# Environmental Profile

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

Ecochain v3.5.80

| | |
|---|---|
| Product: | 3000325 - PVC U3 Pipe GN 315 SN8 L=5 SC/CH |
| Unit: | 1 piece |
| Manufacturer: | Wavin - NL - Hardenberg - Verified |
| Address: | J.C. Kellerlaan 3<br>7772 SG Hardenberg<br>Netherlands |

Multi-layer U3 PVC pipes from Wavin made with recycled PVC in the middle layer. The tubes contain at least 40% recycled material.

| | |
|---|---|
| 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 | 5.49 | 0.28 | 0.47 | 6.23 | 0.17 | 3.66 | 0.02 | -1.55 | 8.53 |
| ADPE | kg Sb-eq | 1.62E-3 | 5.88E-5 | 8.48E-5 | 1.77E-3 | 3.57E-5 | 2.95E-4 | 3.71E-7 | -2.37E-4 | 1.86E-3 |
| ADPF | kg Sb-eq | 5.51E-1 | 1.69E-2 | 2.27E-2 | 5.91E-1 | 1.01E-2 | 1.04E-1 | 5.26E-4 | -1.97E-1 | 5.08E-1 |
| GWP | kg CO2-eq | 4.78E+1 | 2.30E+0 | 4.04E+0 | 5.42E+1 | 1.37E+0 | 3.53E+1 | 3.33E-1 | -1.81E+1 | 7.31E+1 |
| ODP | kg CFC-11-eq | 2.30E-5 | 4.08E-7 | 3.80E-7 | 2.38E-5 | 2.54E-7 | 4.16E-6 | 1.26E-8 | -6.19E-6 | 2.20E-5 |
| POCP | kg ethene-eq | 3.13E-2 | 1.39E-3 | 1.78E-3 | 3.44E-2 | 8.22E-4 | 8.22E-3 | 8.85E-5 | -7.15E-3 | 3.64E-2 |
| AP | kg SO2-eq | 1.88E-1 | 1.01E-2 | 1.59E-2 | 2.14E-1 | 5.90E-3 | 5.97E-2 | 2.80E-4 | -4.15E-2 | 2.38E-1 |
| EP | kg PO4 3−-eq | 2.56E-2 | 1.99E-3 | 2.50E-3 | 3.01E-2 | 1.18E-3 | 9.07E-3 | 1.10E-4 | -5.44E-3 | 3.50E-2 |
| HTP | kg 1,4-DB-eq | 1.82E+1 | 9.69E-1 | 1.53E+0 | 2.07E+1 | 5.86E-1 | 1.62E+1 | 2.88E-2 | -3.92E+0 | 3.36E+1 |
| FAETP | kg 1,4-DB-eq | 3.28E+0 | 2.83E-2 | 6.21E-2 | 3.37E+0 | 1.72E-2 | 2.38E-1 | 8.80E-3 | -8.15E-2 | 3.55E+0 |
| MAETP | kg 1,4-DB-eq | 1.40E+3 | 1.02E+2 | 2.53E+2 | 1.76E+3 | 6.13E+1 | 7.81E+2 | 1.07E+1 | -2.41E+2 | 2.37E+3 |
| TETP | kg 1,4-DB-eq | 1.39E+0 | 3.43E-3 | 9.48E-2 | 1.49E+0 | 2.08E-3 | 5.75E-2 | 9.46E-5 | -2.68E-2 | 1.52E+0 |
| Environmental impact | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| GWP-total | kg CO2 eq | 4.42E+1 | 2.32E+0 | 4.76E+0 | 5.13E+1 | 1.38E+0 | 4.21E+1 | 3.88E-1 | -1.85E+1 | 7.66E+1 |
| GWP-f | kg CO2 eq | 4.87E+1 | 2.32E+0 | 3.73E+0 | 5.48E+1 | 1.38E+0 | 3.56E+1 | 3.88E-1 | -1.84E+1 | 7.36E+1 |
| GWP-b | kg CO2 eq | -4.90E+0 | 1.07E-3 | 8.06E-1 | -4.09E+0 | 8.39E-4 | 6.51E+0 | 4.96E-4 | -8.17E-2 | 2.34E+0 |
| GWP-luluc | kg CO2 eq | 3.73E-1 | 8.51E-4 | 2.27E-1 | 6.01E-1 | 4.89E-4 | 1.61E-2 | 1.04E-5 | -8.42E-3 | 6.09E-1 |
| ODP | kg CFC11 eq | 2.28E-5 | 5.12E-7 | 4.50E-7 | 2.37E-5 | 3.18E-7 | 4.29E-6 | 1.57E-8 | -6.22E-6 | 2.21E-5 |
| AP | mol H+ eq | 2.30E-1 | 1.35E-2 | 2.03E-2 | 2.64E-1 | 7.87E-3 | 7.50E-2 | 3.75E-4 | -5.10E-2 | 2.96E-1 |
| EP-fw | kg P eq | 2.06E-3 | 2.34E-5 | 5.33E-5 | 2.13E-3 | 1.14E-5 | 5.33E-4 | 4.70E-7 | -4.34E-4 | 2.24E-3 |
| EP-m | kg N eq | 4.58E-2 | 4.74E-3 | 5.99E-3 | 5.65E-2 | 2.82E-3 | 1.83E-2 | 2.33E-4 | -9.93E-3 | 6.79E-2 |
| EP-T | mol N eq | 4.78E-1 | 5.23E-2 | 6.43E-2 | 5.94E-1 | 3.10E-2 | 2.02E-1 | 1.50E-3 | -1.11E-1 | 7.18E-1 |
| POCP | kg NMVOC eq | 1.58E-1 | 1.49E-2 | 1.81E-2 | 1.91E-1 | 8.87E-3 | 6.07E-2 | 5.10E-4 | -3.66E-2 | 2.25E-1 |
| ADP-mm | kg Sb eq | 1.62E-3 | 5.88E-5 | 8.48E-5 | 1.77E-3 | 3.57E-5 | 2.95E-4 | 3.71E-7 | -2.37E-4 | 1.86E-3 |
| ADP-f | MJ | 1.16E+3 | 3.50E+1 | 4.31E+1 | 1.24E+3 | 2.12E+1 | 2.07E+2 | 1.14E+0 | -3.98E+2 | 1.07E+3 |
| WDP | m3 depriv. | 6.97E+1 | 1.25E-1 | 2.92E+1 | 9.90E+1 | 6.51E-2 | 7.95E+0 | 6.32E-3 | -1.65E+1 | 9.05E+1 |
| PM | disease inc. | 2.35E-6 | 2.09E-7 | 3.16E-7 | 2.88E-6 | 1.25E-7 | 9.45E-7 | 7.78E-9 | -3.41E-7 | 3.62E-6 |
| IR | kBq U-235 eq | 2.43E+0 | 1.47E-1 | 7.79E-2 | 2.66E+0 | 9.27E-2 | 7.19E-1 | 5.21E-3 | -5.68E-1 | 2.91E+0 |
| ETP-fw | CTUe | 8.20E+2 | 3.12E+1 | 7.20E+1 | 9.23E+2 | 1.72E+1 | 1.52E+3 | 1.67E+1 | -1.95E+2 | 2.28E+3 |
| HTP-c | CTUh | 3.35E-8 | 1.01E-9 | 2.46E-9 | 3.70E-8 | 6.13E-10 | 2.27E-8 | 2.94E-11 | -6.71E-9 | 5.36E-8 |
| HTP-nc | CTUh | 9.73E-7 | 3.42E-8 | 7.51E-8 | 1.08E-6 | 2.05E-8 | 5.39E-7 | 3.21E-9 | -2.19E-7 | 1.43E-6 |
| SQP | Pt | 7.38E+2 | 3.04E+1 | 3.23E+0 | 7.72E+2 | 1.81E+1 | 1.30E+2 | 2.88E+0 | -1.49E+2 | 7.74E+2 |

| Resource use | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 1.40E+2 | 4.38E-1 | 1.30E+2 | 2.71E+2 | 3.04E-1 | 1.47E+1 | 4.09E-2 | -3.56E+1 | 2.50E+2 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 1.40E+2 | 4.38E-1 | 1.30E+2 | 2.71E+2 | 3.04E-1 | 1.47E+1 | 4.09E-2 | -3.56E+1 | 2.50E+2 |
| PENRE | MJ | 1.25E+3 | 3.72E+1 | 4.68E+1 | 1.33E+3 | 2.25E+1 | 2.20E+2 | 1.21E+0 | -4.32E+2 | 1.14E+3 |
| PENRM | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ | 1.25E+3 | 3.72E+1 | 4.68E+1 | 1.33E+3 | 2.25E+1 | 2.20E+2 | 1.21E+0 | -4.32E+2 | 1.14E+3 |
| PET | MJ | 1.39E+3 | 3.76E+1 | 1.77E+2 | 1.60E+3 | 2.28E+1 | 2.35E+2 | 1.25E+0 | -4.68E+2 | 1.39E+3 |
| 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 | 8.15E-1 | 4.26E-3 | 6.87E-1 | 1.51E+0 | 2.40E-3 | 2.18E-1 | 1.39E-3 | -1.81E-1 | 1.55E+0 |
| Output flows and waste categories | Unit | A1 | A2 | A3 | A1-A3 | C2 | C3 | C4 | D | Total |
| HWD | kg | 9.69E-4 | 8.87E-5 | 6.04E-5 | 1.12E-3 | 5.42E-5 | 3.33E-4 | 1.37E-6 | -3.67E-4 | 1.14E-3 |
| NHWD | kg | 4.81E+0 | 2.22E+0 | 8.72E-2 | 7.12E+0 | 1.31E+0 | 7.73E+0 | 5.27E+0 | -9.46E-1 | 2.05E+1 |
| RWD | kg | 2.24E-3 | 2.30E-4 | 1.09E-4 | 2.58E-3 | 1.44E-4 | 7.75E-4 | 7.43E-6 | -5.20E-4 | 2.99E-3 |
| 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 |