# Environmental Profile

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

Ecochain v3.5.80

| | |
|---|---|
| Product: | 3024594 - Wfx PVC Bend 45° BR/GD 160 SN8 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

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# Results

| Environmental impact SBK set 1 | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| ECI | euro | 0.23 | 0 | 0.01 | 0.25 | 0 | 0.08 | 0 | -0.12 | 0.21 |
| ADPE | kg Sb-eq | 1.98E-3 | 7.70E-7 | 3.37E-6 | 1.98E-3 | 6.99E-7 | 6.13E-6 | 7.79E-9 | -2.35E-5 | 1.96E-3 |
| ADPF | kg Sb-eq | 2.59E-2 | 2.22E-4 | 5.79E-4 | 2.67E-2 | 1.97E-4 | 2.12E-3 | 1.08E-5 | -1.40E-2 | 1.50E-2 |
| GWP | kg CO2-eq | 2.11E+0 | 3.01E-2 | 1.10E-1 | 2.25E+0 | 2.68E-2 | 7.55E-1 | 7.63E-3 | -1.19E+0 | 1.85E+0 |
| ODP | kg CFC-11-eq | 1.10E-6 | 5.35E-9 | 8.68E-9 | 1.11E-6 | 4.97E-9 | 8.57E-8 | 2.58E-10 | -5.65E-7 | 6.38E-7 |
| POCP | kg ethene-eq | 1.29E-3 | 1.82E-5 | 4.77E-5 | 1.35E-3 | 1.61E-5 | 1.70E-4 | 1.95E-6 | -6.28E-4 | 9.14E-4 |
| AP | kg SO2-eq | 8.42E-3 | 1.33E-4 | 4.72E-4 | 9.02E-3 | 1.15E-4 | 1.23E-3 | 5.81E-6 | -4.01E-3 | 6.36E-3 |
| EP | kg PO4 3−-eq | 1.08E-3 | 2.60E-5 | 6.07E-5 | 1.16E-3 | 2.30E-5 | 1.89E-4 | 2.44E-6 | -5.45E-4 | 8.33E-4 |
| HTP | kg 1,4-DB-eq | 8.02E-1 | 1.27E-2 | 5.10E-2 | 8.66E-1 | 1.15E-2 | 3.28E-1 | 6.24E-4 | -3.74E-1 | 8.31E-1 |
| FAETP | kg 1,4-DB-eq | 2.45E-2 | 3.70E-4 | 1.74E-3 | 2.66E-2 | 3.36E-4 | 5.06E-3 | 2.30E-4 | -1.08E-2 | 2.14E-2 |
| MAETP | kg 1,4-DB-eq | 5.68E+1 | 1.33E+0 | 6.86E+0 | 6.50E+1 | 1.20E+0 | 1.71E+1 | 2.69E-1 | -2.42E+1 | 5.94E+1 |
| TETP | kg 1,4-DB-eq | 5.79E-3 | 4.48E-5 | 3.79E-3 | 9.63E-3 | 4.06E-5 | 1.16E-3 | 2.02E-6 | -3.59E-3 | 7.24E-3 |
| Environmental impact | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| GWP-total | kg CO2 eq | 2.18E+0 | 3.04E-2 | 1.26E-1 | 2.34E+0 | 2.70E-2 | 8.11E-1 | 8.90E-3 | -1.11E+0 | 2.08E+0 |
| GWP-f | kg CO2 eq | 2.16E+0 | 3.04E-2 | 9.66E-2 | 2.29E+0 | 2.70E-2 | 7.60E-1 | 8.90E-3 | -1.21E+0 | 1.87E+0 |
| GWP-b | kg CO2 eq | 1.91E-2 | 1.40E-5 | 1.99E-2 | 3.90E-2 | 1.64E-5 | 5.02E-2 | 1.09E-5 | 1.09E-1 | 1.98E-1 |
| GWP-luluc | kg CO2 eq | 2.40E-3 | 1.11E-5 | 9.17E-3 | 1.16E-2 | 9.56E-6 | 3.26E-4 | 2.25E-7 | -1.53E-3 | 1.04E-2 |
| ODP | kg CFC11 eq | 1.09E-6 | 6.71E-9 | 1.02E-8 | 1.10E-6 | 6.22E-9 | 8.85E-8 | 3.20E-10 | -5.59E-7 | 6.39E-7 |
| AP | mol H+ eq | 1.02E-2 | 1.76E-4 | 5.89E-4 | 1.10E-2 | 1.54E-4 | 1.55E-3 | 7.78E-6 | -4.86E-3 | 7.86E-3 |
| EP-fw | kg P eq | 1.00E-4 | 3.07E-7 | 1.69E-6 | 1.02E-4 | 2.22E-7 | 1.09E-5 | 1.02E-8 | -5.10E-5 | 6.25E-5 |
| EP-m | kg N eq | 1.83E-3 | 6.21E-5 | 1.39E-4 | 2.03E-3 | 5.50E-5 | 3.83E-4 | 5.13E-6 | -8.72E-4 | 1.60E-3 |
| EP-T | mol N eq | 1.98E-2 | 6.85E-4 | 1.53E-3 | 2.20E-2 | 6.07E-4 | 4.21E-3 | 3.10E-5 | -9.40E-3 | 1.74E-2 |
| POCP | kg NMVOC eq | 6.52E-3 | 1.96E-4 | 4.36E-4 | 7.15E-3 | 1.73E-4 | 1.26E-3 | 1.08E-5 | -3.16E-3 | 5.44E-3 |
| ADP-mm | kg Sb eq | 1.98E-3 | 7.70E-7 | 3.37E-6 | 1.98E-3 | 6.99E-7 | 6.13E-6 | 7.79E-9 | -2.35E-5 | 1.96E-3 |
| ADP-f | MJ | 5.52E+1 | 4.58E-1 | 1.08E+0 | 5.68E+1 | 4.15E-1 | 4.20E+0 | 2.34E-2 | -2.96E+1 | 3.18E+1 |
| WDP | m3 depriv. | 3.36E+0 | 1.64E-3 | 8.35E-1 | 4.20E+0 | 1.27E-3 | 1.62E-1 | 1.48E-4 | -1.78E+0 | 2.58E+0 |
| PM | disease inc. | 7.30E-8 | 2.73E-9 | 7.27E-9 | 8.30E-8 | 2.44E-9 | 1.94E-8 | 1.61E-10 | -3.87E-8 | 6.64E-8 |
| IR | kBq U-235 eq | 1.22E-1 | 1.92E-3 | 1.72E-3 | 1.26E-1 | 1.81E-3 | 1.48E-2 | 1.08E-4 | -5.89E-2 | 8.37E-2 |
| ETP-fw | CTUe | 6.44E+1 | 4.09E-1 | 2.51E+0 | 6.73E+1 | 3.37E-1 | 3.12E+1 | 3.43E-1 | -2.42E+1 | 7.50E+1 |
| HTP-c | CTUh | 1.70E-9 | 1.33E-11 | 8.68E-11 | 1.80E-9 | 1.20E-11 | 4.71E-10 | 6.41E-13 | -6.55E-10 | 1.63E-9 |
| HTP-nc | CTUh | 5.55E-8 | 4.47E-10 | 2.71E-9 | 5.87E-8 | 4.01E-10 | 1.11E-8 | 6.66E-11 | -2.26E-8 | 4.76E-8 |
| SQP | Pt | 1.16E+1 | 3.98E-1 | 8.07E-2 | 1.21E+1 | 3.55E-1 | 2.60E+0 | 5.98E-2 | -2.38E+1 | -8.64E+0 |

| Resource use | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 3.56E+0 | 5.74E-3 | 5.25E+0 | 8.81E+0 | 5.95E-3 | 2.98E-1 | 8.80E-4 | -4.96E+0 | 4.16E+0 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 3.56E+0 | 5.74E-3 | 5.25E+0 | 8.81E+0 | 5.95E-3 | 2.98E-1 | 8.80E-4 | -4.96E+0 | 4.16E+0 |
| PENRE | MJ | 5.92E+1 | 4.87E-1 | 1.17E+0 | 6.09E+1 | 4.40E-1 | 4.47E+0 | 2.48E-2 | -3.18E+1 | 3.40E+1 |
| PENRM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ | 5.92E+1 | 4.87E-1 | 1.17E+0 | 6.09E+1 | 4.40E-1 | 4.47E+0 | 2.48E-2 | -3.18E+1 | 3.40E+1 |
| PET | MJ | 6.28E+1 | 4.92E-1 | 6.42E+0 | 6.97E+1 | 4.46E-1 | 4.77E+0 | 2.57E-2 | -3.68E+1 | 3.81E+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 | 3.90E-2 | 5.58E-5 | 1.98E-2 | 5.88E-2 | 4.69E-5 | 4.46E-3 | 2.87E-5 | -2.13E-2 | 4.20E-2 |
| Output flows and waste categories | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| HWD | kg | 2.82E-4 | 1.16E-6 | 1.15E-6 | 2.84E-4 | 1.06E-6 | 6.90E-6 | 2.84E-8 | -2.38E-5 | 2.68E-4 |
| NHWD | kg | 2.17E-1 | 2.91E-2 | 1.77E-3 | 2.48E-1 | 2.57E-2 | 1.55E-1 | 1.03E-1 | -9.45E-2 | 4.37E-1 |
| RWD | kg | 1.10E-4 | 3.01E-6 | 2.12E-6 | 1.15E-4 | 2.82E-6 | 1.60E-5 | 1.52E-7 | -5.24E-5 | 8.15E-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 |

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