

## 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-3490-2088-EN
Registration number:	NEPD-3490-2088-EN
ECO Platform reference number:	-
Issue date:	06.05.2022
Valid to:	06.05.2027

### Pipe Pressure Hobas, Spigot-Coupling DN500-3600, PN6, SN10000


Amiblu Technology AS

**Amiblu**<sup>®</sup>

[www.epd-norge.no](http://www.epd-norge.no)



## General information

<b>Product:</b> Pipe Pressure Hobas, Spigot-Coupling DN500-3600, PN6, SN10000	<b>Owner of the declaration:</b> Amiblu Technology AS Contact person: Marcin Pazdro Phone: +47 907 21 877 e-mail: Marcin.Pazdro@amiblu.com
<b>Program operator:</b> The Norwegian EPD Foundation Pb. 5250 Majorstuen, 0303 Oslo Phone: +47 23 08 80 00 e-mail: <a href="mailto:post@epd-norge.no">post@epd-norge.no</a>	<b>Manufacturer:</b> Averaged CC data from 3 production sites, see Technical data on page 3 for more details
<b>Declaration number:</b> NEPD-3490-2088-EN	<b>Place of production:</b> Averaged CC data from 3 production sites, see Technical data on page 3 for more details  Europe
<b>ECO Platform reference number:</b>	<b>Management system:</b> ISO 14001
<b>This declaration is based on Product Category Rules:</b> 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)	<b>Organisation no:</b> 916 041 195
<b>Statement of liability:</b> 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.	<b>Issue date:</b> 06.05.2022  <b>Valid to:</b> 06.05.2027
<b>Declared unit:</b> 1 kg Pipe Pressure Hobas, Spigot-Coupling DN500-3600, PN6, SN10000	<b>Year of study:</b> 2020
<b>Declared unit with option:</b> A1,A2,A3,A4,A5,C1,C2,C3,C4,D	<b>Comparability:</b> EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a construction works context.
<b>Functional unit:</b> 1 kg Hobas Pressure Pipe with FWC coupling. DN500-3600, PN6, SN10000	<b>Development and verification of EPD:</b> 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
<b>General information on verification of EPD from EPD tools:</b> 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.	Developer of EPD: Marcin Pazdro  Reviewer of company-specific input data and EPD: Frans Sørensen
<b>Verification of EPD tool:</b> 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)	<b>Approved:</b>  Sign  Håkon Hauan, CEO EPD-Norge

## Product

### Product description:

Filled (VO) Pipe, Hobas Diameter Series, DN500-3600, PN6, SN10000, Liner: Standard, Length: 6 m, Glass: E, Resin: Ortho, Liner Resin: Ortho, with FWC 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	30-35
Sand	40-45
Glass fibers	10-15
Filler	22-27
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 PN6 SN10000 - 39.9 kg	DN550 PN6 SN10000 - 43.2 kg
DN600 PN6 SN10000 - 53.1 kg	DN650 PN6 SN10000 - 58.8 kg
DN700 PN6 SN10000 - 71.1 kg	DN750 PN6 SN10000 - 77.4 kg
DN800 PN6 SN10000 - 91.1 kg	DN860 PN6 SN10000 - 99.9 kg
DN900 PN6 SN10000 - 114.5 kg	DN960 PN6 SN10000 - 123.2 kg
DN1000 PN6 SN10000 - 141.9 kg	DN1100 PN6 SN10000 - 161.7 kg
DN1200 PN6 SN10000 - 200.0 kg	DN1280 PN6 SN10000 - 216.3 kg
DN1400 PN6 SN10000 - 268.9 kg	DN1500 PN6 SN10000 - 289.1 kg
DN1535 PN6 SN10000 - 306.1 kg	DN1600 PN6 SN10000 - 347.1 kg
DN1720 PN6 SN10000 - 381.4 kg	DN1800 PN6 SN10000 - 435.5 kg
DN1940 PN6 SN10000 - 480.2 kg	DN2000 PN6 SN10000 - 534.6 kg
DN2160 PN6 SN10000 - 593.5 kg	DN2200 PN6 SN10000 - 642.7 kg
DN2400 PN6 SN10000 - 731.2 kg	DN2555 PN6 SN10000 - 826.5 kg
DN3000 PN6 SN10000 - 1130.6 kg	DN3270 PN6 SN10000 - 1339.6 kg
DN3600 PN6 SN10000 - 1618.4 kg	

### Market:

Europe

### Reference service life, product

Up to 150 years

### Reference service life, construction

## LCA: Calculation rules

### Declared unit:

1 kg Pipe Pressure Hobas, Spigot-Coupling DN500-3600, PN6, 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.

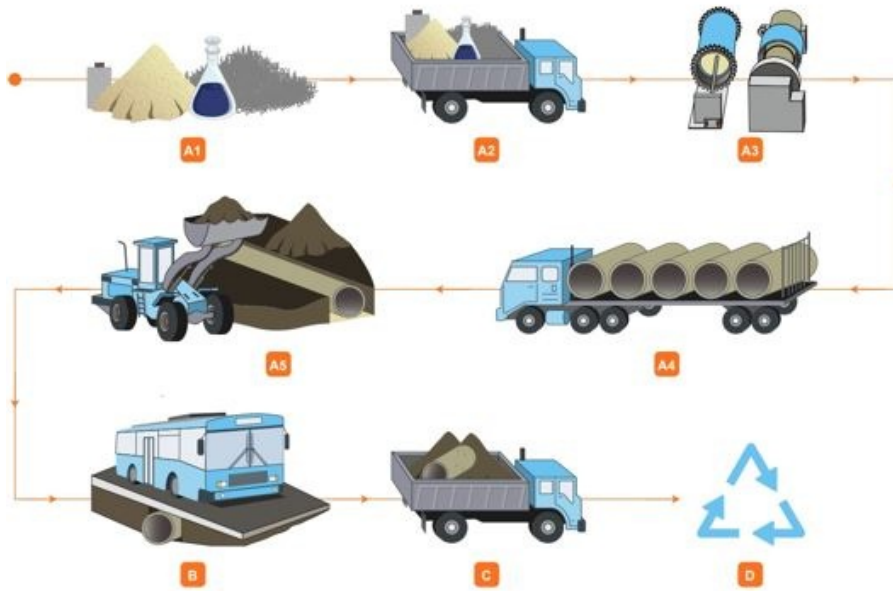
Materials	Source	Data quality	Year
Chemicals	ecoinvent3.6	Database	2019
Glass fibre	ecoinvent3.6	Database	2019
Pigments and Fillers	ecoinvent3.6	Database	2019
Rubber, synthetic	ecoinvent3.6	Database	2019
Sand	ecoinvent3.6	Database	2019
Polyester resin	Modified ecoinvent3.6	Database	2019

### 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 and 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**

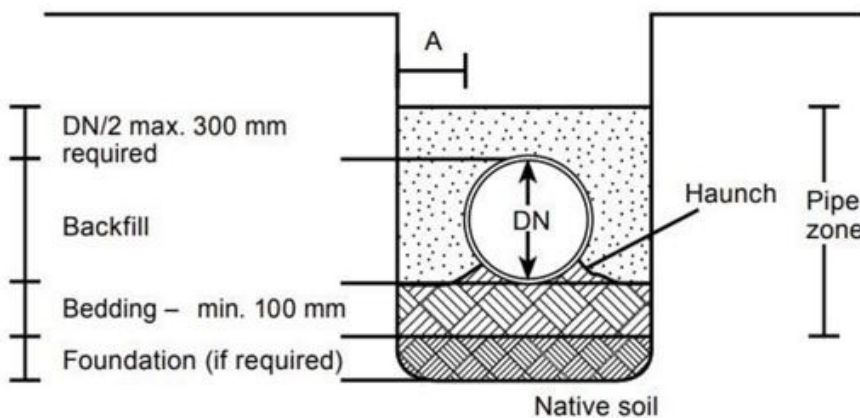
Use, maintenance, repair, replacement, refurbishment, operational energy use, operational water use

**C – End of life**

Excavation, transport, waste processing, disposal

**D – Beyond construction works Life Cycle**

Reuse, recovery, recycling potential



**Assumptions:**

- “A” distance is calculated according to following equation:
- $A = (0.2156 * DN + 205.2) / 1000$
- Trench depth is 2.5-time pipes DN;
- Bedding and foundation material are represented as gravel (Ecolnvent) and make up 50% of the trench fill;
- Remaining 50% is reused native soil;
- Soil excavation consumes 0.36 l diesel/m<sup>3</sup>
- Finishing operations consumes 1.6 l diesel for 1m of trench constructed for DN600 pipes. For other diameters, this consumption is scaled up or down based on diameter of the pipe.
- The distance from the quarry for gravel transport is 20 km and the tracks are fully utilized.

A5 outputs can be calculated according to equation below:

$$A5_{O-DN?} = A5_{O-DN} * \frac{2 \left( \frac{DN_x}{1000} \right)^{2.1} + \frac{DN_x}{1000}}{2 \left( \frac{DN}{1000} \right)^{2.1} + \frac{DN}{1000}} * 1mPipeMass, \text{ where:}$$

$A5_{O-DN}$  - An A5 output presented on page 6 and 7 for known diameter (ref. Declared Unit on page 2);

$A5_{O-DN?}$  - An A5 output for a pipe with diameter different than for DU pipe;

DN – Diameter of the pipe for which calculation was made (ref. Declared Unit on page 2);

$DN_x$  - Diameter of the pipe for which the output is to be calculated;

1mPipeMass – weight of 1m piping section as provided in Technical Data section on page 2.

**Additional technical information:**

## LCA: Scenarios and additional technical information

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

For A4 stage, a typical transport distance of 500 km from the pipe production plant to the installation site is assumed. A project specific EPD can be provided on request. For A5 module, a trench geometry is calculated automatically based on the diameter of the pipe. The trench depth is assume to be  $DN + 1/4DN + 1$  m. The diesel consumption of 0.36 liter per 1 cubic meter of excavated soil is used. In addition, the consumption of 1.6 liter of diesel per 1 m of the trench length is used to account for material compaction and trench filling operations. It is assumed that 50 % of excavated soil is replaced with gravel. Transport distance for disposal site of unused soil and gravel from quarry is assumed to be 20 km on average. Use stage has not been included since glass reinforced plastic piping, once installed, does not require maintenance. It has been assumed that at the end of the functional life of the piping, the installation is either left in ground or relined. Potential relining is considered to be a second life stage, thus, all environmental burdens associated with relining are omitted in this declaration. LCA study was performed for the 6 m Hobas Pressure Pipe VO DN700 PN6 SN10000 with the corresponding FWC coupling. The environmental impacts for 1kg of other piping systems covered by this EPD stays within the +/-10 % range compared to values presented on pages 6 and 7. The A2 and A3 scenario represents an weight average calculated for 2020 for following manufacturing plants: - Amiblu Germany GmbH (DE10), Gewerbepark 1, 17039 Trollenhagen, GERMANY; - Amiblu Poland Sp. z o.o. (PL20), Ul. Koksownicza 11, 41-300 Dabrowa Gòmicza, POLAND; - Amiblu Romania SRL (RO20), Drumul Mare nr. 2, 77060 Comuna Clinceni, ROMANIA;

### 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, lorry 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	53,8682
Water consumption	m <sup>3</sup>	
Electricity consumption	kWh	
Other energy carriers	MJ	1,5502
Material loss	kg	
Output materials from waste treatment	kg	
Dust in the air	kg	
VOC emissions	kg	

..

## 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	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

### Environmental impact

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO <sub>2</sub> -eq	1,55E+00	8,13E-02	2,83E-01	0	0	0	0	0
ODP	kg CFC11 -eq	1,92E-07	1,50E-08	5,06E-08	0	0	0	0	0
POCP	kg C <sub>2</sub> H <sub>4</sub> -eq	5,46E-04	1,33E-05	4,88E-05	0	0	0	0	0
AP	kg SO <sub>2</sub> -eq	6,75E-03	2,59E-04	8,05E-04	0	0	0	0	0
EP	kg PO <sub>4</sub> <sup>3-</sup> -eq	9,52E-04	4,30E-05	1,88E-04	0	0	0	0	0
ADPM	kg Sb -eq	3,55E-05	2,48E-07	1,06E-06	0	0	0	0	0
ADPE	MJ	3,25E+01	1,23E+00	3,96E+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<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

## Resource use

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	1,55E+00	1,79E-02	2,08E-01	0	0	0	0	0
RPEM	MJ	1,56E-04	0,00E+00	0,00E+00	0	0	0	0	0
TPE	MJ	1,55E+00	1,79E-02	2,08E-01	0	0	0	0	0
NRPE	MJ	3,68E+01	1,25E+00	4,37E+00	0	0	0	0	0
NRPM	MJ	1,22E-02	0,00E+00	0,00E+00	0	0	0	0	0
TRPE	MJ	3,68E+01	1,25E+00	4,37E+00	0	0	0	0	0
SM	kg	5,93E-03	0,00E+00	2,84E+01	0	0	0	0	0
RSF	MJ	9,01E-02	0,00E+00	2,60E-04	0	0	0	0	0
NRSF	MJ	6,99E-03	0,00E+00	3,83E-03	0	0	0	0	0
W	m <sup>3</sup>	2,12E-02	2,35E-04	3,61E-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<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

## End of life - Waste

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HW	kg	2,31E-03	7,33E-07	5,95E-05	0	0	0	0	0
NHW	kg	2,81E-01	6,60E-02	9,08E-02	0	0	0	0	0
RW	kg	7,25E-05	8,61E-06	3,22E-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<sup>-3</sup> = 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	1,06E-03	0,00E+00	2,92E-06	0	0	0	0	0
MER	kg	1,73E-02	0,00E+00	9,42E-04	0	0	0	0	0
EEE	MJ	1,06E-02	0,00E+00	1,00E-05	0	0	0	0	0
ETE	MJ	1,23E-01	0,00E+00	1,51E-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<sup>-3</sup> = 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, Romania (kWh)	ecoinvent 3.6	468,43	g CO2-ekv/kWh
Amiblu - Electricity, Germany (kWh)	ecoinvent 3.6	629,86	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.  
 ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.  
 Iversen et al., (2018) eEPD v3.0 - Background information for EPD generator system. LCA.no report 04.18.  
 Ruttenborg et al., (2021) EPD generator for Amiblu Technology AS Background information for customer application and LCA data, LCA.no report number 01.21  
 NPCR Part A: Construction products and services. Ver. 1.0. April 2017, EPD-Norge.  
 NPCR 019 Part B for Piping systems for use in sewage and storm water systems (under gravity), Ver 2.0.

<p>The Norwegian EPD Foundation</p>	<b>Program operator and publisher</b> The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: +47 23 08 80 00 e-mail: post@epd-norge.no web: www.epd-norge.no
	<b>Owner of the declaration</b> Amiblu Technology AS Østre Kullerød 3 3241 Sandefjord	Phone: +47 907 21 877 e-mail: Marcin.Pazdro@amiblu.com web: https://www.amiblu.com/
	<b>Author of the Life Cycle Assessment</b> LCA.no AS Dokka 6B 1671 Kråkerøy	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
	<b>Developer of EPD generator</b> LCA.no AS Dokka 1C,1671 Kråkerøy	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no