# Environmental Profile

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

Ecochain v3.5.80

| | |
|---|---|
| Product: | 3001345 - Wafix PVC Branch 45° GY 160x125 SN4S/S/S |
| 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

# Results

| Environmental impact SBK set 1 | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| ECI | euro | 0.36 | 0.01 | 0.02 | 0.38 | 0 | 0.12 | 0 | -0.18 | 0.32 |
| ADPE | kg Sb-eq | 2.95E-3 | 1.17E-6 | 4.97E-6 | 2.96E-3 | 1.07E-6 | 9.18E-6 | 1.19E-8 | -3.53E-5 | 2.93E-3 |
| ADPF | kg Sb-eq | 3.99E-2 | 3.37E-4 | 8.54E-4 | 4.11E-2 | 3.01E-4 | 3.19E-3 | 1.65E-5 | -2.15E-2 | 2.31E-2 |
| GWP | kg CO2-eq | 3.20E+0 | 4.58E-2 | 1.62E-1 | 3.41E+0 | 4.09E-2 | 1.15E+0 | 1.18E-2 | -1.80E+0 | 2.82E+0 |
| ODP | kg CFC-11-eq | 1.63E-6 | 8.13E-9 | 1.28E-8 | 1.66E-6 | 7.59E-9 | 1.28E-7 | 3.94E-10 | -8.46E-7 | 9.45E-7 |
| POCP | kg ethene-eq | 2.00E-3 | 2.76E-5 | 7.04E-5 | 2.10E-3 | 2.46E-5 | 2.56E-4 | 3.01E-6 | -9.53E-4 | 1.43E-3 |
| AP | kg SO2-eq | 1.28E-2 | 2.01E-4 | 6.96E-4 | 1.37E-2 | 1.76E-4 | 1.85E-3 | 8.88E-6 | -6.00E-3 | 9.69E-3 |
| EP | kg PO4 3−-eq | 1.61E-3 | 3.96E-5 | 8.95E-5 | 1.74E-3 | 3.52E-5 | 2.83E-4 | 3.80E-6 | -7.95E-4 | 1.26E-3 |
| HTP | kg 1,4-DB-eq | 1.21E+0 | 1.93E-2 | 7.53E-2 | 1.30E+0 | 1.75E-2 | 4.95E-1 | 9.61E-4 | -5.57E-1 | 1.26E+0 |
| FAETP | kg 1,4-DB-eq | 3.58E-2 | 5.63E-4 | 2.57E-3 | 3.89E-2 | 5.13E-4 | 7.68E-3 | 3.71E-4 | -1.54E-2 | 3.21E-2 |
| MAETP | kg 1,4-DB-eq | 8.54E+1 | 2.03E+0 | 1.01E+1 | 9.76E+1 | 1.83E+0 | 2.55E+1 | 4.29E-1 | -3.60E+1 | 8.94E+1 |
| TETP | kg 1,4-DB-eq | 8.57E-3 | 6.82E-5 | 5.60E-3 | 1.42E-2 | 6.21E-5 | 1.75E-3 | 3.07E-6 | -5.12E-3 | 1.09E-2 |
| Environmental impact | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| GWP-total | kg CO2 eq | 3.31E+0 | 4.62E-2 | 1.85E-1 | 3.54E+0 | 4.13E-2 | 1.23E+0 | 1.38E-2 | -1.71E+0 | 3.11E+0 |
| GWP-f | kg CO2 eq | 3.28E+0 | 4.62E-2 | 1.42E-1 | 3.47E+0 | 4.13E-2 | 1.16E+0 | 1.38E-2 | -1.84E+0 | 2.85E+0 |
| GWP-b | kg CO2 eq | 2.75E-2 | 2.13E-5 | 2.94E-2 | 5.69E-2 | 2.51E-5 | 6.25E-2 | 1.66E-5 | 1.34E-1 | 2.53E-1 |
| GWP-luluc | kg CO2 eq | 3.46E-3 | 1.69E-5 | 1.35E-2 | 1.70E-2 | 1.46E-5 | 4.89E-4 | 3.43E-7 | -2.10E-3 | 1.54E-2 |
| ODP | kg CFC11 eq | 1.62E-6 | 1.02E-8 | 1.51E-8 | 1.64E-6 | 9.51E-9 | 1.32E-7 | 4.89E-10 | -8.38E-7 | 9.48E-7 |
| AP | mol H+ eq | 1.55E-2 | 2.68E-4 | 8.69E-4 | 1.66E-2 | 2.35E-4 | 2.32E-3 | 1.19E-5 | -7.26E-3 | 1.19E-2 |
| EP-fw | kg P eq | 1.50E-4 | 4.66E-7 | 2.50E-6 | 1.53E-4 | 3.40E-7 | 1.63E-5 | 1.55E-8 | -7.44E-5 | 9.48E-5 |
| EP-m | kg N eq | 2.74E-3 | 9.44E-5 | 2.05E-4 | 3.04E-3 | 8.41E-5 | 5.73E-4 | 8.00E-6 | -1.29E-3 | 2.41E-3 |
| EP-T | mol N eq | 2.97E-2 | 1.04E-3 | 2.26E-3 | 3.30E-2 | 9.27E-4 | 6.32E-3 | 4.74E-5 | -1.39E-2 | 2.63E-2 |
| POCP | kg NMVOC eq | 9.95E-3 | 2.97E-4 | 6.44E-4 | 1.09E-2 | 2.65E-4 | 1.90E-3 | 1.65E-5 | -4.74E-3 | 8.32E-3 |
| ADP-mm | kg Sb eq | 2.95E-3 | 1.17E-6 | 4.97E-6 | 2.96E-3 | 1.07E-6 | 9.18E-6 | 1.19E-8 | -3.53E-5 | 2.93E-3 |
| ADP-f | MJ | 8.50E+1 | 6.97E-1 | 1.59E+0 | 8.73E+1 | 6.34E-1 | 6.33E+0 | 3.57E-2 | -4.52E+1 | 4.91E+1 |
| WDP | m3 depriv. | 5.04E+0 | 2.49E-3 | 1.23E+0 | 6.28E+0 | 1.94E-3 | 2.42E-1 | 2.24E-4 | -2.64E+0 | 3.88E+0 |
| PM | disease inc. | 1.11E-7 | 4.15E-9 | 1.07E-8 | 1.26E-7 | 3.73E-9 | 2.92E-8 | 2.46E-10 | -5.61E-8 | 1.03E-7 |
| IR | kBq U-235 eq | 1.86E-1 | 2.92E-3 | 2.53E-3 | 1.91E-1 | 2.77E-3 | 2.22E-2 | 1.65E-4 | -8.70E-2 | 1.29E-1 |
| ETP-fw | CTUe | 9.33E+1 | 6.21E-1 | 3.70E+0 | 9.76E+1 | 5.14E-1 | 4.63E+1 | 5.11E-1 | -3.42E+1 | 1.11E+2 |
| HTP-c | CTUh | 2.54E-9 | 2.02E-11 | 1.28E-10 | 2.68E-9 | 1.83E-11 | 7.10E-10 | 9.76E-13 | -9.71E-10 | 2.44E-9 |
| HTP-nc | CTUh | 8.28E-8 | 6.80E-10 | 4.00E-9 | 8.74E-8 | 6.13E-10 | 1.66E-8 | 9.95E-11 | -3.35E-8 | 7.13E-8 |
| SQP | Pt | 1.65E+1 | 6.05E-1 | 1.19E-1 | 1.72E+1 | 5.42E-1 | 3.94E+0 | 9.15E-2 | -3.05E+1 | -8.70E+0 |

| Resource use | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 5.14E+0 | 8.72E-3 | 7.74E+0 | 1.29E+1 | 9.09E-3 | 4.48E-1 | 1.35E-3 | -6.51E+0 | 6.84E+0 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 5.14E+0 | 8.72E-3 | 7.74E+0 | 1.29E+1 | 9.09E-3 | 4.48E-1 | 1.35E-3 | -6.51E+0 | 6.84E+0 |
| PENRE | MJ | 9.12E+1 | 7.40E-1 | 1.72E+0 | 9.36E+1 | 6.73E-1 | 6.73E+0 | 3.79E-2 | -4.87E+1 | 5.24E+1 |
| PENRM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ | 9.12E+1 | 7.40E-1 | 1.72E+0 | 9.36E+1 | 6.73E-1 | 6.73E+0 | 3.79E-2 | -4.87E+1 | 5.24E+1 |
| PET | MJ | 9.63E+1 | 7.49E-1 | 9.46E+0 | 1.07E+2 | 6.82E-1 | 7.18E+0 | 3.92E-2 | -5.52E+1 | 5.92E+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 | 5.89E-2 | 8.49E-5 | 2.91E-2 | 8.81E-2 | 7.17E-5 | 6.68E-3 | 4.38E-5 | -3.12E-2 | 6.37E-2 |
| Output flows and waste categories | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| HWD | kg | 4.18E-4 | 1.77E-6 | 1.69E-6 | 4.21E-4 | 1.62E-6 | 1.04E-5 | 4.34E-8 | -3.56E-5 | 3.98E-4 |
| NHWD | kg | 3.22E-1 | 4.42E-2 | 2.61E-3 | 3.69E-1 | 3.93E-2 | 2.35E-1 | 1.57E-1 | -1.40E-1 | 6.59E-1 |
| RWD | kg | 1.68E-4 | 4.58E-6 | 3.13E-6 | 1.76E-4 | 4.31E-6 | 2.40E-5 | 2.32E-7 | -7.73E-5 | 1.27E-4 |
| 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 |

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