THE INTERNATIONAL EPD® SYSTEM

# ENVIRONMENTAL PRODUCT DECLARATION

In accordance with **ISO 14025:2006** and **EN 15804:2012+A2:2019** for:

## KONTI KAN Corrugated PPHM pipes and fittings*

from

## *Konti Hidroplast*

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|---|---|
| Programme: | The International EPD® System, www.environdec.com |
| Programme operator: | EPD International AB |
| EPD registration number: | EPD-IES-0024268 |
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**EPD of multiple products, based on the average result of the product group.*
*An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com*

# Programme information

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| **Programme:** | The International EPD® System |
| **Address:** | EPD International AB<br>Box 210 60<br>SE-100 31 Stockholm<br>Sweden |
| **Website:** | www.environdec.com |
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| **Accountabilities for PCR, LCA and independent, third-party verification** |
|---|
| **Product Category Rules (PCR)** |
| PCR: *CEN standard EN 15804, and construction products PCR 2014:14, v1.3.4* |
| PCR review was conducted by: *The Technical Committee of the International EPD® System. A full list of members is available on www.environdec.com. The review panel may be contacted at info@environdec.com.* |
| **Life Cycle Assessment (LCA)** |
| LCA accountability: *Edis Glogić, LCA consultant* |
| **Third-party verification** |
| Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:<br><br>☒ EPD verification by individual verifier<br><br>Third-party verifier: *Silvia Vilčeková*<br><br>Approved by: The International EPD® System |
| Procedure for follow-up of data during EPD validity involves third-party verifier:<br><br>☐ Yes ☒ No<br><br>[Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier] |

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see ISO 14025.

# Company information

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| **Manufacturer** | **Konti Hidroplast DOOEL** |
| **Address** | Industriska 5, 1480 Gevgelija , North Macedonia |
| **Contact details:** | Gordana Manoleva, +389 70 216 292, gordanam@konti-hidroplast.com.mk, Industriska 5, 1480 Gevgelija, North Macedonia |
| **Website:** | www.konti-hidroplast.com.mk |

**Description of the organisation:**

Konti Hidroplast is a leading private enterprise in the Balkans, specializing in the production and distribution of polymer-based products and solutions. Established in 1990, the company began with the manufacturing of polyethylene (PE) water pipes and has since evolved to include polypropylene (PP) and significantly broaden its product portfolio. Today, the company is a recognized expert in piping systems for water supply, gas distribution, sewage, drainage, and other infrastructure applications, serving both utility and industrial sectors. With a strong export orientation, Konti Hidroplast has established a presence across Europe and North Africa, and continues to grow as a trusted partner in international markets.

**Product-related or management system-related certifications:**

Pipes are manufactured under a recognized Quality and environmental management system standars, such as ISO 9001 (Quality Management System) and ISO 14001 standards (Environmental Management System).

**Name and location of production site:**

Industriska 5, 1480 Gevgelija, North Macedonia

# Product information

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|---|---|
| **Product name:** | **KONTI KAN Corrugated PPHM pipes and fittings** |
| **Product reference:** | https://konti-hidroplast.com.mk/wp-content/uploads/2024/10/konti-kan-pp-hm-2023-en.pdf |
| **UN CPC code** | 36320 - Tubes, pipes and hoses, and fittings therefor, of plastics |

**Product description:**

KONTI KAN double-wall corrugated polypropylene copolymer (PPHM) pipes and fittings are used in construction of sewerage, rainwater, ground and domestic drainage, and specialty waste management for utilities and industry. The pipes are highly resistant to cracking and mechanical shocks, and possess high thermal and chemicals resistance suitable for non-pressurized industrial systems. Fittings are used to produce seamless seal between pipes and transportation network. The pipes

conform to the EN 13476-3 standards concerning polymer sewage ducts with structural walls and EN 476 standard regarding their temperature stress levels, able to withstand temperature ranging from -15°C to +60°C. The latest research into PP pipes and specific performance tests indicate a minimum service life of 100 years. The impacts represented in this EPD account for approximately 95% pipes and 5% fittings, as an average based on the different pipe sizes and fittings used.

**Geographical scope:**

Modules A1 and A2: Global
Module A3: North Macedonia
Modules A4, A5, C1-C4 & D: Europe

# LCA information

**Declared unit:**

1 kg of product (pipes and fittings)

**Time representativeness:**

Data used for LCA calculation is 2024 (calendar year).

**Database(s) and LCA software used:**

Modeling is carried out using Ecoinvent database version 3.10.1 and OpenLCA software version 2.4.0.

**Description of system boundaries:**

The scope of this analysis Cradle-to-gate with options (A4, A5), C1-C4, D. Use stage (B1-B7) is not considered.

Manufacture and packaging (A1-A3)

Pipes are manufactured at a single industrial site in North Macedonia by means of double-wall extrusion combined with vacuum for forming the corrugation and socket. Fittings and rubber gaskets are injection-molded. Material inputs for both pipes and fittings consist of plastic resin mixed with masterbaches in pellet form to achieve a required color, and rubber resin for gaskets used as seals. Additives to achieve certain properties such as UV resistance are already part of imported raw PP resin; therefore, no additives, antioxidants or stabilizers are further added during manufacturing. Materials are imported from Europe and the Middle East with an approximated distance of 3647 km by sea and 381 km by road. Only primary (virgin) materials are used in manufacturing. Material losses during production (2%) are recycled in a closed-loop system. Electricity used in the manufacturing process is sourced from the national grid in North Macedonia (82%) and from on-site photovoltaic generation (18%).

Water is used for cooling during the manufacturing process and is reused multiple times before being disposed of. The wastewater does not contain any significant contamination beyond traces of lubricant and plastic particles. This is the only emission output from production.
Packaging materials, including wooden pallets, PET plastic straps, and strapping steel tape, are used to secure products during transport. They are used in small quantities, as only 35% of the products are packaged, with the rest sold as loose pipes.

Transport and installation (A4, A5)

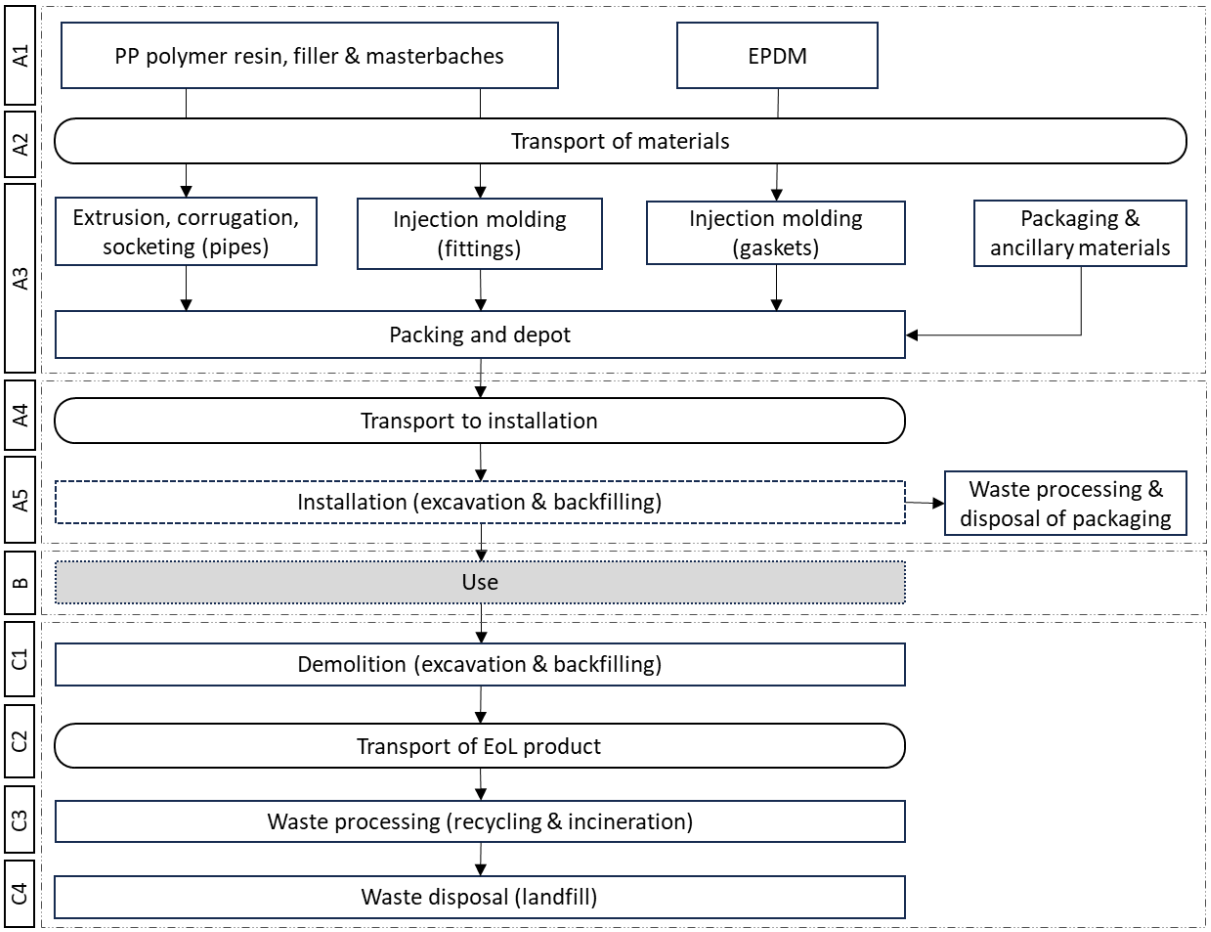
Transportation distance from the manufacturer to the user is based on average sales figures for 2024. Pipes are mostly exported to European Union (EU) countries by truck, covering an average distance of 430 km. Installation of pipes and fittings involves excavation and backfilling. Disposal of transportation materials is considered based on an average EU context. The following recycling, incineration, and landfill ratios were considered: 31%-31%-38% for wood[1], 32.5%-42.5%-25% for plastics[2] and 85.5%-0%-14.5% for metal[3]. It is assumed that the incineration of wood and plastic is carried out with energy recovery of which electricity accounts for 11% and heat for 62% (Eriksson & Finnveden, G. 2017).

Product end-of-life (C1-C4 & D)

At the end of life, pipes are excavated from the ground and sent for waste processing and disposal. Waste treatment is based on an average EU context, using the same rates of landfill, recycling, and incineration as previously described for plastic packaging. Transport to waste processing is estimated at 50 km. Environmental benefits and loads from potential product and packaging recycling and incineration are reported in Module D. Loads represent the impacts arising from the recycling process, while benefits result from the avoided production of equivalent virgin or recycled materials.

[1] Eurostat and PSR-0014 v2 (2023)
[2] EuroParl (2023)
[3] Apeal (2020)

**System diagram:**




**Allocation and assumptions**

All raw, auxillary and packaging materials and manufacturing energy are allocated from annual average production data. Allocation of packaging materials was carried out based on approximate quantities for specific product transporation, and allocation of energy and water was carried out based on physcial parameters (mass and process conditions).

**Cut-off criteria**

The study includes all the major material and energy consumption, with a minimum 95% of the input and output flows reported, in accordance with EN15804+A2:2019 standard. The cut-off includes the impacts associated with capital goods (equipment, machinery, vehicles, and buildings), fuel and lubricant use for machinery cranes and forklifts, and fuel use for stamping and compacting during installation. Specific data for these were not available, difficult to average across product lines and are likely small.

| | Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | | Resource recovery stage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Raw material supply | Transport | Manufacturing | Transport | Construction installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Modules declared | X | X | X | X | X | ND | ND | ND | ND | ND | ND | ND | X | X | X | X | X |
| Geography | GLO | GLO | NM | EU | EU | ND | ND | ND | ND | ND | ND | ND | EU | EU | EU | EU | EU |
| Share of specific data | >90 % | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation - products | - | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Variation - sites | - | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

# Content declaration

| **Product components** | **Weight, kg** | **Post-consumer material, weight-%** | **Biogenic material, weight-% and kg C/declared unit** |
|---|---|---|---|
| PP | 0.961 | 0% | 0% |
| Filler | 0.027 | 0% | 0% |
| Rubber (EPDM) | 0.012 | 0% | 0% |
| TOTAL | 1 | 0% | 0% |
| **Packaging materials** | **Weight, kg** | **Weight-% (versus the product)** | **Weight biogenic carbon, kg C/declared unit** |
| Wood (pallet) | 0.008 | 0.77% | 3.07E-03 |
| PET (straping) | 3.96E-04 | 0.04% | 0 |
| Steel (tape) | 1.96E-04 | 0.02% | 0 |
| TOTAL | 0.008 | 0.83% | 3.07E-03 |
| **Dangerous substances from the candidate list of SVHC for Authorisation** | **EC No.** | **CAS No.** | **Weight-% per functional or declared unit** |
| - | - | - | 0% |

# Results of the environmental performance indicators

## Mandatory impact category indicators according to EN 15804

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| **GWP-total** | kg $CO_2$ eq. | 4.1E+00 | 6.6E-02 | 1.3E-01 | 5.6E-02 | 7.7E-03 | 1.2E+00 | 2.6E-02 | -1.7E+00 |
| **GWP-fossil** | kg $CO_2$ eq. | 4.1E+00 | 6.6E-02 | 1.3E-01 | 5.6E-02 | 7.7E-03 | 1.2E+00 | 2.6E-02 | -1.7E+00 |
| **GWP-biogenic** | kg $CO_2$ eq. | -2.1E-02 | 4.0E-05 | 3.2E-02 | 1.8E-05 | 4.6E-06 | -3.5E-04 | 2.3E-05 | 1.2E-02 |
| **GWP-luluc** | kg $CO_2$ eq. | 1.8E-03 | 2.3E-05 | 1.4E-05 | 5.9E-06 | 2.6E-06 | 7.5E-05 | 1.6E-06 | -8.3E-04 |
| **ODP** | kg CFC 11 eq. | 1.0E-07 | 1.3E-09 | 2.4E-09 | 1.1E-09 | 1.5E-10 | 1.6E-09 | 7.2E-11 | -2.9E-08 |
| **AP** | mol $H^+$ eq. | 1.7E-02 | 3.0E-04 | 1.1E-03 | 4.8E-04 | 3.4E-05 | 4.7E-04 | 2.0E-05 | -9.5E-03 |
| **EP-freshwater** | kg P eq. | 1.8E-03 | 4.6E-06 | 5.5E-06 | 2.4E-06 | 5.3E-07 | 1.8E-05 | 2.9E-07 | -6.0E-04 |
| **EP-marine** | kg N eq. | 3.3E-03 | 1.2E-04 | 5.0E-04 | 2.2E-04 | 1.3E-05 | 2.0E-04 | 5.7E-05 | -1.4E-03 |
| **EP-terrestrial** | mol N eq. | 3.2E-02 | 1.3E-03 | 5.5E-03 | 2.4E-03 | 1.5E-04 | 1.8E-03 | 8.1E-05 | -1.5E-02 |
| **POCP** | kg NMVOC eq. | 1.7E-02 | 4.6E-04 | 1.7E-03 | 7.4E-04 | 5.3E-05 | 6.0E-04 | 3.4E-05 | -6.3E-03 |
| **ADPE*** | kg Sb eq. | 2.4E-05 | 2.1E-07 | 5.8E-08 | 2.5E-08 | 2.4E-08 | 5.4E-07 | 6.1E-09 | -5.3E-06 |
| **ADPF*** | MJ | 9.1E+01 | 9.5E-01 | 1.6E+00 | 7.2E-01 | 1.1E-01 | 1.4E+00 | 6.2E-02 | -3.1E+01 |
| **WDP*** | $m^3$ | 1.1E+00 | 4.2E-03 | 3.8E-03 | 1.9E-03 | 4.8E-04 | 2.7E-02 | -4.0E-02 | -2.9E-01 |
| **Acronyms** | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; 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; ADP**E** = Abiotic depletion potential for non- fossil resources; ADP**F** = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption | | | | | | | | |

**Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

## Additional mandatory and optional impact category indicators

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| **GWP-GHG** | kg $CO_2$eq. | 4.1E+00 | 6.6E-02 | 1.3E-01 | 5.6E-02 | 7.7E-03 | 1.2E+00 | 2.6E-02 | -1.7E+00 |

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| **PM** | Disease incidence | 1.7E-07 | 6.4E-09 | 3.1E-08 | 1.4E-08 | 7.4E-10 | 6.7E-09 | 4.5E-10 | -1.0E-07 |
| **IRP*** | kBq U235 eq. | 1.9E-01 | 1.3E-03 | 1.3E-03 | 5.9E-04 | 1.4E-04 | 4.8E-03 | 6.1E-05 | -1.1E-01 |
| **ETP-fw**** | CTUe | 3.6E+01 | 2.5E-01 | 3.3E-01 | 1.4E-01 | 2.8E-02 | 1.0E+00 | 8.4E-02 | -9.7E+00 |
| **HTP-c**** | CTUh | 1.1E-08 | 4.5E-10 | 8.3E-10 | 3.7E-10 | 5.2E-11 | 1.4E-09 | 1.6E-11 | -2.5E-09 |
| **HTP-nc**** | CTUh | 3.1E-08 | 6.6E-10 | 2.6E-10 | 1.1E-10 | 7.6E-11 | 2.6E-09 | 2.5E-10 | -1.1E-08 |
| **SQP**** | dimensionless | 1.2E+01 | 7.1E-01 | 1.2E-01 | 5.3E-02 | 8.2E-02 | 9.7E-01 | 1.4E-01 | -7.9E+00 |
| **Acronyms** | PM = Particulate matter emissions; IRP = Ionizing radiation, human health; ETP-fw = Eco-toxicity-freshwater; HTP-c = Human toxicity, cancer effect; HTP-nc = Human toxicity, non-cancer effects; SQP = Land use related impacts/Soil quality | | | | | | | | |

**Disclaimer: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.*

***Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

## Resource use indicators

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| **PERE** | MJ | 2.8E+00 | 1.6E-02 | 1.2E-01 | 7.2E-03 | 1.8E-03 | 7.0E-02 | 8.9E-04 | -2.1E+00 |
| **PERM** | MJ | 1.1E-01 | 0.0E+00 | -1.1E-01 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| **PERT** | MJ | 2.9E+00 | 1.6E-02 | 1.6E-02 | 7.2E-03 | 1.8E-03 | 7.0E-02 | 8.9E-04 | -2.1E+00 |
| **PENRE** | MJ | 4.8E+01 | 9.5E-01 | 1.6E+00 | 7.2E-01 | 1.1E-01 | 6.3E+00 | 1.1E+01 | -3.1E+01 |
| **PENRM** | MJ | 4.3E+01 | 0.0E+00 | -8.7E-03 | 0.0E+00 | 0.0E+00 | -3.2E+01 | -1.1E+01 | 0.0E+00 |
| **PENRT** | MJ | 9.1E+01 | 9.5E-01 | 1.6E+00 | 7.2E-01 | 1.1E-01 | 1.4E+00 | 6.2E-02 | -3.1E+01 |
| **SM** | kg | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| **RSF** | MJ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| **NRSF** | MJ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| **FW** | $m^3$ | 2.6E-02 | 1.4E-04 | 1.3E-04 | 6.3E-05 | 1.6E-05 | 7.8E-04 | -9.2E-04 | -1.2E-02 |
| **Acronyms** | 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; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water | | | | | | | | |

## Waste indicators (optional)

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| **Hazardous waste disposed** | kg | 3.0E-03 | 2.5E-05 | 3.9E-05 | 7.0E-06 | 2.8E-06 | 8.5E-03 | 1.6E-06 | 1.6E-03 |
| **Non-hazardous waste disposed** | kg | 2.6E-01 | 5.9E-02 | 4.4E-03 | 5.8E-04 | 6.7E-03 | 6.2E-02 | 2.5E-01 | -9.7E-03 |
| **Radioactive waste disposed** | kg | 4.7E-05 | 3.1E-07 | 3.3E-07 | 1.5E-07 | 3.6E-08 | 1.2E-06 | 1.5E-08 | -2.7E-05 |

## Output flow indicators (optional)

| Indicator | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|
| **Components for reuse** | kg | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| **Material for recycling** | kg | 0.0E+00 | 0.0E+00 | 2.7E-03 | 0.0E+00 | 0.0E+00 | 3.3E-01 | 0.0E+00 | 0.0E+00 |
| **Materials for energy recovery** | kg | 0.0E+00 | 0.0E+00 | 2.5E-03 | 0.0E+00 | 0.0E+00 | 4.3E-01 | 0.0E+00 | 0.0E+00 |
| **Exported energy, electricity** | MJ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.6E+00 | 0.0E+00 | 0.0E+00 |
| **Exported energy, thermal** | MJ | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.2E+01 | 0.0E+00 | 0.0E+00 |

Disclaimer: The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of modules A1-A3 should not be used without considering the results of module C.

# Additional environmental information

The company strives to minimize the use of energy and water, and improve the recycling efficiency in manufacturing. Energy-saving tips and instructions are in place to reduce consumption during production with high control and scheduling of machine operation using licensed software to measure and optimize energy use.
Konti Hidroplast is committed to supporting a circular economy by designing products for long life and recyclability, optimize production, waste reuse, and collaboration with other industries to close material cycles. The corrugated PPHM pipes and fittings are made of highly recyclable polypropylene and given the nature of seggragated collection at the end-of-life without crosscontamination with other plastics, they have a good potential to be recycled and used as raw material for new piping products or other plastic-based applications.

The company strives to minimize the use of energy and water, and improve the recycling efficiency in manufacturing. Energy-saving tips and instructions are in place to reduce consumption during production with high control and scheduling of machine operation using licensed software to measure and optimize energy use.
Konti Hidroplast is committed to circular economy by designing products for long life and recyclability, optimizing production, reuse of waste, and through collaboration with other industries to close material cycles. The corrugated PPHM pipes and fittings are made of highly recyclable polypropylene and given their seggragated collection at the end-of-life without crosscontamination with other plastics, they have a good potential to be recycled and reused as raw material for new pipes or other plastic products.

# References

European Committee for Standardization (CES), EN 15804+A2:2019/AC:2021 Sustainabilty of construction works – Environmental product declarations – Core rules for the product category of construction products

Eriksson, O.; Finnveden, G. Energy Recovery from Waste Incineration—the Importance of Technology Data and System Boundaries on CO2 Emissions. Energies 2017, 10 (4), 539.

General Programme Instructions of the Internatonal EPD System. Version 5.0. PCR 2019:14. Construction products. Version 1.3.4.

ISO 14025: Environmental labels and declarations — Type III environmental declarations — Principles and procedures, International Organization for Standardization, ISO 14025:2006.