03	0,00E+00	1,90E-02	7,16E-02	9,39E-04	-1,70E-02
GWP-biogenic	kg CO ₂ eq.	9,07E-03	4,43E-05	4,66E-06	0,00E+00	1,32E-05	8,01E-05	2,49E-06	-3,28E-03
GWP-luluc	kg CO ₂ eq.	6,05E-04	2,16E-05	1,77E-06	0,00E+00	6,31E-06	3,50E-05	9,78E-08	-1,26E-05
ODP	kg CFC11 eq.	2,58E-08	1,28E-09	1,95E-11	0,00E+00	3,78E-10	8,02E-10	1,45E-11	-2,93E-10
AP	mol H ⁺ eq.	1,16E-02	1,33E-04	5,89E-06	0,00E+00	3,96E-05	5,44E-04	8,32E-06	-9,09E-05
EP-freshwater	kg PO ₄ eq.	2,30E-04	4,42E-06	1,36E-06	0,00E+00	1,29E-06	2,64E-05	2,77E-08	-1,27E-06
EP-marine	kg N eq.	1,88E-03	3,18E-05	1,31E-06	0,00E+00	9,51E-06	2,26E-04	3,85E-06	-3,72E-05
EP-terrestrial	mol N eq.	2,25E-02	3,43E-04	1,09E-05	0,00E+00	1,03E-04	2,43E-03	4,21E-05	-4,05E-04
POCP	kg NMVOC eq.	6,38E-03	2,21E-04	3,53E-06	0,00E+00	6,58E-05	7,22E-04	1,26E-05	-2,10E-04
ADP-minerals & metals	kg Sb eq.	1,35E-05	2,15E-07	2,00E-09	0,00E+00	6,18E-08	4,76E-08	3,85E-10	-3,96E-08
ADP-fossil	MJ	1,48E+01	9,02E-01	1,90E-02	0,00E+00	2,67E-01	8,87E-01	1,23E-02	-2,34E-01
WDP	WDP (m ³) świat. ekw.	3,48E-01	3,76E-03	6,83E-05	0,00E+00	1,11E-03	2,52E-03	2,66E-05	3,18E-02
ADDITIONAL IMPACT INDICATORS: 1 kg insulated glazing units Wiśniowski with 4 /18/4/18/4 package with a glass weight of 30 kg/m ²									
	Life Cycle Stage								
Indicator	Unit	A1	A2	A3	C1	C2	C3	C4	D
PM	Disease incidence	1,19E-07	4,61E-09	1,80E-11	0,00E+00	1,40E-09	1,30E-08	2,40E-10	-1,92E-09
IRP	kBq U235 eq.	8,07E-02	1,22E-03	1,59E-05	0,00E+00	3,47E-04	4,96E-04	6,77E-06	-2,59E-04
ETP-fw	CTUe	1,43E-04	2,75E-06	8,44E-07	0,00E+00	8,01E-07	1,64E-05	1,73E-08	-7,91E-07
HTP-c	CTUh	4,88E-09	4,59E-10	2,03E-12	0,00E+00	1,35E-10	2,18E-10	3,62E-12	-1,37E-10
HTP-nc	CTUh	9,60E-09	5,64E-10	1,60E-11	0,00E+00	1,68E-10	3,48E-10	1,66E-12	-1,33E-10
SQP	-	5,10E+00	5,30E-01	9,86E-03	0,00E+00	1,61E-01	1,06E-01	1,51E-02	-4,87E-01

INDICATORS DESCRIPTIONS RESOURCE CONSUMPTION: 1 kg insulated glazing units Wiśniowski with 4 /18/4/18/4 package with a glass weight of 30 kg/m²

Life Cycle Stage									
Indicator	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	MJ	1,28E+00	1,61E-02	3,30E-03	0,00E+00	4,60E-03	3,57E-02	3,66E-04	-3,88E-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
PERT	MJ	1,28E+00	1,61E-02	3,30E-03	0,00E+00	4,60E-03	3,57E-02	3,66E-04	-3,88E-03
PEN-RE	MJ	1,42E+01	9,05E-01	2,29E-02	0,00E+00	2,68E-01	9,65E-01	1,23E-02	-2,37E-01
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
PENRT	MJ	1,42E+01	9,05E-01	2,29E-02	0,00E+00	2,68E-01	9,65E-01	1,23E-02	-2,37E-01
SM	kg	0,00E+00	0,00E+00	1,16E-01	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
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
FW	m ³	1,59E-02	1,78E-04	2,13E-05	0,00E+00	4,94E-05	4,04E-04	4,99E-07	-2,94E-05

INDICATORS DESCRIBING OUTPUT STREAMS AND WASTE: 1 kg 1 kg insulated glazing units Wiśniowski with 4 /18/4/18/4 package with a glass weight of 30 kg/m²

Life Cycle Stage									
Indicator	Unit (expressed per DU)	A1	A2	A3	C1	C2	C3	C4	D
Hazardous waste	kg	WN	WN	1,21E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste	kg	WN	WN	6,01E-02	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
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
Materials for recycling	kg	WN	WN	6,00E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	WN	WN	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

CARBON BIOGENIC

Contents organic carbon in product (kg C_{org})	0,00E+00
Contents organic carbon in packaging (kg C_{org})	0,00E+00

MAIN IMPACT INDICATORS: 1 kg insulated glazing units Wiśniowski with 55.1/24/6/24/55.1 package with a glass weight of 65 kg/m²

Life Cycle Stage									
Indicator	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	2,21E+00	8,70E-02	1,55E-03	0,00E+00	1,90E-02	7,17E-02	8,98E-04	-2,07E-02
GWP-fossil	kg CO ₂ eq.	2,20E+00	8,70E-02	1,54E-03	0,00E+00	1,90E-02	7,16E-02	8,95E-04	-1,74E-02
GWP-biogenic	kg CO ₂ eq.	1,58E-02	6,01E-05	4,57E-06	0,00E+00	1,32E-05	8,01E-05	2,37E-06	-3,36E-03
GWP-luluc	kg CO ₂ eq.	8,65E-04	2,91E-05	1,74E-06	0,00E+00	6,31E-06	3,50E-05	9,32E-08	-1,29E-05
ODP	kg CFC11 eq.	4,53E-08	1,73E-09	1,91E-11	0,00E+00	3,78E-10	8,02E-10	1,38E-11	-3,00E-10
AP	mol H ⁺ eq.	2,14E-02	1,81E-04	5,78E-06	0,00E+00	3,96E-05	5,44E-04	7,93E-06	-9,31E-05
EP-freshwater	kg PO ₄ eq.	3,44E-04	5,94E-06	1,33E-06	0,00E+00	1,29E-06	2,64E-05	2,64E-08	-1,30E-06
EP-marine	kg N eq.	3,44E-03	4,33E-05	1,29E-06	0,00E+00	9,51E-06	2,26E-04	3,66E-06	-3,81E-05
EP-terrestrial	mol N eq.	4,17E-02	4,67E-04	1,07E-05	0,00E+00	1,03E-04	2,43E-03	4,01E-05	-4,15E-04
POCP	kg NMVOC eq.	1,17E-02	3,00E-04	3,46E-06	0,00E+00	6,58E-05	7,22E-04	1,20E-05	-2,15E-04
ADP-minerals & metals	kg Sb eq.	2,13E-05	2,87E-07	1,96E-09	0,00E+00	6,18E-08	4,76E-08	3,67E-10	-4,06E-08
ADP-fossil	MJ	2,51E+01	1,22E+00	1,86E-02	0,00E+00	2,67E-01	8,87E-01	1,17E-02	-2,39E-01
WDP	WDP (m ³) świat. ekw.	5,60E-01	5,08E-03	6,70E-05	0,00E+00	1,11E-03	2,52E-03	2,53E-05	3,25E-02

ADDITIONAL IMPACT INDICATORS: 1 kg insulated glazing units Wiśniowski with 55.1/24/6/24/55.1 package with a glass weight of 65 kg/m²

Life Cycle Stage									
Indicator	Unit	A1	A2	A3	C1	C2	C3	C4	D
PM	Disease incidency	2,18E-07	6,32E-09	1,76E-11	0,00E+00	1,40E-09	1,30E-08	2,29E-10	-1,96E-09
IRP	kBq U235 eq.	1,22E-01	1,62E-03	1,56E-05	0,00E+00	3,47E-04	4,96E-04	6,46E-06	-2,66E-04
ETP-fw	CTUe	2,14E-04	3,70E-06	8,28E-07	0,00E+00	8,01E-07	1,64E-05	1,65E-08	-8,10E-07
HTP-c	CTUh	5,47E-09	6,19E-10	1,99E-12	0,00E+00	1,35E-10	2,18E-10	3,45E-12	-1,40E-10
HTP-nc	CTUh	1,42E-08	7,66E-10	1,56E-11	0,00E+00	1,68E-10	3,48E-10	1,58E-12	-1,36E-10
SQP	-	8,74E+00	7,29E-01	9,67E-03	0,00E+00	1,61E-01	1,06E-01	1,44E-02	-4,99E-01

INDICATORS DESCRIPTIONS RESOURCE CONSUMPTION: 1 kg insulated glazing units Wiśniowski with 55.1/24/6/24/55.1 package with a glass weight of 65 kg/m²

Life Cycle Stage									
Indicator	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	MJ	1,88E+00	2,14E-02	3,23E-03	0,00E+00	4,60E-03	3,57E-02	3,49E-04	-3,97E-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
PERT	MJ	1,88E+00	2,14E-02	3,23E-03	0,00E+00	4,60E-03	3,57E-02	3,49E-04	-3,97E-03
PEN-RE	MJ	2,41E+01	1,23E+00	2,24E-02	0,00E+00	2,68E-01	9,65E-01	1,18E-02	-2,43E-01
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
PENRT	MJ	2,41E+01	1,23E+00	2,24E-02	0,00E+00	2,68E-01	9,65E-01	1,18E-02	-2,43E-01
SM	kg	0,00E+00	0,00E+00	1,16E-01	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
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
FW	m ³	2,41E-02	2,31E-04	2,09E-05	0,00E+00	4,90E-05	4,04E-04	4,66E-07	-2,98E-05

INDICATORS DESCRIBING OUTPUT STREAMS AND WASTE: 1 kg insulated glazing units Wiśniowski with 55.1/24/6/24/55.1 package with a glass weight of 65 kg/m²

Indicator	Unit (expressed per DU)	Life Cycle Stage							
		A1	A2	A3	C1	C2	C3	C4	D
Hazardous waste	kg	WN	WN	1,18E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste	kg	WN	WN	3,00E-01	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
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
Materials for recycling	kg	WN	WN	3,00E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	WN	WN	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

BIOGENIC CARBON

Contents organic carbon in product (kg C_{org})	0,00E+00
Contents organic carbon in packaging (kg C_{org})	0,00E+00

6. INTERPRETATION OF LCA

Figures 4 and 5 present diagrams of the shares of individual life cycle modules on the basic impact categories for Wiśniowski insulated glazing units with a package 4/18/4/18/4 about the weight of the glass 30 kg/m² and Wiśniowski insulated glazing units with a package 55.1/24/6/24/55.1 about the weight of the glass 65 kg/m²:

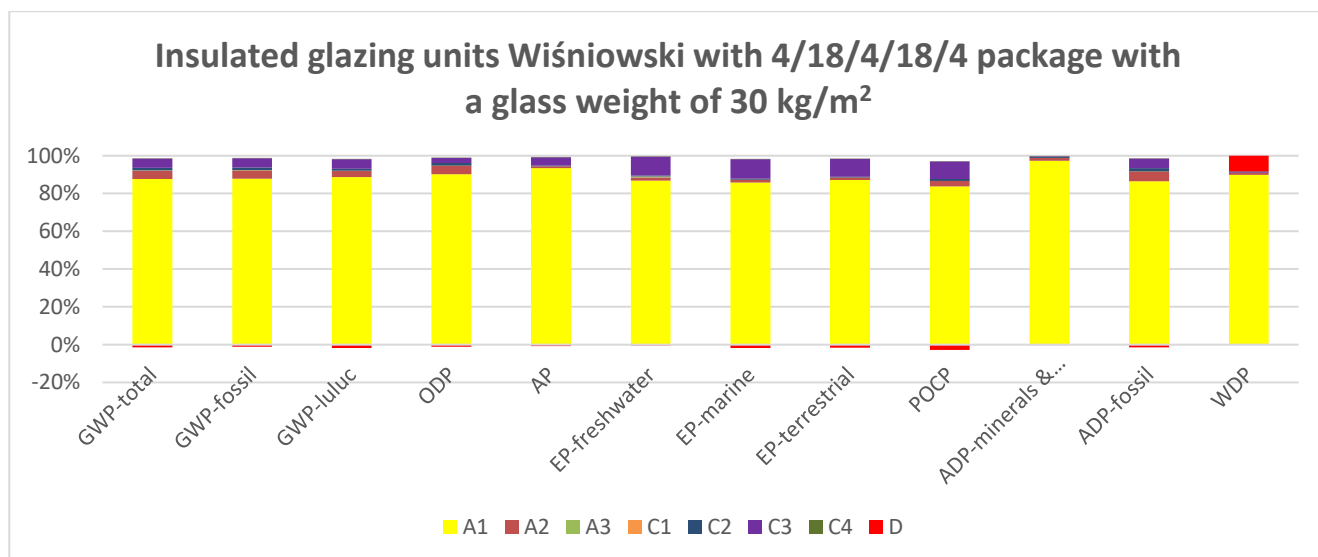


Figure 4 Shares of life cycle modules in the main categories of impacts – Wiśniowski insulated glazing units with a 4 /18/4/18/4 package with a glass weight of 30 kg/m².

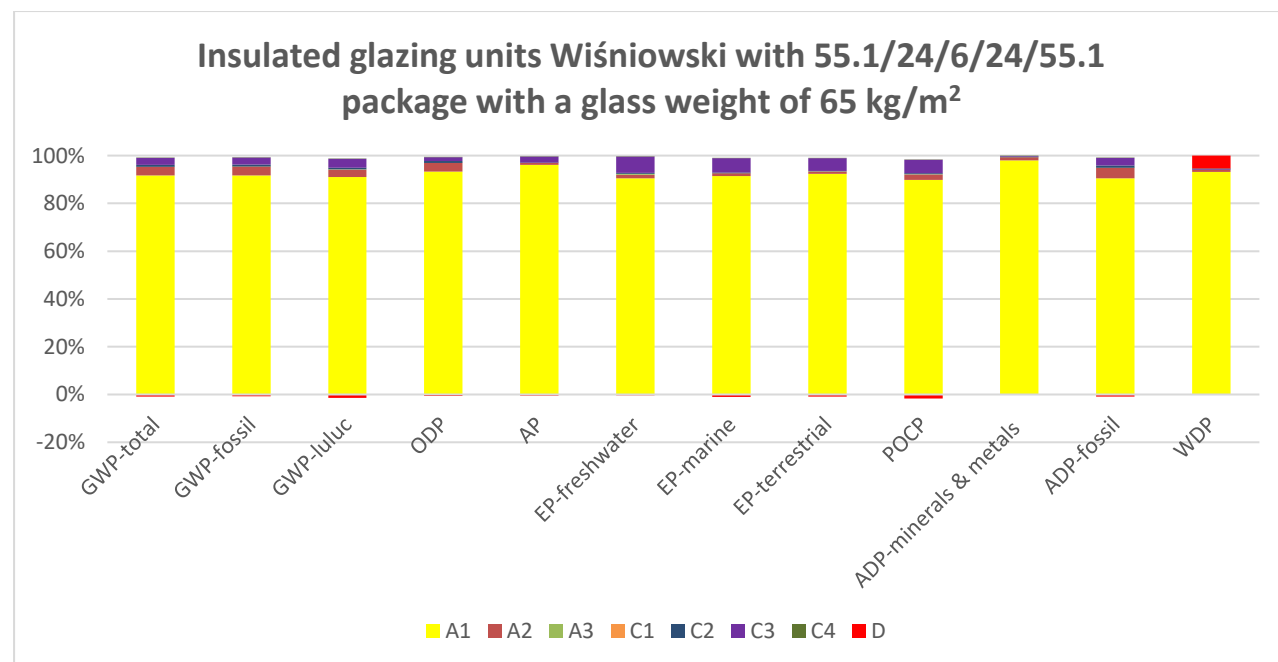


Figure 5 Shares of life cycle modules in the main categories of impacts – Wiśniowski insulated glazing units with 55.1/24/6/24/55.1 package with a glass weight of 65 kg/m².

LITERATURE

- ✓ ICIMB-PCR A. General Product Category Rules for Construction Products.
- ✓ PN-EN ISO 14025:2014-04, Environmental labels and declarations -- Type III environmental declarations -- Rules and procedures.
- ✓ PN-EN 15804+A2:2020, Sustainability of building structures -- Environmental product declarations -Basic principles of categorization of 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.
- ✓ PN-EN ISO 12543-4:2022-05, Glass in construction — Laminated glass and safety laminated glass — Part 4: Durability test methods.
- ✓ PN-EN 572-1:2012, Glass in building. Basic soda-lime silicate glass products- Definitions and general physical and mechanical properties.
- ✓ KOBIZE CO₂, SO₂, NO_x, CO and total particulate matter emission factors for electricity, December 2023.
- ✓ M. Asif, A. Davidson, T.Muneer, MImech: LIFE CYCLE OF WINDOW MATERIALS - A COMPARATIVE ASSESSMENT FICBSE Millennium Fellow School of Engineering , Napier University, 10 Colinton Road, Edinburgh EH10 5DT, U.K.
- ✓ Asif, M., Muneer, T. and Kubie, J, "Sustainability analysis of window frames", Building Services Engineering Research and Technology. 2005, vol. 26, no. 1, pp. 71-87.
- ✓ Weir, G. and Muneer, T., "Energy and environmental impact analysis of double-glazed windows", Energy Conversion and Management 1998, vol. 39, no. 3-4, pp. 243-256.
- ✓ Heinz Stichnothe^{1,2} and Adisa Azapagic¹ Life cycle assessment of recycling PVC window frames Resources Conservation and Recycling · February 2013 DOI: 10.1016/j.resconrec.2012.12.005
- ✓ Additional explanatory material can be obtained from the company page of the declaration owner: <https://www.wisniowski.pl/>

PROCESS ENGINEERING RESEARCH GROUP

TYPE III ENVIRONMENTAL DECLARATION CERTIFICATE

no. 01-03/2025

Products:

Insulated glazing units Wiśniowski

Owner:

Wiśniowski Sp. z o.o. S.K.A.

33-311 Wielogłowy 153

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

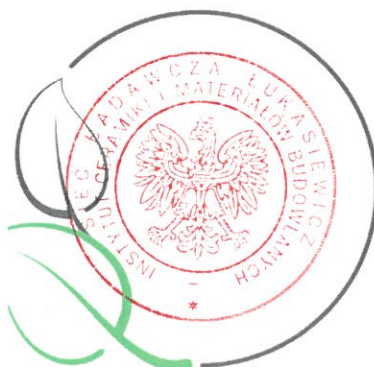
Environmental labels and declarations
Type III environmental declarations. Principles and procedures

The certificate was issued for the first time on **March 21, 2025** and is valid for 5 years or until the said EPD is amended.

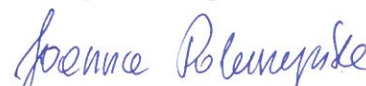
**Process Engineering
Research Group Leader**



Ewa Głodek-Bucyk, PhD Eng.



**Director of
Environmental
Engineering Center**



Joanna Poluszyńska, PhD

Opole, March 2025