epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Hobas Sewer Pipe VO with coupling DN900-DN1280 PN1 SN10000

Amiblu®

The Norwegian EPD Foundation

Owner of the declaration:
Amiblu Technology AS

Product:
Hobas Sewer Pipe VO with coupling DN900-DN1280 PN1 SN10000

Declared unit:
1 kg

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 019:2018 Part B for Piping systems use in sewage and storm water systems (under gravity)

Program operator:
The Norwegian EPD Foundation

Declaration number:

NEPD-7097-6491-EN

Registration number:

NEPD-7097-6491-EN

Issue date: 12.07.2024

Valid to: 12.07.2029

EPD software:
LCAno EPD generator ID: 349821

General information

Product

Hobas Sewer Pipe VO with coupling DN900-DN1280 PN1 SN10000

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Declaration number:

NEPD-7097-6491-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 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 Hobas Sewer Pipe VO with coupling DN900-DN1280 PN1 SN10000

Declared unit (cradle to gate) with option:

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

Functional unit:

1 kg pipe with coupling. Pipe lengths covered are 3 and 6

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. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. 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.

Third party verifier:

Elisabet Amat, GREENIZE projects

(no signature required)

Owner of the declaration:

Amiblu Technology AS
Contact person: Thore M. Klaveness
Phone: +47 928 40 677
e-mail: thore.klaveness@amiblu.com

Manufacturer:

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

Place of production:

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

, Europe

Management system:

ISO 14001

Organisation no:

916 041 195

Issue date:

12.07.2024

Valid to:

12.07.2029

Year of study:

2020

Comparability:

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

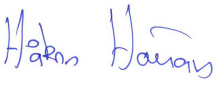
Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway. NEPDT22

Developer of EPD: Thore Klaveness

Reviewer of company-specific input data and EPD: Petter Åsrud

Approved:



Håkon Hauan, CEO EPD-Norge

Product

Product description:

Hobas sewer pipes with couplings made from glass fiber reinforced unsaturated polyester (GRP). Declaration for pipes as specified in other sections of this document. Other pipe qualities in the Amiblu range may be covered by different EPDs.

Product specification

Materials	Value	Unit
Sand	40 - 60	%
Unsaturated polyester resin	20 - 30	%
Filler	20 - 30	%
Glass fiber	7 - 13	%
Rubber	0 - 1	%

Technical data:

The table below provides the average mass of 1 meter pipe section for a pipe system with couplings of specified DN and pipe segment lengths. This information can be used to calculate the A1-A3 and A4 outputs for 1 meter section of pipeline by multiplying the values presented in tables on page 6-9 with this tabulated mass of 1 meter pipe.
Furthermore, mass of 1 meter pipe section shall also be used to calculate A5 outputs according to the equation provided on page 4.

DN	Length: 3 meter	Length: 6 meter
900	123.7	121.5
960	133.6	131.3
1000	152.9	150.5
1100	175.0	172.4
1200	218.5	215.4
1280	236.8	233.6

Market:

Europe

Reference service life, product

150 years

Reference service life, building

LCA: Calculation rules

Declared unit:

1 kg Hobas Sewer Pipe VO with coupling DN900-DN1280 PN1 SN10000

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. 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.

Data quality:

Specific data for the product composition are provided by the manufacturer. They represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on registered EPDs according to EN 15804, Ostfold Research databases, ecoinvent and other LCA databases. The data quality of the raw materials in A1 is presented in the table below.

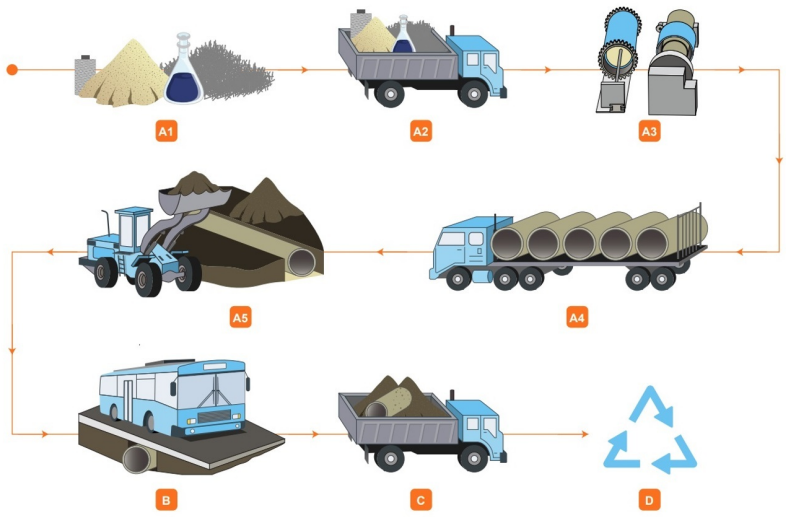
Materials	Source	Data quality	Year
Additives	ecoinvent 3.6	Database	2019
Chemical	ecoinvent 3.6	Database	2019
Filler	ecoinvent 3.6	Database	2019
Glass fibre	ecoinvent 3.6	Database	2019
Polyester resin	Modified ecoinvent 3.6	Database	2019
Rubber, synthetic	ecoinvent 3.6	Database	2019

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

Product stage			Construction installation stage		Use 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

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

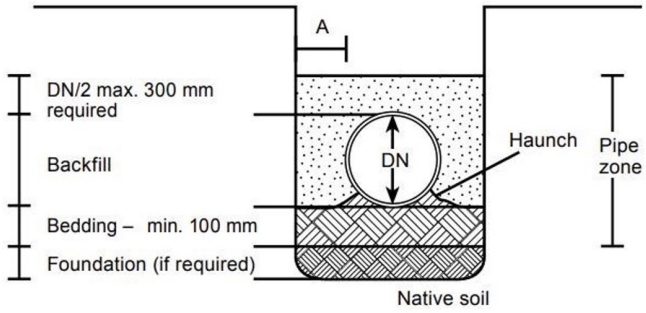
A5 - Installation
Operation of excavators and earth moving equipment, bedding material, transport

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, EcoInvent 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:

$$A5_{DN_{x;1m}} = A5_{DN_{1kg}} * \frac{2\left(\frac{DN_x}{1000}\right)^{2,1} + \frac{DN_x}{1000}}{2\left(\frac{DN}{1000}\right)^{2,1} + \frac{DN}{1000}} * m_{1mPipe}$$ where:

$A5_{DNx,1m}$ – A5 impact calculated per 1m piping section;
$A5_{DN,1kg}$ – A5 impact given in table on page 6 or 7;
DN – the diameter of the pipe for which calculation was made (Product description on page 3);
DN_x – the diameter of a pipe for which A5 impact is to be calculated;
m_{1mPipe} – weight of 1m piping section (Technical data section on page 2);

Additional technical information:

Additional information available at www.amiblu.com

LCA: Scenarios and additional technical information

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

This EPD is based on a life cycle assessment that has been performed on DN1000 and 6 meters pipe length. Additional assessments have been performed to verify that the covered range of pipes are within the allowable global warming potential range.
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 has been calculated based on the diameter of the pipe. The trench depth is set to DN + 1/4DN + 1 meter. The diesel consumption of 0,36 liter per 1 cubic meter of excavated soil is used. In addition, the consumption of 1.6 liters of diesel per meter 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 (B) has not been declared 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 the ground or relined. Potential relining is considered a second life stage, thus, all environmental burdens associated with relining are omitted in this declaration.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 5 (kgkm)	36,7 %	500	0,044	l/tkm	22,00

Assembly (A5)	Unit	Value			
Diesel, burned (MJ)	MJ/kg	1,21			
Gravel (kg)	kg/kg	23,56			
Local mass (kg)	kg/kg	26,18			
Truck, 16-32 tonnes, EURO 6 (kgkm)	kgkm/kg	1203,69			

LCA: Results

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

Environmental impact										
	Indicator	**Unit**	A1-A3	A4	A5	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	1,37E+00	8,34E-02	3,62E-01	0	0	0	0	0
	GWP-fossil	kg CO_2 -eq	1,30E+00	8,33E-02	3,61E-01	0	0	0	0	0
	GWP-biogenic	kg CO_2 -eq	6,50E-02	3,40E-05	1,18E-03	0	0	0	0	0
	GWP-luluc	kg CO_2 -eq	7,96E-04	2,91E-05	1,15E-04	0	0	0	0	0
	ODP	kg CFC11 -eq	1,71E-07	1,90E-08	7,82E-08	0	0	0	0	0
	AP	mol H+ -eq	7,10E-03	3,41E-04	2,21E-03	0	0	0	0	0
	EP-FreshWater	kg P -eq	6,13E-05	6,55E-07	3,41E-06	0	0	0	0	0
	EP-Marine	kg N -eq	1,31E-03	1,01E-04	7,90E-04	0	0	0	0	0
	EP-Terrestial	mol N -eq	1,36E-02	1,12E-03	8,83E-03	0	0	0	0	0
	POCP	kg NMVOC -eq	7,45E-03	3,42E-04	2,54E-03	0	0	0	0	0
	ADP-minerals&metals[1]	kg Sb-eq	3,66E-05	2,26E-06	1,04E-05	0	0	0	0	0
	ADP-fossil[1]	MJ	2,73E+01	1,26E+00	5,41E+00	0	0	0	0	0
	WDP[1]	m^3	7,50E+01	1,20E+00	4,60E+01	0	0	0	0	0

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment: EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Remarks to environmental impacts

Additional environmental impact indicators

Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	PM	Disease incidence	5,77E-08	6,00E-09	5,30E-08	0	0	0	0	0
	IRP[2]	kgBq U235 -eq	6,06E-02	5,49E-03	2,79E-02	0	0	0	0	0
	ETP-fw[1]	CTUe	3,32E+01	9,26E-01	3,97E+00	0	0	0	0	0
	HTP-c[1]	CTUh	1,97E-09	0,00E+00	8,00E-11	0	0	0	0	0
	HTP-nc[1]	CTUh	2,87E-08	1,00E-09	4,33E-09	0	0	0	0	0
	SQP[1]	dimensionless	5,13E+00	8,66E-01	2,01E-01	0	0	0	0	0

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
2. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Resource use										
Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	1,26E+00	1,77E-02	2,65E-01	0	0	0	0	0
	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0
	PERT	MJ	1,26E+00	1,77E-02	2,65E-01	0	0	0	0	0
	PENRE	MJ	2,74E+01	1,26E+00	5,46E+00	0	0	0	0	0
	PENRM	MJ	1,75E-01	0,00E+00	0,00E+00	0	0	0	0	0
	PENRT	MJ	2,76E+01	1,26E+00	5,46E+00	0	0	0	0	0
	SM	kg	3,35E-03	0,00E+00	2,62E+01	0	0	0	0	0
	RSF	MJ	8,08E-02	6,35E-04	6,09E-03	0	0	0	0	0
	NRSF	MJ	1,53E-02	2,27E-03	1,29E-02	0	0	0	0	0
	FW	m^3	1,81E-02	1,32E-04	3,39E-02	0	0	0	0	0

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = 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; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	HWD	kg	5,15E-03	6,41E-05	4,18E-04	0	0	0	0	0
	NHWD	kg	2,46E-01	6,01E-02	1,53E-01	0	0	0	0	0
	RWD	kg	6,31E-05	8,57E-06	3,80E-05	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0
	MFR	kg	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0
	MER	kg	1,41E-02	0,00E+00	0,00E+00	0	0	0	0	0
	EEE	MJ	8,35E-03	0,00E+00	0,00E+00	0	0	0	0	0
	EET	MJ	1,26E-01	0,00E+00	0,00E+00	0	0	0	0	0

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

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	Source	Amount	Unit
Electricity, Germany (kWh)	ecoinvent 3.6	585,93	g CO2-eq/kWh
Electricity, Poland (kWh)	ecoinvent 3.6	1060,47	g CO2-eq/kWh
Electricity, Romaina (kWh)	ecoinvent 3.6	465,15	g CO2-eq/kWh

Dangerous substances

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

Indoor environment

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products									
Indicator	**Unit**	A1-A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	1,37E+00	8,34E-02	3,64E-01	0	0	0	0	0

GWP-IOBC = Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Bibliography

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ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.
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NPCR 019:2022 Part B for Piping systems use in sewage and storm water systems (under gravity). Ver. 2.0 May 2022, EPD-Norge.

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