# Environmental Profile

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

Ecochain v3.5.80

**Ecochain**

| | | | |
|---|---|---|---|
| Product: | 3000675 - PVC Pipe GY BENOR 160x3.2 SN2 L=3 SC/CH | LCA standard: | NMD Bepalingsmethode 1.1 (2022) |
| Unit: | 1 piece | Standard database: | Worldwide - Ecoinvent v 3.6 Cut-Off |
| Manufacturer: | Wavin - NL - Hardenberg - Verified | Externally verified: | Yes |
| Address: | J.C. Kellerlaan 3 | Issue date: | 08-06-2023 |
| | 7772 SG Hardenberg | End of validity: | 08-06-2028 |
| | Netherlands | Verifier: | Martijn van Hövell - SGS Search |

**wavin**
An Orbia business.

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.

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

**SGS | SEARCH**

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 | 1.49 | 0.04 | 0.07 | 1.6 | 0.02 | 0.54 | 0 | -0.74 | 1.41 |
| ADPE | kg Sb-eq | 4.13E-4 | 8.27E-6 | 1.21E-5 | 4.34E-4 | 5.18E-6 | 4.34E-5 | 5.44E-8 | -1.57E-4 | 3.25E-4 |
| ADPF | kg Sb-eq | 1.66E-1 | 2.38E-3 | 3.25E-3 | 1.71E-1 | 1.46E-3 | 1.53E-2 | 7.68E-5 | -8.78E-2 | 1.00E-1 |
| GWP | kg CO2-eq | 1.34E+1 | 3.24E-1 | 5.77E-1 | 1.43E+1 | 1.99E-1 | 5.17E+0 | 4.88E-2 | -7.40E+0 | 1.23E+1 |
| ODP | kg CFC-11-eq | 7.80E-6 | 5.74E-8 | 5.43E-8 | 7.91E-6 | 3.68E-8 | 6.18E-7 | 1.84E-9 | -3.86E-6 | 4.70E-6 |
| POCP | kg ethene-eq | 8.27E-3 | 1.95E-4 | 2.54E-4 | 8.72E-3 | 1.19E-4 | 1.20E-3 | 1.30E-5 | -3.77E-3 | 6.28E-3 |
| AP | kg SO2-eq | 5.19E-2 | 1.42E-3 | 2.27E-3 | 5.56E-2 | 8.55E-4 | 8.79E-3 | 4.10E-5 | -2.42E-2 | 4.11E-2 |
| EP | kg PO4 3--eq | 6.20E-3 | 2.80E-4 | 3.58E-4 | 6.84E-3 | 1.71E-4 | 1.33E-3 | 1.59E-5 | -2.93E-3 | 5.42E-3 |
| HTP | kg 1,4-DB-eq | 5.27E+0 | 1.36E-1 | 2.18E-1 | 5.63E+0 | 8.50E-2 | 2.36E+0 | 4.20E-3 | -2.35E+0 | 5.73E+0 |
| FAETP | kg 1,4-DB-eq | 1.14E-1 | 3.98E-3 | 8.87E-3 | 1.27E-1 | 2.49E-3 | 3.47E-2 | 1.24E-3 | -5.14E-2 | 1.14E-1 |
| MAETP | kg 1,4-DB-eq | 3.33E+2 | 1.43E+1 | 3.62E+1 | 3.83E+2 | 8.89E+0 | 1.15E+2 | 1.52E+0 | -1.51E+2 | 3.57E+2 |
| TETP | kg 1,4-DB-eq | 3.62E-2 | 4.82E-4 | 1.35E-2 | 5.03E-2 | 3.01E-4 | 8.42E-3 | 1.40E-5 | -1.71E-2 | 4.19E-2 |
| Environmental impact | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| GWP-total | kg CO2 eq | 1.30E+1 | 3.27E-1 | 6.80E-1 | 1.40E+1 | 2.00E-1 | 6.09E+0 | 5.68E-2 | -7.63E+0 | 1.27E+1 |
| GWP-f | kg CO2 eq | 1.37E+1 | 3.26E-1 | 5.33E-1 | 1.46E+1 | 2.00E-1 | 5.21E+0 | 5.68E-2 | -7.58E+0 | 1.25E+1 |
| GWP-b | kg CO2 eq | -7.75E-1 | 1.51E-4 | 1.15E-1 | -6.60E-1 | 1.22E-4 | 8.79E-1 | 7.30E-5 | -5.31E-2 | 1.66E-1 |
| GWP-luluc | kg CO2 eq | 1.11E-2 | 1.20E-4 | 3.25E-2 | 4.37E-2 | 7.09E-5 | 2.37E-3 | 1.54E-6 | -5.05E-3 | 4.11E-2 |
| ODP | kg CFC11 eq | 7.69E-6 | 7.20E-8 | 6.43E-8 | 7.83E-6 | 4.62E-8 | 6.37E-7 | 2.29E-9 | -3.82E-6 | 4.69E-6 |
| AP | mol H+ eq | 6.25E-2 | 1.89E-3 | 2.90E-3 | 6.73E-2 | 1.14E-3 | 1.10E-2 | 5.49E-5 | -2.92E-2 | 5.04E-2 |
| EP-fw | kg P eq | 6.07E-4 | 3.29E-6 | 7.62E-6 | 6.18E-4 | 1.65E-6 | 7.88E-5 | 6.93E-8 | -2.82E-4 | 4.16E-4 |
| EP-m | kg N eq | 1.05E-2 | 6.67E-4 | 8.56E-4 | 1.21E-2 | 4.08E-4 | 2.69E-3 | 3.37E-5 | -5.09E-3 | 1.01E-2 |
| EP-T | mol N eq | 1.14E-1 | 7.35E-3 | 9.18E-3 | 1.31E-1 | 4.50E-3 | 2.96E-2 | 2.19E-4 | -5.48E-2 | 1.10E-1 |
| POCP | kg NMVOC eq | 3.95E-2 | 2.10E-3 | 2.59E-3 | 4.42E-2 | 1.29E-3 | 8.89E-3 | 7.46E-5 | -1.87E-2 | 3.57E-2 |
| ADP-mm | kg Sb eq | 4.13E-4 | 8.27E-6 | 1.21E-5 | 4.34E-4 | 5.18E-6 | 4.34E-5 | 5.44E-8 | -1.57E-4 | 3.25E-4 |
| ADP-f | MJ | 3.53E+2 | 4.92E+0 | 6.16E+0 | 3.64E+2 | 3.07E+0 | 3.03E+1 | 1.66E-1 | -1.84E+2 | 2.13E+2 |
| WDP | m3 depriv. | 2.30E+1 | 1.76E-2 | 4.17E+0 | 2.72E+1 | 9.44E-3 | 1.18E+0 | 9.54E-4 | -1.10E+1 | 1.74E+1 |
| PM | disease inc. | 4.54E-7 | 2.93E-8 | 4.51E-8 | 5.28E-7 | 1.81E-8 | 1.38E-7 | 1.14E-9 | -1.89E-7 | 4.96E-7 |
| IR | kBq U-235 eq | 7.52E-1 | 2.06E-2 | 1.11E-2 | 7.84E-1 | 1.34E-2 | 1.06E-1 | 7.61E-4 | -3.55E-1 | 5.49E-1 |
| ETP-fw | CTUe | 2.38E+2 | 4.39E+0 | 1.03E+1 | 2.53E+2 | 2.50E+0 | 2.26E+2 | 2.49E+0 | -1.10E+2 | 3.74E+2 |
| HTP-c | CTUh | 9.46E-9 | 1.42E-10 | 3.51E-10 | 9.95E-9 | 8.88E-11 | 3.33E-9 | 4.34E-12 | -4.07E-9 | 9.30E-9 |
| HTP-nc | CTUh | 2.98E-7 | 4.80E-9 | 1.07E-8 | 3.14E-7 | 2.98E-9 | 7.97E-8 | 4.79E-10 | -1.41E-7 | 2.56E-7 |
| SQP | Pt | 1.24E+2 | 4.27E+0 | 4.61E-1 | 1.28E+2 | 2.63E+0 | 1.89E+1 | 4.21E-1 | -3.67E+1 | 1.14E+2 |

| Resource use | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 2.89E+1 | 6.16E-2 | 1.86E+1 | 4.76E+1 | 4.41E-2 | 2.17E+0 | 5.99E-3 | -1.14E+1 | 3.84E+1 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 2.89E+1 | 6.16E-2 | 1.86E+1 | 4.76E+1 | 4.41E-2 | 2.17E+0 | 5.99E-3 | -1.14E+1 | 3.84E+1 |
| PENRE | MJ | 3.78E+2 | 5.23E+0 | 6.68E+0 | 3.90E+2 | 3.26E+0 | 3.22E+1 | 1.76E-1 | -1.98E+2 | 2.27E+2 |
| PENRM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ | 3.78E+2 | 5.23E+0 | 6.68E+0 | 3.90E+2 | 3.26E+0 | 3.22E+1 | 1.76E-1 | -1.98E+2 | 2.27E+2 |
| PET | MJ | 4.07E+2 | 5.29E+0 | 2.53E+1 | 4.38E+2 | 3.31E+0 | 3.44E+1 | 1.82E-1 | -2.10E+2 | 2.66E+2 |
| 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 | 2.47E-1 | 5.99E-4 | 9.82E-2 | 3.46E-1 | 3.48E-4 | 3.23E-2 | 2.03E-4 | -1.15E-1 | 2.64E-1 |

| Output flows and waste categories | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| HWD | kg | 2.81E-4 | 1.25E-5 | 8.63E-6 | 3.02E-4 | 7.86E-6 | 4.88E-5 | 2.00E-7 | -1.53E-4 | 2.06E-4 |
| NHWD | kg | 1.34E+0 | 3.12E-1 | 1.25E-2 | 1.67E+0 | 1.91E-1 | 1.13E+0 | 7.63E-1 | -5.91E-1 | 3.16E+0 |
| RWD | kg | 6.64E-4 | 3.23E-5 | 1.55E-5 | 7.12E-4 | 2.09E-5 | 1.14E-4 | 1.08E-6 | -3.13E-4 | 5.34E-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 |