

ENVIRONMENTAL PRODUCT DECLARATION
No. 06-05/2024

PP sewage fittings



Declaration owner:

Kaczmarek Malewo Sp.K.

Program Owner:

Łukasiewicz – Institute of Ceramics and
Building Materials
Environmental Engineering Center

Name of program

Environmental Product Declarations – B2B

Release Date:



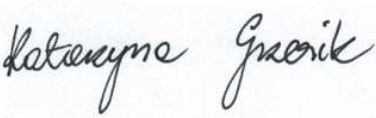
29.05.2024

Declaration valid until:

29.05.2029

1. OVERVIEW

<p>Program owner: Kaczmarek Malewo Sp.K.</p>	<p>Products covered by the declaration: PP sewage fittings</p>
<p>Program Owner: Łukasiewicz – Institute of Ceramics and Building Materials Environmental Engineering Center in Opole. http://www.icimb.pl/opole/</p>	<p>Declaration owner: Kaczmarek Malewo Sp.K. Malewo 1, 63-800 Gostyń Telefon: +48 65 575 86 00 Adres e-mail: sekretariat@kaczmarek2.pl https://www.kaczmarek2.pl/</p>
<p>Date of issue: 29.05.2024</p>	<p>Declared Product/Declared Unit: 1 kg (1 kilogram) of PP sewage fittings</p>
<p>Declaration valid until: 29.05.2029</p>	<p>The declaration includes: PP sewage fittings manufactured in the Kaczmarek Malewo Sp.K. plant. in Piaski and Malewo.</p> <p>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.</p> <p>The average values of the input and output streams were calculated based on data provided by the manufacturer from one production plant. Contains information about the impact of the declared products on the environment. All data regarding the production cycle were collected by Kaczmarek Malewo Sp.K. from the period from January 1, 2022 to December 31, 2022 (12 months) and correspond to the production technology at that time.</p> <p>The life cycle assessment was developed in accordance with the requirements of the PN-EN ISO 15804+A2:2020, PN-EN ISO 14025 and PN-EN ISO 14040 standards. The product categorization rules were adopted in accordance with the PN-EN 15804 standard. The owner of the declaration is responsible for the underlying information and evidence. Łukasiewicz Research Network - Institute of Ceramics and Building Materials Environmental Engineering Center is not responsible for the manufacturer's information, data and evidence regarding life cycle assessment.</p> <p>Declarations that are the result of different programs or are not performed in accordance with the standard may not be comparable.</p> <p>]</p>

Product Categorization (PCR) Rules	According to the standard: PN-EN 15804+A2:2020-03 Sustainability of construction works. Environmental Product Declarations. Basic principles of categorization of construction products.
Representativeness:	Polish product, year 2022
Declared durability:	100 years
Reasons for performing LCA:	B2B
Life Cycle Analysis (LCA):	The LCA analysis includes modules A1-A3, A4, C1-C4 and D according to PN-EN 15804+A2 (Cradle-to-Gate with options)
<p>The Łukasiewicz – Institute of Ceramics and Building Materials Environmental Engineering Center provides access to the Type III environmental declaration for PP sewage fittings Kaczmarek Malewo Sp.K. to interested parties.</p>	
<p>Authors' team: Katarzyna Kiprian, M.Sc. Ewa Głodek-Bucyk, Ph.D. Patryk Okoń, M.Sc.</p> <p>Approved:</p>  <p>Joanna Poluszyńska, PhD Director of the Center for Environmental Engineering</p>  <p>Ewa Głodek-Bucyk, Ph.D. Leader of the Process Engineering Research Group</p>	<p>Review:</p> <p>CEN standard PN-EN 15804+A2 serves as the main PCR document. Independent verification of declarations and data according to EN ISO 14025:2010</p> <p><input type="checkbox"/> Internal <input checked="" type="checkbox"/> External</p>  <p>Katarzyna Grzesik, PhD, DSc</p>

2. MANUFACTURER AND PRODUCT INFORMATION



Figure 1. Production plant in Malewo.

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. Production also takes place in the second production plant in Piaski. 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-u 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.*

External sewage fittings made of polypropylene (**PP**) are manufactured in accordance with the requirements of the PN-EN 1852-1 standard, intended for use with PP and PVC-U sewage pipes in non-pressure underground sanitary, drainage, combined or industrial sewage systems, laid in the ground under heavily loaded roads or in other areas.

The production of **PP** fittings is carried out according to the diagram (Fig. 3).



Figure 3: Diagram of the production process of PP sewage fittings.



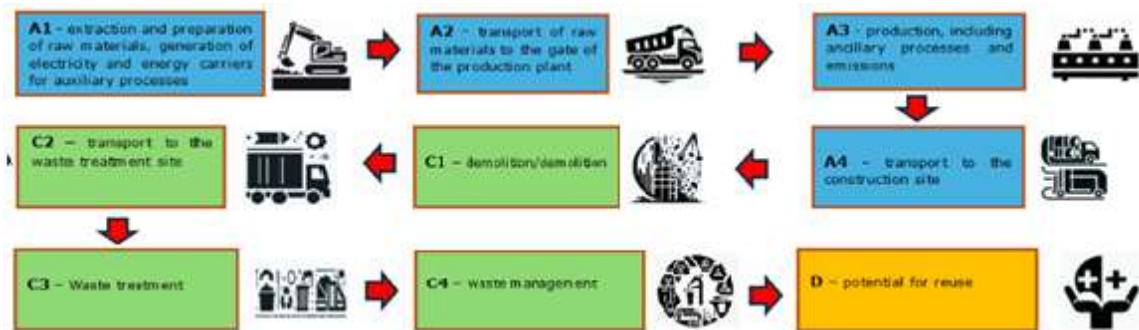
Technical data:

Material	Mass participation[%]
POLYPROPYLENE (PP)	99
DYE	1

Polypropylene density $\geq 900 \text{ kg/m}^3$

3. LCA: SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

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



Duration of data collection The data on the production process were provided in 2024 for the period from January 1, 2022 to December 31, 2022.

Declared Unit (DU) **1 kg** (1 kilogram) of product **PP sewage pipes**

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 - CO₂, NO_x, SO₂ 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 CO₂/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 sewage fittings. 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** sewage fittings 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 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 **PP sewage fittings**. 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 kg of PP sewage fittings										
Indicator	Unit	Life Cycle Stage								
		A1	A2	A3	A4	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	1,98E+00	2,60E-01	2,23E-01	6,64E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP-fossil	kg CO ₂ eq.	1,97E+00	2,60E-01	4,89E-01	6,63E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP-biogenic	kg CO ₂ eq.	1,11E-02	2,44E-04	-2,67E-01	6,22E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP-luluc	kg CO ₂ eq.	4,80E-04	1,26E-04	7,55E-04	3,22E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ODP	kg CFC11 eq.	1,14E-08	5,51E-09	2,63E-09	1,41E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
AP	mol H+ eq.	6,73E-03	5,54E-04	2,34E-03	1,41E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EP-freshwater	kg PO ₄ eq.	2,19E-04	1,80E-05	5,96E-04	4,60E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EP-marine	kg N eq.	1,17E-03	1,40E-04	5,12E-04	3,57E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EP-terrestrial	mol N eq.	1,24E-02	1,42E-03	4,28E-03	3,62E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
POCP	kg NMVOC eq.	6,13E-03	8,58E-04	1,35E-03	2,19E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADP-minerals & metals	kg Sb eq.	8,87E-06	8,30E-07	7,30E-07	2,11E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADP-fossil	MJ	7,11E+01	3,60E+00	5,83E+00	9,18E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
WDP	WDP (m ³) świat. ekw	1,39E+00	1,50E-02	7,51E-02	3,84E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADDITIONAL IMPACT INDICATORS: 1 kg PP sewage fittings										
Indicator	Unit	Life Cycle Stage								
		A1	A2	A3	A4	C1	C2	C3	C4	D
PM	Disease incidence	7,24E-08	1,88E-08	1,14E-08	4,82E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
IRP	kBq U235 eq.	1,01E-01	4,89E-03	1,73E-02	1,24E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETP-fw	CTUe	2,19E-04	1,80E-05	5,96E-04	4,60E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
HTP-c	CTUh	1,37E-10	6,06E-11	2,86E-10	1,55E-11	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
HTP-nc	CTUh	5,74E-09	9,31E-10	1,21E-09	2,38E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
SQP	-	1,62E+00	2,17E+00	2,71E+01	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 sewage fittings										
Life Cycle Stage										
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
PERE	MJ	1,04E+00	5,68E-02	5,29E+00	1,45E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
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
PERT	MJ	1,04E+00	5,68E-02	5,29E+00	1,45E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PEN-RE	MJ	7,21E+01	3,76E+00	7,20E+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	7,21E+01	3,76E+00	7,20E+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	5,27E-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	m ³	2,00E-02	5,65E-04	1,37E-02	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 PP sewage fittings										
Life Cycle Stage										
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
Amount of hazardous waste	kg	WN	WN	2,51E-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	WN	WN	5,34E-03	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
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
Recyclable Materials	kg	WN	WN	5,27E-03	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
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

Biogenic carbon	
Biogenic carbon content in the product (kg C_{org})	0.00E+00
Biogenic carbon content in the package (kg C_{org})	3,73E-02

6. INTERPRETATION OF RESULTS

Figure 3 presents a diagram of the shares of individual modules of the life cycle on the basic categories of impact of **PP** sewage fittings:

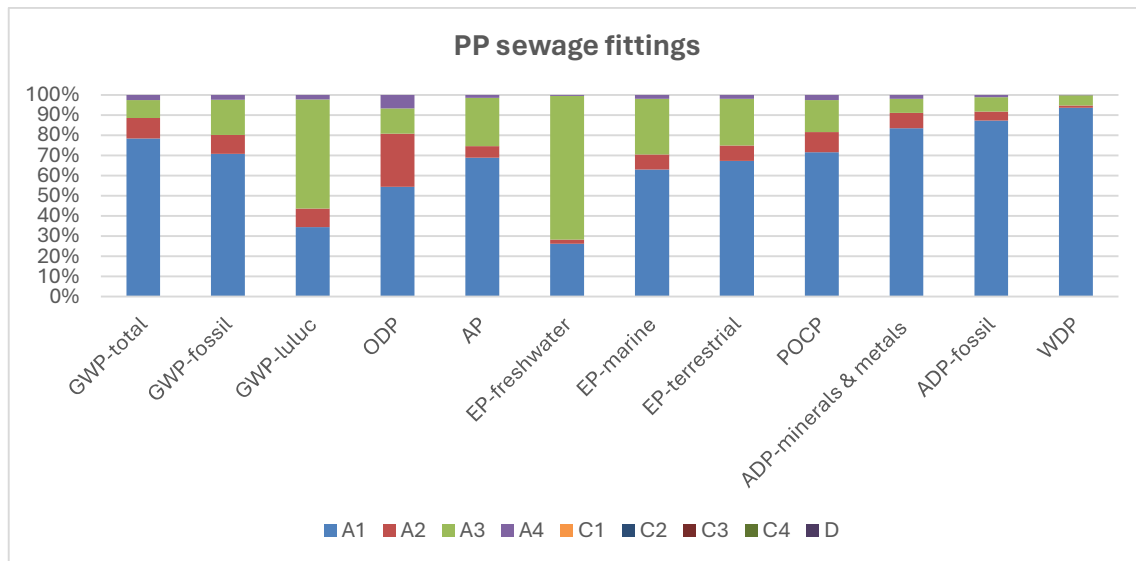


Figure 3 Shares of life cycle modules for the main categories of inflows-**PP** sewage fittings.

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.
- ✓ Data from the company's website: <https://www.kaczmarek2.pl/>

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