

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

| | |
|--------------------------------|------------------------------|
| Owner of the declaration: | Amiblu Technology AS |
| Program operator: | The Norwegian EPD Foundation |
| Publisher: | The Norwegian EPD Foundation |
| Declaration number: | NEPD-3570-2164-EN |
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| ECO Platform reference number: | - |
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| Valid to: | 14.06.2027 |

Flowtite Pressure Pipe FP2.1 with coupling DN500-3400, PN16, SN10000

Amiblu Technology AS



www.epd-norge.no



General information

Product:

Flowtite Pressure Pipe FP2.1 with coupling DN500-3400, PN16, SN10000

Program operator:

The Norwegian EPD Foundation
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Phone: +47 23 08 80 00
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Declaration number:

NEPD-3570-2164-EN

ECO Platform reference number:

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A1:2013 serves as core PCR
NPCR 019:2018 Part B for Piping systems use in sewage and storm water systems
(under gravity)

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Declared unit:

1 kg Flowtite Pressure Pipe FP2.1 with coupling DN500-3400, PN16, SN10000

Declared unit with option:

A1,A2,A3,A4,A5,C1,C2,C3,C4,D

Functional unit:

1 kg Flowtite Pressure Pipe FP2.1 with coupling DN500-3400, PN16, SN10000

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Individual third party verification of each EPD is not required when the EPD tool is i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPDNorway, and iii) the process is reviewed annually. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools.

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Michael M. Jenssen, Asplan Viak AS

(no signature required)

Owner of the declaration:

Amiblu Technology AS
Contact person: Marcin Pazdro
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e-mail: Marcin.Pazdro@amiblu.com

Manufacturer:

Averaged CFW data from 4 production sites, see Technical data on page 3 for more details

Place of production:

Averaged CFW data from 4 production sites, see Technical data on page 3 for more details

Global

Management system:

ISO 14001

Organisation no:

916 041 195

Issue date: 14.06.2022

Valid to: 14.06.2027

Year of study:

2020

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a construction works context.

Development and verification of EPD:

The declaration has been developed and verified using EPD tool lca.tools ver EPD2020.11, developed by LCA.no AS. The EPD tool is integrated into the company's environmental management system, and has been approved by EPD-Norway

Developer of EPD:

Frans Sørensen

Reviewer of company-specific input data and EPD:

Marcin Pazdro

Approved:

Sign



Håkon Hauan, CEO EPD-Norge

Product

Product description:

FP2.1 Pipe, Flowtite Diameter Series, DN900, PN16, SN10000, Liner: Standard (Type 1), Length: 6 m, Glass: ECR, Resin: Ortho, Liner Resin: Ortho, with FPC2.1 Coupling

Product specification

Glass: E, Resin: Ortho, Liner Resin: Ortho, Specifications and product details are presented here: <https://www.amiblu.com/>

A typical composition of the pipes covered by this EPD is as follows:

| Materials | % |
|-----------------|-------|
| Polyester Resin | 25-30 |
| Sand | 46-51 |
| Glass fibers | 27-32 |
| Rubber gasket | 0-1 |
| Peroxide | 0-1 |

Technical data:

The list below provides a mass of a functional unit (1m pipe section with the coupling assembled on a 6m pipe unit). This information is used to calculate the A1-A3 and A4 outputs for 1m section of pipeline by multiplying the values presented in tables on page 6-7 with the mass of of the pipe.

DN500 PN16 SN10000 - 39.8 kg, DN600 PN16 SN10000 - 51.2 kg, DN700 PN16 SN10000 - 66.2 kg, DN800 PN16 SN10000 - 83.3 kg, DN900 PN16 SN10000 - 103.1 kg, DN1000 PN16 SN10000 - 124.7 kg, DN1100 PN16 SN10000 - 148.6 kg, DN1200 PN16 SN10000 - 174.8 kg, DN1300 PN16 SN10000 - 202.9 kg, DN1400 PN16 SN10000 - 233.9 kg, DN1500 PN16 SN10000 - 267.0 kg, DN1600 PN16 SN10000 - 302.1kg, DN1700 PN16 SN10000 - 339.4 kg, DN1800 PN16 SN10000 - 379.3 kg, DN1900 PN16 SN10000 - 420.8 kg, DN2000 PN16 SN10000 - 465.0 kg, DN2100 PN16 SN10000 - 511.3 kg, DN2200 PN16 SN10000 - 559.9 kg, DN2300 PN16 SN10000 - 611.2 kg, DN2400 PN16 SN10000 - 664.2 kg, DN2500 PN16 SN10000 - 719.7 kg, DN2600 PN16 SN10000 - 776.6 kg, DN2700 PN16 SN10000 - 837.2 kg, DN2800 PN16 SN10000 - 898.7 kg, DN2900 PN16 SN10000 - 964.1 kg, DN3000 PN16 SN10000 - 1030.0 kg, DN3100 PN16 SN10000 - 1097.9 kg, DN3200 PN16 SN10000 - 1169.5 kg, DN3300 PN16 SN10000 - 1243.2 kg, DN3400 PN16 SN10000 - 1318.4 kg

Market:

Europe

Reference service life, product

Up to 150 years

Reference service life, construction

LCA: Calculation rules

Declared unit:

1 kg Flowtite Pressure Pipe FP2.1 with coupling DN500-3400, PN16, SN10000

Cut-off criteria:

All raw materials which are present in the final product at a concentration greater than 0.1 % are included. Some of the raw materials used at lower content are modeled using datasets representing the closest match according to the best knowledge of Amiblu. The contribution of capital goods is estimated to be lower than the general cut-off criteria of 1%. Transport of personnel is outside the scope of the LCA

Data quality:

Specific data for the product compositions are used. In case of some raw materials, data from ecoinvent 3.6 were modified to better reflect the composition of specific materials used by Amiblu. Transportation modes and distances are collected for all raw materials, specific for each production site. Energy inputs are also specific for each site. Production site data were collected in the year of study defined on page 2. The data quality of the raw materials in A1 is presented in the table below.

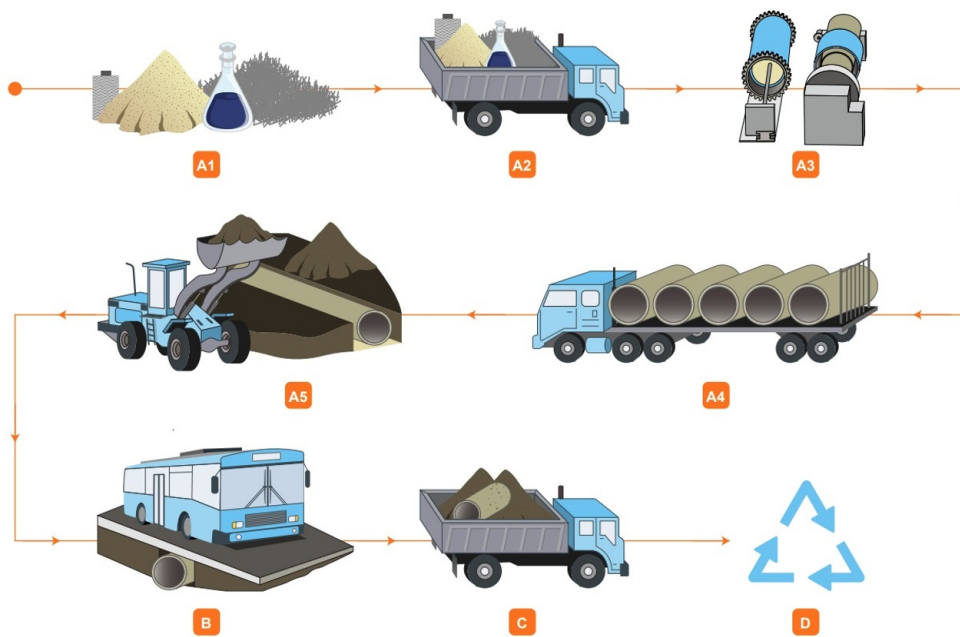
| Materials | Source | Data quality | Year |
|-------------------|-----------------------|--------------|------|
| Chemicals | ecoinvent3.6 | Database | 2019 |
| Glass fibre | ecoinvent3.6 | Database | 2019 |
| Rubber, synthetic | ecoinvent3.6 | Database | 2019 |
| Sand | ecoinvent3.6 | Database | 2019 |
| Polyester resin | Modified ecoinvent3.6 | Database | 2019 |

Allocation:

Allocation was carried out in accordance with EN 15804. There are no-allocations between co-products in the EPD since there are no co-products created during the manufacturing. Environmental burdens related to A1 and A2 stages are allocated to pipes based on the specific pipe composition, transport modes and distances of raw materials to a plant in which the product has been produced. All manufacturing inputs (energy and auxiliary materials) are allocated equally to products through mass allocation. Equal allocation also applies to waste, although for certain waste flows, a specific allocation was performed based on the production process and product formulation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

System boundary:

Production Flow



A1 - Raw materials

Typically including glass fibers, resin, sand, filler, rubber

A2 - Transport of raw materials

Tanker, container transport, sea-transport

A3- Manufacturing

Continuous Filament Winding, Centrifugal Casting, Filament Winding, Hand Lay-up Lamination

A4 - Transport to site

Road transport, sea transport

A5 - Installation

Operation of excavators and earth moving equipment, bedding material, transport

B - Use

Use, maintenance, repair, replacement, refurbishment, operational energy use, operational water use

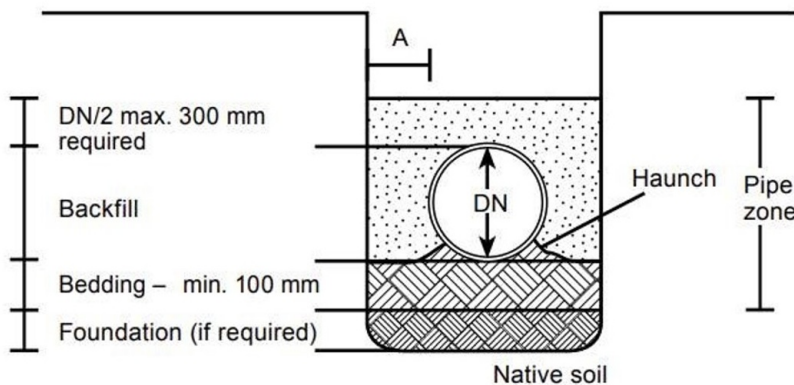
C - End of life

Excavation, transport, waste processing, disposal

D - Beyond construction works Life Cycle

Reuse, recovery, recycling potential

Standard Trench Geometry



Assumptions:

- "A" distance is calculated according to following equation:
 $A = (0,2156 * DN + 205,2) / 1000$
- Bedding and foundation material are represented as "gravel, round – gravel and sand quarry operation, Ecolnvent database".
- The amount of soil reused as backfill, the amount of gravel used as foundation and bedding material and the distance from the quarry, the consumption of diesel fuel for excavation and finishing operations are provided in "Scenarios and additional technical information" on page 5.

A5 outputs should be calculated according to the equation below:

$$A5_{DNx,1m} = A5_{DN,1kg} * \frac{A_{T-DN}}{A_{T-DNx}} * m_{1mPipe}, \text{ where:}$$

- $A5_{DNx,1m}$ – A5 impact calculated for 1m piping section;
- $A5_{DN,1kg}$ – A5 impact given in tables on page 6 or 7 for a modelled pipe;
- A_{T-DN} – cross-section area for a trench used in LCA calculations (used for generation of the data in tables on page 6 and 7);
- A_{T-DNx} – cross-section area for a trench modelled for a pipe having different diameter than the modelled one;
- m_{1mPipe} – weight of 1m piping section of pipe used for LCA calculations(Technical data section on page 2);

Trench's cross-section area for a pipe with a known DN can be calculated using following equation:

$$A_{T-DN} = 1.79 * \left(\frac{DN}{1000}\right)^2 + 1.94 * \frac{DN}{1000} + 0.41$$

Additional technical information:

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to user (A4)

| Type | Capacity utilisation (incl. return) % | Type of vehicle | Distance km | Fuel/Energy consumption | Unit | Value (l/t) |
|----------------------|---------------------------------------|---|-------------|-------------------------|-------|-------------|
| Truck | 38,8 % | Amiblu - Truck, lory 16-32 tonnes, EURO 5 | 500 | 0,044606 | l/tkm | 22,30 |
| Railway | | | | | l/tkm | |
| Boat | | | | | l/tkm | |
| Other Transportation | | | | | l/tkm | |

Assembly (A5)

| | Unit | Value |
|---------------------------------------|----------------|---------|
| Auxiliary | kg | 47,7636 |
| Water consumption | m ³ | |
| Electricity consumption | kWh | |
| Other energy carriers | MJ | 1,5545 |
| Material loss | kg | |
| Output materials from waste treatment | kg | |
| Dust in the air | kg | |
| VOC emissions | kg | |

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LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

| Product stage | | | Construction installation stage | | User stage | | | | | | | End of life stage | | | | Beyond the system boundaries |
|---------------|-----------|---------------|---------------------------------|----------|------------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|------------------------------------|
| Raw materials | Transport | Manufacturing | Transport | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| X | X | X | X | X | | | | | | | | X | X | X | X | X |

Environmental impact

| Parameter | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|-----------|--------------------------------------|----------|----------|----------|----|----|----|----|---|
| GWP | kg CO ₂ -eq | 1,68E+00 | 8,13E-02 | 2,67E-01 | 0 | 0 | 0 | 0 | 0 |
| ODP | kg CFC11 -eq | 1,80E-07 | 1,50E-08 | 4,77E-08 | 0 | 0 | 0 | 0 | 0 |
| POCP | kg C ₂ H ₄ -eq | 5,46E-04 | 1,33E-05 | 4,58E-05 | 0 | 0 | 0 | 0 | 0 |
| AP | kg SO ₂ -eq | 8,30E-03 | 2,59E-04 | 7,38E-04 | 0 | 0 | 0 | 0 | 0 |
| EP | kg PO ₄ ³⁻ -eq | 9,98E-04 | 4,30E-05 | 1,69E-04 | 0 | 0 | 0 | 0 | 0 |
| ADPM | kg Sb -eq | 5,62E-05 | 2,48E-07 | 9,65E-07 | 0 | 0 | 0 | 0 | 0 |
| ADPE | MJ | 3,30E+01 | 1,23E+00 | 3,74E+00 | 0 | 0 | 0 | 0 | 0 |

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

Resource use

| Parameter | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|-----------|----------------|----------|----------|----------|----|----|----|----|---|
| RPEE | MJ | 1,68E+00 | 1,79E-02 | 1,86E-01 | 0 | 0 | 0 | 0 | 0 |
| RPEM | MJ | 1,00E-03 | 0,00E+00 | 0,00E+00 | 0 | 0 | 0 | 0 | 0 |
| TPE | MJ | 1,68E+00 | 1,79E-02 | 1,86E-01 | 0 | 0 | 0 | 0 | 0 |
| NRPE | MJ | 3,68E+01 | 1,25E+00 | 4,10E+00 | 0 | 0 | 0 | 0 | 0 |
| NRPM | MJ | 5,79E-01 | 0,00E+00 | 0,00E+00 | 0 | 0 | 0 | 0 | 0 |
| TRPE | MJ | 3,74E+01 | 1,25E+00 | 4,10E+00 | 0 | 0 | 0 | 0 | 0 |
| SM | kg | 5,69E-02 | 0,00E+00 | 2,51E+01 | 0 | 0 | 0 | 0 | 0 |
| RSF | MJ | 9,41E-02 | 0,00E+00 | 2,61E-04 | 0 | 0 | 0 | 0 | 0 |
| NRSF | MJ | 1,02E-02 | 0,00E+00 | 3,84E-03 | 0 | 0 | 0 | 0 | 0 |
| W | m ³ | 1,81E-02 | 2,35E-04 | 3,20E-02 | 0 | 0 | 0 | 0 | 0 |

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

End of life - Waste

| Parameter | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|-----------|------|----------|----------|----------|----|----|----|----|---|
| HW | kg | 4,32E-03 | 7,33E-07 | 5,95E-05 | 0 | 0 | 0 | 0 | 0 |
| NHW | kg | 2,99E-01 | 6,60E-02 | 8,08E-02 | 0 | 0 | 0 | 0 | 0 |
| RW | kg | 8,28E-05 | 8,61E-06 | 3,01E-05 | 0 | 0 | 0 | 0 | 0 |

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

End of life - Output flow

| Parameter | Unit | A1-A3 | A4 | A5 | C1 | C2 | C3 | C4 | D |
|-----------|------|----------|----------|----------|----|----|----|----|---|
| CR | kg | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0 | 0 | 0 | 0 | 0 |
| MR | kg | 1,04E-03 | 0,00E+00 | 2,93E-06 | 0 | 0 | 0 | 0 | 0 |
| MER | kg | 1,31E-02 | 0,00E+00 | 9,45E-04 | 0 | 0 | 0 | 0 | 0 |
| EEE | MJ | 1,02E-02 | 0,00E+00 | 1,00E-05 | 0 | 0 | 0 | 0 | 0 |
| ETE | MJ | 1,30E-01 | 0,00E+00 | 1,52E-04 | 0 | 0 | 0 | 0 | 0 |

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

| Electricity mix | Data source | Amount | Unit |
|-------------------------------------|---------------|---------|---------------|
| Amiblu - Electricity, Poland (kWh) | ecoinvent 3.6 | 1099,70 | g CO2-ekv/kWh |
| Amiblu - Electricity, Spain (kWh) | ecoinvent 3.6 | 349,18 | g CO2-ekv/kWh |
| Amiblu - Electricity, Germany (kWh) | ecoinvent 3.6 | 629,86 | g CO2-ekv/kWh |
| Amiblu - Electricity, Morocco (kWh) | ecoinvent 3.6 | 888,34 | g CO2-ekv/kWh |

Dangerous substances

The product contains no substances given by the REACH Candidate list or the national priority list.

Indoor environment

Bibliography

ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines.

EN 15804:2012+A1:2013 Environmental product declaration - Core rules for the product category of construction products.

ISO 21930:2017 Core rules for environmental product declarations of construction products.





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Ruttenborg et al., (2021) EPD generator for Amiblu Technology AS Background information for customer application and LCA data, LCA.no report number 01.21

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NPCR 019 Part B for Piping systems for use in sewage and storm water systems (under gravity), Ver 2.0.

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|--|--|--|
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