Łukasiewicz
Institute of Ceramics
and Building Materials

Kaczmarek

ENVIRONMENTAL PRODUCT DECLARATION
No. 03-06/2024

PP ML sewer pipes

Owner of the declaration:	Kaczmarek Malewo Sp.K.
Program owner:	Łukasiewicz – Institute of Ceramics and Building Materials Center for Environmental Engineering
Name of program	Environmental Product Declarations – B2B
Release Date:	**11.06.2024**
Declaration valid until:	**11.06.2029**

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DECLARATION
ENVIRONMENTAL
PRODUCT NO. 03-06/2024

Kaczmarek

1. GENERAL INFORMATION

Owner of the declaration: **Kaczmarek Malewo Sp.K.**	**Products covered by the declaration:** **PP ML sewer pipes**
Program owner: Łukasiewicz – Institute of Ceramics and Building Materials of the Centre for Environmental Engineering in Opole. **http://www.icimb.pl/opole/**	**Owner of the declaration:** Kaczmarek Malewo Sp.K. Malewo 1, 63-800 Gostyń Phone: +48 65 575 86 00 Email address: sekretariat@kaczmarek2.pl **https://www.kaczmarek2.pl/**
Date of issue: **11.06.2024**	**Declared unit:** **1 kg** (1 kilogram) of PP ML sewer pipe.
Declaration valid until: **11.06.2029**	**Scope:** The declaration includes PP ML sewer pipes manufactured at the Kaczmarek Malewo SP.K. plant in Malewo. The environmental declaration is based on average data provided by the manufacturer for one production plant for individual products covered by the declaration manufactured by Kaczmarek Malewo Sp.K. The average values of the input and output streams were calculated based on data provided by the manufacturer from one production site. It contains information on the environmental impact of the declared products. All data on the production cycle were collected by Kaczmarek Malewo Sp.K. from the period from 01/01/2022 to 31/12/2022 (12 months) and correspond to the production technology of the time. 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. The declaration owner is responsible for the information and the base evidence. The 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. Declarations resulting from different programmes or not made in accordance with the standard may not be comparable

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Rules for product categorization (PCR)	According to the standards: PN-EN ISO 15804+A2:2020-03 Sustainability of construction works. Environmental Product Declarations. Basic principles of categorization of construction products.
Representativeness:	Polish product, year 2022
Claimed durability:	100 years
Reasons for performing LCA:	B2B
Life Cycle Analysis (LCA):	LCA analysis includes modules A1-A3, A4, C1-C4 and D according to EN 15804+A2 (cradle-to-gate with options)

The Łukasiewicz Research Network Institute of Ceramics and Building Materials, Environmental Engineering Division, provides access to the Type III environmental declaration for PP ML sewer pipes by Kaczmarek Malewo Sp.K. to interested parties.

Authors' team:
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Approved:

Joanna Poluszyńska, PhD

Director of the Center for Environmental Engineering

Ewa Głodek-Bucyk, PhD

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 in accordance with EN ISO 14025:2010

☐ Internal ☒ External

Katarzyna Grzesik, PhD, DSc, Eng.

2. MANUFACTURER AND PRODUCT INFORMATION

Figure 1. Production plant in Malew.

The main profile of the company's activity is the production of plastic products. The history of the company dates back to 1985, when its activity began with the production of haberdashery film and technical technology made of softened PVC, was started by PPHT Barbara Kaczmarek Malewo, managed by four brothers. In the following years of activity, on the basis of the experience gained, the scope of production was introduced and expanded to include water, gas and sanitary sewage systems. For almost 40 years, the Kaczmarek Malewo company has been operating in Malewo in Wielkopolska. The production plant is shown in Figure 1. Thanks to the principles of loyalty, honesty and building success on trust, the company is still managed as a family. The company manufactures PVC-you and PE water supply systems, PE gas systems, PVC-U, PP and PE external sewage systems, PP internal sewage systems, as well as gutter systems, drainage systems, cable casing pipes, as well as manholes, tanks and retention and drainage boxes. The company's latest projects include the implementation of the production of tanks made of K2-Kan XXL structural pipes and PE water supply and sewage pipes with a diameter of up to DN1400. For the production of systems, the company uses the most modern production lines in Europe. All manufactured products meet quality standards. The official confirmation of the high quality of products is the ISO 9001 certificate: *production and distribution of plastic products for the construction of gas, water and sewage, sewage, gutter, cable, drainage and hollow slab installations.*

Structural PP sewer pipes with smooth internal and external surfaces, manufactured in accordance with the requirements of PN-EN 13476-2, are designed for the transport of sewage in non-pressure sewage networks, for non-pressure transport of rainwater.

The production of PP ML pipes is carried out according to the scheme (Fig. 2).

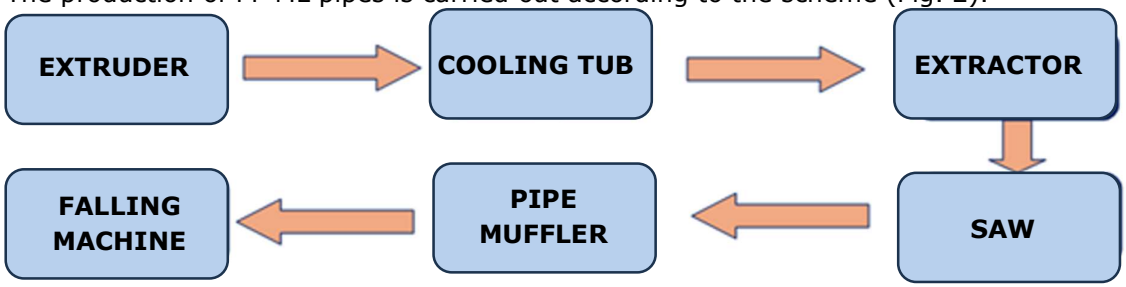


Figure 2: Process diagram of PP ML sewer pipe.

Technical data:

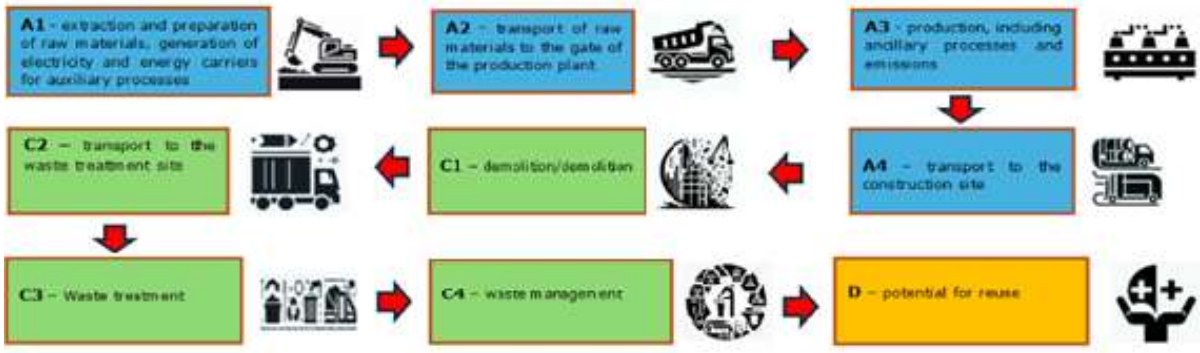
Material	Mass share [%]
Polypropylene (PP)	**64**
Dye	**1**
Fillers	**35**

Polypropylene density ≥ 900 kg/m3

3. LCA: CALCULATION RULES

System limitations

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



Data collection period	The data on the production process were provided in 2024 for the period 01.01.2022 - 31.12.2022.
Declared Unit	**1 kg** (1 kilogram) of PP ML sewer pipe.
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 varied depending on the method of delivery of raw materials, **A3** – CO_2, NO_x, SO_2 and dust emission values from the production process obtained as a result of measurements carried out at the plant, the rest estimated on the basis of fuel consumption. **A4** - transport - data used for calculations are included in the developed scenario. **C1 -C4** - After completion of use, the fittings are left buried in the ground. **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. 3.9.2 and KOBiZE. The emission factors for electricity were determined using the actual KOBiZE data. The applied emission factor of Polish electricity (Ecoinvent supplemented with current national data KOBiZE) is 0.685 kg CO_2/kWh. A detailed analysis of data quality was part of an external audit.
Allocation	All data provided by the manufacturer have been referenced to the product's declared unit (DU) – **1 kg** of PP ML sewer pipe. The allocation rules used in this EPD are based on the general principles of ICIMB-PCR A.

4. LCA: SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

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

Module A4:
Transport is carried out by a vehicle with a load capacity of 16-32 tonnes that meets the EURO 6 emission standards, the average distance from the plant to the customer is 350 km.

Modules C1- C4:
Demolition/demolition, waste transport, waste processing, waste disposal.

After the end of use, PP ML sewer pipe are left buried in the ground. As a result, processes related to the demolition, transport, treatment and disposal of waste do not take place, which means that the environmental impact of these modules is zero.

Module D
Module D is zero. This means that no potential benefits or burdens are anticipated for the reuse, recycling or recovery of materials at the end of a product's lifecycle.

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.

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**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**X**	**X**	**X**	**X**	**X**

The following tables present the results of the LCA analysis for the PP ML sewer pipe. 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-terrestial	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: 1kg PP ML sewer pipe

		Life cycle stage								
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO2 eq.	1.31E+00	1.52E-01	3.76E-01	6.64E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-fossil	kg CO2 eq.	1.31E+00	1.52E-01	4.47E-01	6.63E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-biogenic	kg CO2 eq.	7.40E-03	1.38E-04	-7.19E-02	6.22E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO2 eq.	3.29E-04	7.50E-05	4.35E-04	3.22E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A	kg CFC11 eq.	8.53E-09	3.20E-09	1.57E-09	1.41E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
AP	mol H+ eq.	4.52E-03	4.39E-04	2.04E-03	1.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-freshwater	kg PO4 eq.	1.50E-04	1.04E-05	5.18E-04	4.60E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-marine	kg N eq.	7.96E-04	1.10E-04	3.87E-04	3.57E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-terrestrial	mol N eq.	8.52E-03	1.15E-03	3.17E-03	3.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POCP	kg NMVOC eq.	4.11E-03	5.81E-04	9.95E-04	2.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-minerals & metals	kg Sb eq.	5.89E-06	4.75E-07	7.85E-07	2.11E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-fossil	MJ	4.68E+01	2.10E+00	5.32E+00	9.18E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
WDP	WDP (m3) world. ekw	9.30E-01	8.68E-03	4.29E-02	3.84E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ADDITIONAL IMPACT INDICATORS: 1 kg of PP ML sewer pipe

		Life cycle stage								
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PM	Disease incidency	4.87E-08	1.09E-08	7.88E-09	4.82E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
IRP	kBq U235 eq.	6.87E-02	2.80E-03	7.49E-03	1.24E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETP-fw	CTUe	1.50E-04	1.04E-05	5.18E-04	4.60E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-c	CTUh	1.01E-10	3.51E-11	2.19E-11	1.55E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HTP-nc	CTUh	3.91E-09	5.42E-10	5.47E-10	2.38E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SQP	-	1.12E+00	1.24E+00	1.62E+00	5.55E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDICATORS DESCRIBING RESOURCE CONSUMPTION: 1 kg of PP ML sewer pipe

		Life cycle stage								
Indicator	**Unit**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	7.06E-01	3.26E-02	5,68E-01	1.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERMIAN	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
PERT	MJ	7.06E-01	3.26E-02	5,68E-01	1.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PEN-RE	MJ	4.75E+01	2.19E+00	6.77E+00	9.59E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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
PENRT	MJ	4.75E+01	2.19E+00	6.77E+00	9.59E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	Kg	0.00E+00	0.00E+00	2.45E-03	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
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
FW	m3	1.36E-02	3.26E-04	8.82E-03	1.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDICATORS DESCRIBING OUTPUT STREAMS AND WASTE: 1 kg of PP ML sewer pipe										
	Life cycle stage									
Indicator	**Unit (referenced to DU)**	**A1**	**A2**	**A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Amount of hazardous waste	Kg	HV	HV	2.48E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Amount of non-hazardous waste	Kg	HV	HV	2.47E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Amount of radioactive waste	Kg	HV	HV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reusable components	Kg	HV	HV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recyclable materials	Kg	HV	HV	2.45E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Energy Recovery Materials	Kg	HV	HV	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	HV	HV	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})	**2.45E-02**

6. INTERPRETATION OF RESULTS

Figure 3 shows a graph of the contributions of individual life cycle modules to the basic categories of impact of PP ML sewer pipe:

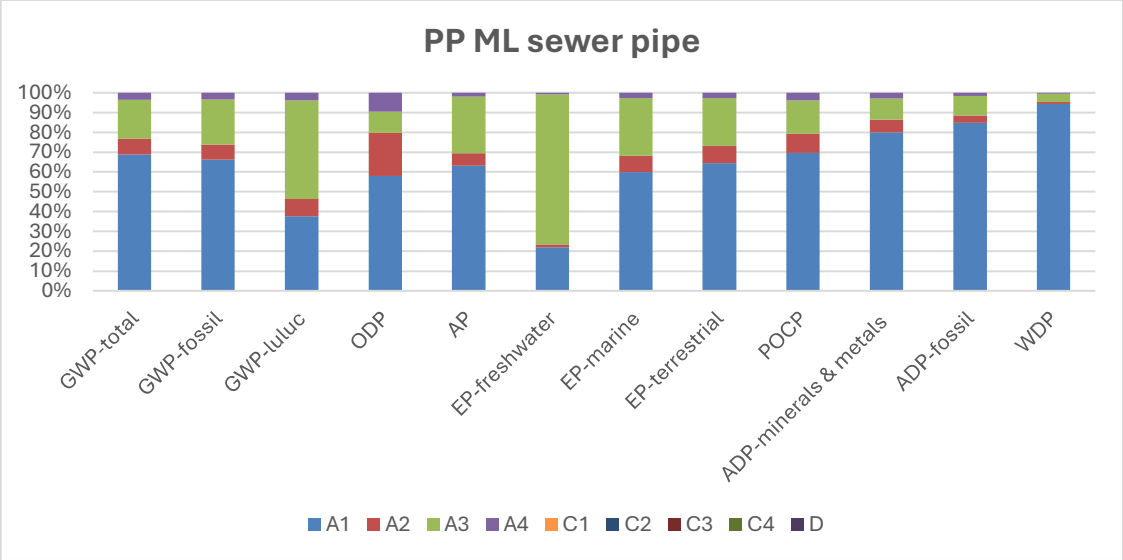


Figure 3 Shares of life cycle modules on the main categories of impacts – PP ML sewer pipe.

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 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.
- ✓ 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.kaczmarek2.pl/**

Explanatory material can be obtained by contacting the representative directly Kaczmarek Malewo Sp.K.

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PROCESS ENGINEERING RESEARCH GROUP

TYPE III ENVIRONMENTAL DECLARATION CERTIFICATE

no. 03-06/2024

Products:

PP ML sewer pipes

Owner:

Kaczmarek Malewo Sp.K.

Malewo 1, 63-800 Gostyń

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 **June 11, 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 Center of Environmental Engineering

Joanna Poluszyńska, PhD

Opole, June 2024