# Environmental Profile

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

Ecochain v3.5.80

| | |
|---|---|
| Product: | 3052464 - Wafix PVC Branch 45° BR/GY 110 SN8 3S |
| 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 | 0.16 | 0 | 0.01 | 0.18 | 0 | 0.05 | 0 | -0.08 | 0.15 |
| ADPE | kg Sb-eq | 1.34E-3 | 5.41E-7 | 2.43E-6 | 1.34E-3 | 4.90E-7 | 4.20E-6 | 5.46E-9 | -1.62E-5 | 1.33E-3 |
| ADPF | kg Sb-eq | 1.84E-2 | 1.56E-4 | 4.17E-4 | 1.90E-2 | 1.38E-4 | 1.46E-3 | 7.57E-6 | -9.92E-3 | 1.07E-2 |
| GWP | kg CO2-eq | 1.47E+0 | 2.12E-2 | 7.91E-2 | 1.57E+0 | 1.88E-2 | 5.31E-1 | 5.44E-3 | -8.28E-1 | 1.30E+0 |
| ODP | kg CFC-11-eq | 7.42E-7 | 3.76E-9 | 6.25E-9 | 7.52E-7 | 3.48E-9 | 5.79E-8 | 1.81E-10 | -3.85E-7 | 4.28E-7 |
| POCP | kg ethene-eq | 9.27E-4 | 1.28E-5 | 3.44E-5 | 9.74E-4 | 1.13E-5 | 1.18E-4 | 1.38E-6 | -4.41E-4 | 6.64E-4 |
| AP | kg SO2-eq | 5.87E-3 | 9.31E-5 | 3.40E-4 | 6.30E-3 | 8.08E-5 | 8.43E-4 | 4.07E-6 | -2.77E-3 | 4.47E-3 |
| EP | kg PO4 3−-eq | 7.42E-4 | 1.83E-5 | 4.37E-5 | 8.04E-4 | 1.61E-5 | 1.30E-4 | 1.75E-6 | -3.70E-4 | 5.82E-4 |
| HTP | kg 1,4-DB-eq | 5.54E-1 | 8.92E-3 | 3.68E-2 | 5.99E-1 | 8.03E-3 | 2.27E-1 | 4.42E-4 | -2.56E-1 | 5.79E-1 |
| FAETP | kg 1,4-DB-eq | 1.66E-2 | 2.60E-4 | 1.26E-3 | 1.81E-2 | 2.35E-4 | 3.53E-3 | 1.74E-4 | -7.21E-3 | 1.48E-2 |
| MAETP | kg 1,4-DB-eq | 3.92E+1 | 9.37E-1 | 4.95E+0 | 4.51E+1 | 8.40E-1 | 1.17E+1 | 2.01E-1 | -1.65E+1 | 4.13E+1 |
| TETP | kg 1,4-DB-eq | 3.92E-3 | 3.15E-5 | 2.73E-3 | 6.69E-3 | 2.85E-5 | 7.99E-4 | 1.40E-6 | -2.39E-3 | 5.13E-3 |
| Environmental impact | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| GWP-total | kg CO2 eq | 1.52E+0 | 2.14E-2 | 9.05E-2 | 1.64E+0 | 1.89E-2 | 5.66E-1 | 6.34E-3 | -7.81E-1 | 1.45E+0 |
| GWP-f | kg CO2 eq | 1.51E+0 | 2.14E-2 | 6.96E-2 | 1.60E+0 | 1.89E-2 | 5.34E-1 | 6.34E-3 | -8.47E-1 | 1.31E+0 |
| GWP-b | kg CO2 eq | 1.25E-2 | 9.86E-6 | 1.44E-2 | 2.68E-2 | 1.15E-5 | 3.11E-2 | 7.64E-6 | 6.71E-2 | 1.25E-1 |
| GWP-luluc | kg CO2 eq | 1.61E-3 | 7.83E-6 | 6.60E-3 | 8.22E-3 | 6.70E-6 | 2.23E-4 | 1.57E-7 | -9.99E-4 | 7.45E-3 |
| ODP | kg CFC11 eq | 7.35E-7 | 4.72E-9 | 7.35E-9 | 7.47E-7 | 4.36E-9 | 5.99E-8 | 2.24E-10 | -3.82E-7 | 4.30E-7 |
| AP | mol H+ eq | 7.14E-3 | 1.24E-4 | 4.24E-4 | 7.69E-3 | 1.08E-4 | 1.06E-3 | 5.45E-6 | -3.35E-3 | 5.51E-3 |
| EP-fw | kg P eq | 6.86E-5 | 2.15E-7 | 1.22E-6 | 7.00E-5 | 1.56E-7 | 7.40E-6 | 7.13E-9 | -3.45E-5 | 4.31E-5 |
| EP-m | kg N eq | 1.26E-3 | 4.37E-5 | 1.00E-4 | 1.41E-3 | 3.86E-5 | 2.63E-4 | 3.70E-6 | -5.99E-4 | 1.11E-3 |
| EP-T | mol N eq | 1.37E-2 | 4.81E-4 | 1.10E-3 | 1.53E-2 | 4.25E-4 | 2.90E-3 | 2.18E-5 | -6.46E-3 | 1.22E-2 |
| POCP | kg NMVOC eq | 4.60E-3 | 1.37E-4 | 3.14E-4 | 5.05E-3 | 1.22E-4 | 8.70E-4 | 7.56E-6 | -2.20E-3 | 3.85E-3 |
| ADP-mm | kg Sb eq | 1.34E-3 | 5.41E-7 | 2.43E-6 | 1.34E-3 | 4.90E-7 | 4.20E-6 | 5.46E-9 | -1.62E-5 | 1.33E-3 |
| ADP-f | MJ | 3.92E+1 | 3.22E-1 | 7.78E-1 | 4.03E+1 | 2.91E-1 | 2.89E+0 | 1.64E-2 | -2.09E+1 | 2.27E+1 |
| WDP | m3 depriv. | 2.30E+0 | 1.15E-3 | 6.02E-1 | 2.90E+0 | 8.92E-4 | 1.10E-1 | 1.03E-4 | -1.21E+0 | 1.80E+0 |
| PM | disease inc. | 5.15E-8 | 1.92E-9 | 5.24E-9 | 5.87E-8 | 1.71E-9 | 1.34E-8 | 1.13E-10 | -2.63E-8 | 4.76E-8 |
| IR | kBq U-235 eq | 8.53E-2 | 1.35E-3 | 1.24E-3 | 8.79E-2 | 1.27E-3 | 1.01E-2 | 7.55E-5 | -4.00E-2 | 5.94E-2 |
| ETP-fw | CTUe | 4.32E+1 | 2.87E-1 | 1.81E+0 | 4.53E+1 | 2.36E-1 | 2.10E+1 | 2.31E-1 | -1.61E+1 | 5.07E+1 |
| HTP-c | CTUh | 1.16E-9 | 9.32E-12 | 6.25E-11 | 1.23E-9 | 8.39E-12 | 3.25E-10 | 4.47E-13 | -4.46E-10 | 1.12E-9 |
| HTP-nc | CTUh | 3.77E-8 | 3.14E-10 | 1.95E-9 | 4.00E-8 | 2.81E-10 | 7.55E-9 | 4.51E-11 | -1.54E-8 | 3.25E-8 |
| SQP | Pt | 7.78E+0 | 2.80E-1 | 5.81E-2 | 8.12E+0 | 2.49E-1 | 1.81E+0 | 4.19E-2 | -1.50E+1 | -4.74E+0 |

| Resource use | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 2.40E+0 | 4.03E-3 | 3.78E+0 | 6.18E+0 | 4.17E-3 | 2.04E-1 | 6.20E-4 | -3.16E+0 | 3.23E+0 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 2.40E+0 | 4.03E-3 | 3.78E+0 | 6.18E+0 | 4.17E-3 | 2.04E-1 | 6.20E-4 | -3.16E+0 | 3.23E+0 |
| PENRE | MJ | 4.21E+1 | 3.42E-1 | 8.41E-1 | 4.33E+1 | 3.08E-1 | 3.08E+0 | 1.74E-2 | -2.25E+1 | 2.42E+1 |
| PENRM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ | 4.21E+1 | 3.42E-1 | 8.41E-1 | 4.33E+1 | 3.08E-1 | 3.08E+0 | 1.74E-2 | -2.25E+1 | 2.42E+1 |
| PET | MJ | 4.45E+1 | 3.46E-1 | 4.62E+0 | 4.94E+1 | 3.13E-1 | 3.28E+0 | 1.80E-2 | -2.56E+1 | 2.74E+1 |
| 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 | 2.70E-2 | 3.92E-5 | 1.42E-2 | 4.13E-2 | 3.29E-5 | 3.04E-3 | 2.01E-5 | -1.45E-2 | 2.99E-2 |
| Output flows and waste categories | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| HWD | kg | 1.89E-4 | 8.16E-7 | 8.26E-7 | 1.91E-4 | 7.43E-7 | 4.74E-6 | 1.99E-8 | -1.63E-5 | 1.80E-4 |
| NHWD | kg | 1.48E-1 | 2.04E-2 | 1.28E-3 | 1.70E-1 | 1.80E-2 | 1.08E-1 | 7.20E-2 | -6.45E-2 | 3.03E-1 |
| RWD | kg | 7.77E-5 | 2.12E-6 | 1.53E-6 | 8.14E-5 | 1.98E-6 | 1.10E-5 | 1.07E-7 | -3.56E-5 | 5.88E-5 |
| 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 |

Ecochain Technologies BV
H.J.E. Wenckebachweg 123, 1096 AM Amsterdam, The Netherlands
https://www.ecochain.com
+31 20 3035 777