# Environmental Profile

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

Ecochain v3.5.80

| | |
|---|---|
| Product: | 3000554 - PVC Pipe BR BENOR 110x3.2 SN8 L=5 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

This document and supporting material contain confidential and proprietary business information of Wavin - NL - Hardenberg - Verified. These materials may be printed or (photo) copied or otherwise used only with the written consent of Wavin - NL - Hardenberg - Verified.

# Results

| Environmental impact SBK set 1 | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| ECI | euro | 1.67 | 0.04 | 0.08 | 1.78 | 0.03 | 0.6 | 0 | -0.84 | 1.58 |
| ADPE | kg Sb-eq | 4.42E-4 | 9.26E-6 | 1.37E-5 | 4.65E-4 | 5.85E-6 | 4.90E-5 | 6.14E-8 | -1.76E-4 | 3.44E-4 |
| ADPF | kg Sb-eq | 1.86E-1 | 2.67E-3 | 3.68E-3 | 1.92E-1 | 1.65E-3 | 1.72E-2 | 8.65E-5 | -9.89E-2 | 1.12E-1 |
| GWP | kg CO2-eq | 1.50E+1 | 3.63E-1 | 6.55E-1 | 1.60E+1 | 2.24E-1 | 5.78E+0 | 5.49E-2 | -8.33E+0 | 1.37E+1 |
| ODP | kg CFC-11-eq | 8.79E-6 | 6.43E-8 | 6.16E-8 | 8.91E-6 | 4.16E-8 | 6.97E-7 | 2.08E-9 | -4.36E-6 | 5.29E-6 |
| POCP | kg ethene-eq | 9.19E-3 | 2.19E-4 | 2.89E-4 | 9.70E-3 | 1.35E-4 | 1.35E-3 | 1.46E-5 | -4.24E-3 | 6.96E-3 |
| AP | kg SO2-eq | 5.79E-2 | 1.59E-3 | 2.57E-3 | 6.21E-2 | 9.65E-4 | 9.89E-3 | 4.62E-5 | -2.72E-2 | 4.58E-2 |
| EP | kg PO4 3−-eq | 6.89E-3 | 3.13E-4 | 4.06E-4 | 7.61E-3 | 1.93E-4 | 1.49E-3 | 1.79E-5 | -3.27E-3 | 6.05E-3 |
| HTP | kg 1,4-DB-eq | 5.90E+0 | 1.53E-1 | 2.47E-1 | 6.30E+0 | 9.59E-2 | 2.66E+0 | 4.74E-3 | -2.64E+0 | 6.42E+0 |
| FAETP | kg 1,4-DB-eq | 1.27E-1 | 4.46E-3 | 1.01E-2 | 1.42E-1 | 2.81E-3 | 3.92E-2 | 1.40E-3 | -5.78E-2 | 1.27E-1 |
| MAETP | kg 1,4-DB-eq | 3.71E+2 | 1.60E+1 | 4.11E+1 | 4.28E+2 | 1.00E+1 | 1.29E+2 | 1.72E+0 | -1.70E+2 | 3.99E+2 |
| TETP | kg 1,4-DB-eq | 4.06E-2 | 5.39E-4 | 1.54E-2 | 5.65E-2 | 3.40E-4 | 9.50E-3 | 1.57E-5 | -1.93E-2 | 4.71E-2 |
| Environmental impact | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| GWP-total | kg CO2 eq | 1.50E+1 | 3.66E-1 | 7.72E-1 | 1.61E+1 | 2.26E-1 | 6.37E+0 | 6.40E-2 | -8.59E+0 | 1.42E+1 |
| GWP-f | kg CO2 eq | 1.54E+1 | 3.66E-1 | 6.04E-1 | 1.63E+1 | 2.26E-1 | 5.82E+0 | 6.39E-2 | -8.52E+0 | 1.39E+1 |
| GWP-b | kg CO2 eq | -4.27E-1 | 1.69E-4 | 1.31E-1 | -2.96E-1 | 1.37E-4 | 5.45E-1 | 8.22E-5 | -6.00E-2 | 1.90E-1 |
| GWP-luluc | kg CO2 eq | 1.22E-2 | 1.34E-4 | 3.68E-2 | 4.92E-2 | 8.00E-5 | 2.67E-3 | 1.73E-6 | -5.64E-3 | 4.63E-2 |
| ODP | kg CFC11 eq | 8.66E-6 | 8.07E-8 | 7.30E-8 | 8.82E-6 | 5.21E-8 | 7.19E-7 | 2.58E-9 | -4.32E-6 | 5.27E-6 |
| AP | mol H+ eq | 6.98E-2 | 2.12E-3 | 3.30E-3 | 7.52E-2 | 1.29E-3 | 1.24E-2 | 6.18E-5 | -3.27E-2 | 5.62E-2 |
| EP-fw | kg P eq | 6.80E-4 | 3.69E-6 | 8.64E-6 | 6.92E-4 | 1.86E-6 | 8.89E-5 | 7.81E-8 | -3.18E-4 | 4.65E-4 |
| EP-m | kg N eq | 1.17E-2 | 7.47E-4 | 9.71E-4 | 1.34E-2 | 4.61E-4 | 3.01E-3 | 3.78E-5 | -5.69E-3 | 1.12E-2 |
| EP-T | mol N eq | 1.27E-1 | 8.24E-3 | 1.04E-2 | 1.45E-1 | 5.08E-3 | 3.32E-2 | 2.47E-4 | -6.09E-2 | 1.23E-1 |
| POCP | kg NMVOC eq | 4.38E-2 | 2.35E-3 | 2.94E-3 | 4.91E-2 | 1.45E-3 | 9.97E-3 | 8.41E-5 | -2.09E-2 | 3.97E-2 |
| ADP-mm | kg Sb eq | 4.42E-4 | 9.26E-6 | 1.37E-5 | 4.65E-4 | 5.85E-6 | 4.90E-5 | 6.14E-8 | -1.76E-4 | 3.44E-4 |
| ADP-f | MJ | 3.95E+2 | 5.51E+0 | 6.99E+0 | 4.08E+2 | 3.47E+0 | 3.41E+1 | 1.87E-1 | -2.08E+2 | 2.38E+2 |
| WDP | m3 depriv. | 2.59E+1 | 1.97E-2 | 4.73E+0 | 3.07E+1 | 1.06E-2 | 1.33E+0 | 1.08E-3 | -1.24E+1 | 1.96E+1 |
| PM | disease inc. | 4.86E-7 | 3.28E-8 | 5.12E-8 | 5.70E-7 | 2.04E-8 | 1.56E-7 | 1.28E-9 | -2.10E-7 | 5.37E-7 |
| IR | kBq U-235 eq | 8.39E-1 | 2.31E-2 | 1.26E-2 | 8.75E-1 | 1.52E-2 | 1.19E-1 | 8.58E-4 | -4.00E-1 | 6.10E-1 |
| ETP-fw | CTUe | 2.65E+2 | 4.92E+0 | 1.17E+1 | 2.82E+2 | 2.82E+0 | 2.55E+2 | 2.81E+0 | -1.22E+2 | 4.20E+2 |
| HTP-c | CTUh | 1.05E-8 | 1.59E-10 | 3.98E-10 | 1.10E-8 | 1.00E-10 | 3.73E-9 | 4.89E-12 | -4.57E-9 | 1.03E-8 |
| HTP-nc | CTUh | 3.34E-7 | 5.38E-9 | 1.22E-8 | 3.52E-7 | 3.36E-9 | 8.99E-8 | 5.40E-10 | -1.58E-7 | 2.87E-7 |
| SQP | Pt | 9.85E+1 | 4.78E+0 | 5.23E-1 | 1.04E+2 | 2.97E+0 | 2.13E+1 | 4.75E-1 | -3.28E+1 | 9.58E+1 |

| Resource use | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 2.65E+1 | 6.90E-2 | 2.11E+1 | 4.76E+1 | 4.98E-2 | 2.45E+0 | 6.74E-3 | -1.12E+1 | 3.90E+1 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 2.65E+1 | 6.90E-2 | 2.11E+1 | 4.76E+1 | 4.98E-2 | 2.45E+0 | 6.74E-3 | -1.12E+1 | 3.90E+1 |
| PENRE | MJ | 4.24E+2 | 5.85E+0 | 7.58E+0 | 4.37E+2 | 3.68E+0 | 3.63E+1 | 1.98E-1 | -2.23E+2 | 2.54E+2 |
| PENRM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ | 4.24E+2 | 5.85E+0 | 7.58E+0 | 4.37E+2 | 3.68E+0 | 3.63E+1 | 1.98E-1 | -2.23E+2 | 2.54E+2 |
| PET | MJ | 4.51E+2 | 5.92E+0 | 2.87E+1 | 4.85E+2 | 3.73E+0 | 3.88E+1 | 2.05E-1 | -2.35E+2 | 2.93E+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 | 2.77E-1 | 6.72E-4 | 1.11E-1 | 3.89E-1 | 3.93E-4 | 3.64E-2 | 2.29E-4 | -1.30E-1 | 2.97E-1 |
| Output flows and waste categories | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| HWD | kg | 3.13E-4 | 1.40E-5 | 9.79E-6 | 3.37E-4 | 8.87E-6 | 5.50E-5 | 2.26E-7 | -1.72E-4 | 2.29E-4 |
| NHWD | kg | 1.49E+0 | 3.50E-1 | 1.41E-2 | 1.85E+0 | 2.15E-1 | 1.26E+0 | 8.60E-1 | -6.63E-1 | 3.53E+0 |
| RWD | kg | 7.37E-4 | 3.62E-5 | 1.76E-5 | 7.91E-4 | 2.36E-5 | 1.28E-4 | 1.22E-6 | -3.53E-4 | 5.91E-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 |

Ecochain

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