# Environmental Profile

This LCA is calculated according to: ISO 14044, ISO 14040 and EN 15804

Ecochain v3.5.80

| | |
|---|---|
| Product: | 3021022 - PVC Pipe GY BENOR 315x9.2 SN8 L=3 SC/CH |
| Unit: | 1 piece |
| Manufacturer: | Wavin - NL - Hardenberg - Verified |
| Address: | J.C. Kellerlaan 3<br>7772 SG Hardenberg<br>Netherlands |

Wavin carries a complete PVC range of outdoor sewers. With PVC as a material, a smooth-walled, flexible and completely watertight piping system is obtained. Moreover, PVC is absolutely resistant to all substances that occur in domestic waste water. By working with a light material, large pipe lengths and plug connections, a very fast installation is guaranteed.

| | |
|---|---|
| LCA standard: | NMD Bepalingsmethode 1.1 (2022) |
| Standard database: | Worldwide - Ecoinvent v 3.6 Cut-Off |
| Externally verified: | Yes |
| Issue date: | 08-06-2023 |
| End of validity: | 08-06-2028 |
| Verifier: | Martijn van Hövell - SGS Search |

This LCA was evaluated according to EN15804+A2. It was concluded that the LCA complies with this standard.

The LCA background information and project dossier have been registered in the online Ecochain application in the account Wavin - NL - Hardenberg - Verified (2020). (☑ = module declared, MND = module not declared).

| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ☑ | ☑ | ☑ | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | ☑ | ☑ | ☑ | ☑ |

**Product stage**

A1 Raw material supply A2 Transport A3 Manufacturing

**Construction process stage**

A4 Transport gate to site
A5 Assembly / Construction installation process

**Use stage**

B1 Use B2 Maintenance B3 Repair B4 Replacement B5 Refurbishment
B6 Operational energy use B7 Operational water use

**End-of-Life stage**

C1 De-construction demolition C2 Transport C3 Waste processing
C4 Disposal

**Benefits and loads beyond the system boundaries**

D Reuse- Recovery- Recycling- potential

## Environmental impacts and parameters

**ECI** = Environmental Costs Indicator [euro]; **ADPE** = Abiotic depletion potential for non-fossil resources [kg Sb-eq]; **ADPF** = Abiotic depletion potential for fossil resources [kg Sb-eq]; **GWP** = Global warming potential [kg CO2-eq]; **ODP** = Depletion potential of the stratospheric ozone layer [kg CFC-11-eq]; **POCP** = Formation potential of tropospheric ozone photochemical oxidants [kg ethene-eq]; **AP** = Acidification potential of land and water [kg SO2-eq]; **EP** = Eutrophication potential [kg PO4 3−-eq]; **HTP** = Human toxicity potential [kg 1,4-DB-eq]; **FAETP** = Freshwater aquatic ecotoxicity potential [kg 1,4-DB-eq]; **MAETP** = Marine aquatic ecotoxicity potential [kg 1,4-DB-eq]; **TETP** = Terrestrial ecotoxicity potential [kg 1,4-DB-eq]; **GWP-total** = EF EN15804+A2 Climate Change [kg CO2 eq]; **GWP-f** = EF Climate change - Fossil [kg CO2 eq]; **GWP-b** = EF EN15804+A2 Climate Change - Biogenic [kg CO2 eq]; **GWP-luluc** = EF EN15804+A2 Climate Change - Land use and LU change [kg CO2 eq]; **ODP** = EF Ozone depletion [kg CFC11 eq]; **AP** = EF Acidification [mol H+ eq]; **EP-fw** = EF Eutrophication, freshwater [kg P eq]; **EP-m** = EF Eutrophication, marine [kg N eq]; **EP-T** = EF Eutrophication, terrestrial [mol N eq]; **POCP** = EF Photochemical ozone formation [kg NMVOC eq]; **ADP-mm** = EF Resource use, minerals and metals [kg Sb eq]; **ADP-f** = EF Resource use, fossils [MJ]; **WDP** = EF Water use [m3 depriv.]; **PM** = EF Particulate matter [disease inc.]; **IR** = EF Ionising radiation [kBq U-235 eq]; **ETP-fw** = EF Ecotoxicity, freshwater [CTUe]; **HTP-c** = EF Human toxicity, cancer [CTUh]; **HTP-nc** = EF Human toxicity, non-cancer [CTUh]; **SQP** = EF Land use [Pt]; **PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw materials [MJ]; **PERM** = Use of renewable primary energy resources used as raw materials [MJ]; **PERT** = Total use of renewable primary energy resources [MJ]; **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials [MJ]; **PENRM** = Use of non-renewable primary energy resources used as raw materials [MJ]; **PENRT** = Total use of non-renewable primary energy resources [MJ]; **PET** = Total energy [MJ]; **SM** = Use of secondary material [kg]; **RSF** = Use of renewable secondary fuels [MJ]; **NRSF** = Use of non-renewable secondary fuels [MJ]; **FW** = Use of net fresh water [m3]; **HWD** = Hazardous waste disposed [kg]; **NHWD** = Non-hazardous waste disposed [kg]; **RWD** = Radioactive waste disposed [kg]; **CRU** = Components for re-use [kg]; **MFR** = Materials for recycling [kg]; **MER** = Materials for energy recovery [kg]; **EE** = Exported energy [MJ]; **EET** = Exported energy thermic [MJ]; **EEE** = Exported energy electric [MJ]

## Statement of Confidentiality

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# Results

| Environmental impact SBK set 1 | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| ECI | euro | 8.31 | 0.22 | 0.37 | 8.9 | 0.13 | 3 | 0.02 | -4.14 | 7.91 |
| ADPE | kg Sb-eq | 2.33E-3 | 4.58E-5 | 6.66E-5 | 2.44E-3 | 2.86E-5 | 2.40E-4 | 3.01E-7 | -8.67E-4 | 1.84E-3 |
| ADPF | kg Sb-eq | 9.28E-1 | 1.32E-2 | 1.79E-2 | 9.59E-1 | 8.05E-3 | 8.44E-2 | 4.24E-4 | -4.89E-1 | 5.63E-1 |
| GWP | kg CO2-eq | 7.48E+1 | 1.79E+0 | 3.17E+0 | 7.98E+1 | 1.10E+0 | 2.93E+1 | 2.70E-1 | -4.13E+1 | 6.91E+1 |
| ODP | kg CFC-11-eq | 4.31E-5 | 3.18E-7 | 2.98E-7 | 4.37E-5 | 2.03E-7 | 3.41E-6 | 1.02E-8 | -2.14E-5 | 2.60E-5 |
| POCP | kg ethene-eq | 4.66E-2 | 1.08E-3 | 1.40E-3 | 4.91E-2 | 6.58E-4 | 6.64E-3 | 7.16E-5 | -2.09E-2 | 3.56E-2 |
| AP | kg SO2-eq | 2.90E-1 | 7.88E-3 | 1.25E-2 | 3.10E-1 | 4.72E-3 | 4.86E-2 | 2.26E-4 | -1.34E-1 | 2.30E-1 |
| EP | kg PO4 3−-eq | 3.46E-2 | 1.55E-3 | 1.97E-3 | 3.81E-2 | 9.43E-4 | 7.37E-3 | 8.82E-5 | -1.62E-2 | 3.03E-2 |
| HTP | kg 1,4-DB-eq | 2.94E+1 | 7.55E-1 | 1.20E+0 | 3.13E+1 | 4.69E-1 | 1.30E+1 | 2.32E-2 | -1.30E+1 | 3.18E+1 |
| FAETP | kg 1,4-DB-eq | 6.34E-1 | 2.20E-2 | 4.88E-2 | 7.05E-1 | 1.37E-2 | 1.95E-1 | 6.86E-3 | -2.84E-1 | 6.37E-1 |
| MAETP | kg 1,4-DB-eq | 1.86E+3 | 7.93E+1 | 1.99E+2 | 2.13E+3 | 4.91E+1 | 6.41E+2 | 8.42E+0 | -8.36E+2 | 2.00E+3 |
| TETP | kg 1,4-DB-eq | 2.01E-1 | 2.67E-3 | 7.44E-2 | 2.78E-1 | 1.66E-3 | 4.65E-2 | 7.71E-5 | -9.45E-2 | 2.32E-1 |
| Environmental impact | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| GWP-total | kg CO2 eq | 7.23E+1 | 1.81E+0 | 3.74E+0 | 7.78E+1 | 1.11E+0 | 3.46E+1 | 3.14E-1 | -4.26E+1 | 7.12E+1 |
| GWP-f | kg CO2 eq | 7.67E+1 | 1.81E+0 | 2.93E+0 | 8.14E+1 | 1.11E+0 | 2.96E+1 | 3.14E-1 | -4.23E+1 | 7.01E+1 |
| GWP-b | kg CO2 eq | -4.47E+0 | 8.35E-4 | 6.33E-1 | -3.84E+0 | 6.71E-4 | 5.02E+0 | 4.03E-4 | -2.93E-1 | 8.92E-1 |
| GWP-luluc | kg CO2 eq | 6.20E-2 | 6.62E-4 | 1.78E-1 | 2.41E-1 | 3.91E-4 | 1.31E-2 | 8.48E-6 | -2.79E-2 | 2.27E-1 |
| ODP | kg CFC11 eq | 4.25E-5 | 3.99E-7 | 3.54E-7 | 4.32E-5 | 2.55E-7 | 3.52E-6 | 1.26E-8 | -2.11E-5 | 2.59E-5 |
| AP | mol H+ eq | 3.49E-1 | 1.05E-2 | 1.60E-2 | 3.76E-1 | 6.30E-3 | 6.10E-2 | 3.03E-4 | -1.62E-1 | 2.82E-1 |
| EP-fw | kg P eq | 3.38E-3 | 1.82E-5 | 4.19E-5 | 3.44E-3 | 9.10E-6 | 4.35E-4 | 3.83E-7 | -1.56E-3 | 2.33E-3 |
| EP-m | kg N eq | 5.90E-2 | 3.69E-3 | 4.71E-3 | 6.74E-2 | 2.25E-3 | 1.49E-2 | 1.87E-4 | -2.82E-2 | 5.64E-2 |
| EP-T | mol N eq | 6.40E-1 | 4.07E-2 | 5.05E-2 | 7.31E-1 | 2.48E-2 | 1.64E-1 | 1.21E-3 | -3.04E-1 | 6.17E-1 |
| POCP | kg NMVOC eq | 2.22E-1 | 1.16E-2 | 1.43E-2 | 2.48E-1 | 7.10E-3 | 4.92E-2 | 4.12E-4 | -1.04E-1 | 2.01E-1 |
| ADP-mm | kg Sb eq | 2.33E-3 | 4.58E-5 | 6.66E-5 | 2.44E-3 | 2.86E-5 | 2.40E-4 | 3.01E-7 | -8.67E-4 | 1.84E-3 |
| ADP-f | MJ | 1.97E+3 | 2.73E+1 | 3.39E+1 | 2.03E+3 | 1.70E+1 | 1.67E+2 | 9.16E-1 | -1.02E+3 | 1.19E+3 |
| WDP | m3 depriv. | 1.28E+2 | 9.75E-2 | 2.29E+1 | 1.51E+2 | 5.21E-2 | 6.50E+0 | 5.27E-3 | -6.06E+1 | 9.68E+1 |
| PM | disease inc. | 2.55E-6 | 1.62E-7 | 2.48E-7 | 2.96E-6 | 9.98E-8 | 7.63E-7 | 6.28E-9 | -1.05E-6 | 2.78E-6 |
| IR | kBq U-235 eq | 4.18E+0 | 1.14E-1 | 6.12E-2 | 4.36E+0 | 7.42E-2 | 5.84E-1 | 4.20E-3 | -1.96E+0 | 3.06E+0 |
| ETP-fw | CTUe | 1.33E+3 | 2.43E+1 | 5.65E+1 | 1.41E+3 | 1.38E+1 | 1.25E+3 | 1.37E+1 | -6.08E+2 | 2.08E+3 |
| HTP-c | CTUh | 5.26E-8 | 7.89E-10 | 1.93E-9 | 5.53E-8 | 4.90E-10 | 1.85E-8 | 2.40E-11 | -2.25E-8 | 5.17E-8 |
| HTP-nc | CTUh | 1.65E-6 | 2.66E-8 | 5.90E-8 | 1.74E-6 | 1.64E-8 | 4.41E-7 | 2.64E-9 | -7.77E-7 | 1.42E-6 |
| SQP | Pt | 7.02E+2 | 2.37E+1 | 2.54E+0 | 7.28E+2 | 1.45E+1 | 1.05E+2 | 2.33E+0 | -2.06E+2 | 6.43E+2 |

| Resource use | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 1.63E+2 | 3.41E-1 | 1.02E+2 | 2.65E+2 | 2.43E-1 | 1.20E+1 | 3.31E-2 | -6.38E+1 | 2.14E+2 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 1.63E+2 | 3.41E-1 | 1.02E+2 | 2.65E+2 | 2.43E-1 | 1.20E+1 | 3.31E-2 | -6.38E+1 | 2.14E+2 |
| PENRE | MJ | 2.11E+3 | 2.89E+1 | 3.67E+1 | 2.18E+3 | 1.80E+1 | 1.78E+2 | 9.72E-1 | -1.10E+3 | 1.27E+3 |
| PENRM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ | 2.11E+3 | 2.89E+1 | 3.67E+1 | 2.18E+3 | 1.80E+1 | 1.78E+2 | 9.72E-1 | -1.10E+3 | 1.27E+3 |
| PET | MJ | 2.28E+3 | 2.93E+1 | 1.39E+2 | 2.45E+3 | 1.83E+1 | 1.90E+2 | 1.01E+0 | -1.17E+3 | 1.49E+3 |
| SM | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RSF | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NRSF | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FW | m3 | 1.38E+0 | 3.32E-3 | 5.40E-1 | 1.92E+0 | 1.92E-3 | 1.79E-1 | 1.12E-3 | -6.34E-1 | 1.47E+0 |
| Output flows and waste categories | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| HWD | kg | 1.56E-3 | 6.91E-5 | 4.75E-5 | 1.67E-3 | 4.34E-5 | 2.70E-4 | 1.11E-6 | -8.56E-4 | 1.13E-3 |
| NHWD | kg | 7.49E+0 | 1.73E+0 | 6.85E-2 | 9.28E+0 | 1.05E+0 | 6.26E+0 | 4.22E+0 | -3.26E+0 | 1.75E+1 |
| RWD | kg | 3.70E-3 | 1.79E-4 | 8.53E-5 | 3.96E-3 | 1.15E-4 | 6.27E-4 | 5.99E-6 | -1.73E-3 | 2.98E-3 |
| CRU | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MFR | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MER | kg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EE | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EET | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EEE | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |