# Environmental Profile

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

Ecochain v3.5.80

| | |
|---|---|
| Product: | 3000560 - PVC Pipe BR BENOR 160x4.0 SN4 L=3 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 | 1.83 | 0.05 | 0.08 | 1.97 | 0.03 | 0.66 | 0 | -0.92 | 1.74 |
| ADPE | kg Sb-eq | 5.02E-4 | 1.02E-5 | 1.50E-5 | 5.27E-4 | 6.41E-6 | 5.36E-5 | 6.73E-8 | -1.94E-4 | 3.93E-4 |
| ADPF | kg Sb-eq | 2.04E-1 | 2.93E-3 | 4.01E-3 | 2.11E-1 | 1.80E-3 | 1.89E-2 | 9.49E-5 | -1.08E-1 | 1.24E-1 |
| GWP | kg CO2-eq | 1.65E+1 | 3.99E-1 | 7.14E-1 | 1.76E+1 | 2.46E-1 | 6.37E+0 | 6.03E-2 | -9.14E+0 | 1.51E+1 |
| ODP | kg CFC-11-eq | 9.63E-6 | 7.07E-8 | 6.71E-8 | 9.77E-6 | 4.55E-8 | 7.64E-7 | 2.28E-9 | -4.78E-6 | 5.81E-6 |
| POCP | kg ethene-eq | 1.02E-2 | 2.41E-4 | 3.14E-4 | 1.07E-2 | 1.47E-4 | 1.48E-3 | 1.60E-5 | -4.66E-3 | 7.71E-3 |
| AP | kg SO2-eq | 6.39E-2 | 1.75E-3 | 2.80E-3 | 6.84E-2 | 1.06E-3 | 1.08E-2 | 5.06E-5 | -2.98E-2 | 5.06E-2 |
| EP | kg PO4 3−-eq | 7.62E-3 | 3.44E-4 | 4.42E-4 | 8.41E-3 | 2.11E-4 | 1.64E-3 | 1.97E-5 | -3.61E-3 | 6.67E-3 |
| HTP | kg 1,4-DB-eq | 6.50E+0 | 1.68E-1 | 2.69E-1 | 6.93E+0 | 1.05E-1 | 2.91E+0 | 5.19E-3 | -2.90E+0 | 7.06E+0 |
| FAETP | kg 1,4-DB-eq | 1.40E-1 | 4.90E-3 | 1.10E-2 | 1.56E-1 | 3.08E-3 | 4.29E-2 | 1.54E-3 | -6.35E-2 | 1.40E-1 |
| MAETP | kg 1,4-DB-eq | 4.09E+2 | 1.76E+1 | 4.48E+1 | 4.72E+2 | 1.10E+1 | 1.42E+2 | 1.88E+0 | -1.87E+2 | 4.40E+2 |
| TETP | kg 1,4-DB-eq | 4.47E-2 | 5.93E-4 | 1.67E-2 | 6.20E-2 | 3.72E-4 | 1.04E-2 | 1.72E-5 | -2.11E-2 | 5.17E-2 |
| Environmental impact | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| GWP-total | kg CO2 eq | 1.62E+1 | 4.02E-1 | 8.41E-1 | 1.74E+1 | 2.48E-1 | 7.30E+0 | 7.02E-2 | -9.43E+0 | 1.56E+1 |
| GWP-f | kg CO2 eq | 1.69E+1 | 4.02E-1 | 6.58E-1 | 1.80E+1 | 2.48E-1 | 6.42E+0 | 7.02E-2 | -9.35E+0 | 1.54E+1 |
| GWP-b | kg CO2 eq | -7.49E-1 | 1.86E-4 | 1.42E-1 | -6.06E-1 | 1.50E-4 | 8.78E-1 | 9.02E-5 | -6.57E-2 | 2.06E-1 |
| GWP-luluc | kg CO2 eq | 1.36E-2 | 1.47E-4 | 4.01E-2 | 5.38E-2 | 8.76E-5 | 2.93E-3 | 1.90E-6 | -6.22E-3 | 5.06E-2 |
| ODP | kg CFC11 eq | 9.50E-6 | 8.88E-8 | 7.95E-8 | 9.67E-6 | 5.71E-8 | 7.87E-7 | 2.83E-9 | -4.73E-6 | 5.79E-6 |
| AP | mol H+ eq | 7.70E-2 | 2.33E-3 | 3.59E-3 | 8.29E-2 | 1.41E-3 | 1.36E-2 | 6.78E-5 | -3.60E-2 | 6.20E-2 |
| EP-fw | kg P eq | 7.48E-4 | 4.06E-6 | 9.41E-6 | 7.62E-4 | 2.04E-6 | 9.74E-5 | 8.56E-8 | -3.49E-4 | 5.12E-4 |
| EP-m | kg N eq | 1.29E-2 | 8.22E-4 | 1.06E-3 | 1.48E-2 | 5.05E-4 | 3.31E-3 | 4.16E-5 | -6.27E-3 | 1.24E-2 |
| EP-T | mol N eq | 1.40E-1 | 9.06E-3 | 1.13E-2 | 1.61E-1 | 5.56E-3 | 3.65E-2 | 2.71E-4 | -6.73E-2 | 1.36E-1 |
| POCP | kg NMVOC eq | 4.85E-2 | 2.59E-3 | 3.20E-3 | 5.43E-2 | 1.59E-3 | 1.10E-2 | 9.22E-5 | -2.30E-2 | 4.39E-2 |
| ADP-mm | kg Sb eq | 5.02E-4 | 1.02E-5 | 1.50E-5 | 5.27E-4 | 6.41E-6 | 5.36E-5 | 6.73E-8 | -1.94E-4 | 3.93E-4 |
| ADP-f | MJ | 4.35E+2 | 6.06E+0 | 7.62E+0 | 4.48E+2 | 3.80E+0 | 3.74E+1 | 2.05E-1 | -2.28E+2 | 2.62E+2 |
| WDP | m3 depriv. | 2.84E+1 | 2.17E-2 | 5.15E+0 | 3.36E+1 | 1.17E-2 | 1.46E+0 | 1.18E-3 | -1.36E+1 | 2.15E+1 |
| PM | disease inc. | 5.49E-7 | 3.61E-8 | 5.57E-8 | 6.41E-7 | 2.24E-8 | 1.71E-7 | 1.40E-9 | -2.32E-7 | 6.03E-7 |
| IR | kBq U-235 eq | 9.25E-1 | 2.54E-2 | 1.38E-2 | 9.65E-1 | 1.66E-2 | 1.31E-1 | 9.40E-4 | -4.39E-1 | 6.74E-1 |
| ETP-fw | CTUe | 2.93E+2 | 5.41E+0 | 1.27E+1 | 3.11E+2 | 3.09E+0 | 2.79E+2 | 3.08E+0 | -1.35E+2 | 4.62E+2 |
| HTP-c | CTUh | 1.16E-8 | 1.75E-10 | 4.33E-10 | 1.22E-8 | 1.10E-10 | 4.10E-9 | 5.37E-12 | -5.02E-9 | 1.14E-8 |
| HTP-nc | CTUh | 3.67E-7 | 5.92E-9 | 1.33E-8 | 3.87E-7 | 3.68E-9 | 9.85E-8 | 5.92E-10 | -1.74E-7 | 3.16E-7 |
| SQP | Pt | 1.34E+2 | 5.26E+0 | 5.70E-1 | 1.39E+2 | 3.25E+0 | 2.34E+1 | 5.20E-1 | -4.13E+1 | 1.25E+2 |

| Resource use | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 3.29E+1 | 7.59E-2 | 2.30E+1 | 5.59E+1 | 5.45E-2 | 2.68E+0 | 7.40E-3 | -1.33E+1 | 4.53E+1 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 3.29E+1 | 7.59E-2 | 2.30E+1 | 5.59E+1 | 5.45E-2 | 2.68E+0 | 7.40E-3 | -1.33E+1 | 4.53E+1 |
| PENRE | MJ | 4.66E+2 | 6.44E+0 | 8.26E+0 | 4.81E+2 | 4.04E+0 | 3.98E+1 | 2.18E-1 | -2.45E+2 | 2.80E+2 |
| PENRM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ | 4.66E+2 | 6.44E+0 | 8.26E+0 | 4.81E+2 | 4.04E+0 | 3.98E+1 | 2.18E-1 | -2.45E+2 | 2.80E+2 |
| PET | MJ | 4.99E+2 | 6.52E+0 | 3.12E+1 | 5.37E+2 | 4.09E+0 | 4.25E+1 | 2.25E-1 | -2.58E+2 | 3.25E+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 | 3.05E-1 | 7.39E-4 | 1.21E-1 | 4.27E-1 | 4.30E-4 | 3.99E-2 | 2.51E-4 | -1.42E-1 | 3.26E-1 |
| Output flows and waste categories | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| HWD | kg | 3.46E-4 | 1.54E-5 | 1.07E-5 | 3.72E-4 | 9.72E-6 | 6.03E-5 | 2.47E-7 | -1.89E-4 | 2.53E-4 |
| NHWD | kg | 1.65E+0 | 3.85E-1 | 1.54E-2 | 2.05E+0 | 2.36E-1 | 1.39E+0 | 9.43E-1 | -7.29E-1 | 3.89E+0 |
| RWD | kg | 8.16E-4 | 3.98E-5 | 1.92E-5 | 8.75E-4 | 2.58E-5 | 1.40E-4 | 1.34E-6 | -3.87E-4 | 6.55E-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