Environmental Product Declaration

of multiple products, based on a representative product.

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Flexible Pipe Systems (Foamed with Metal Pipes)

from

BRUGG Rohrsystem AG

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products from a company
EPD registration number:	EPD-IES-0017459:001
Version date:	2025-10-03
Validity date:	2030-10-02
	An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

Products included in the EPD:

- CASAFLEX UNO
- CASAFLEX DUO
- FLEXWELL FHK
- FLEXWELL CRYO PIPE-PUR

A detailed list can be found in the Annex.

GENERAL INFORMATION

Programme Information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products version 2.0.1 and UN CPC code: 53241 - Long-distance pipelines
PCR review was conducted by: The Technical Committee of the International EPD System. A full list of members is available on www.environdec.com. **Chair of the PCR review:** Rob Rouwette (chair), Noa Meron (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/support.
c-PCR, if applicable: *not applicable*

LCA Accountability
LCA accountability: Franziska Heinz, DEKRA Assurance Services GmbH, Handwerkstraße 15, 70565 Stuttgart, Germany

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: Sazal Kundu, Edge Impact, sazal.kundu@edgeimpact.global, Greenhouse, Level 3, 180 George Street, Sydney NSW 2000, Australia  Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025

INFORMATION ABOUT EPD OWNER

Owner of the EPD: BRUGG Rohrsystem AG
Address: Industriestrasse 39, CH-5314 Kleindöttingen, Switzerland

Contact: Boris Mäder (Boris.Maeder@brugg.com)

Address and contact information of the LCA practitioner commissioned by the EPD owner, if applicable: DEKRA Assurance Services GmbH, Handwerkstraße 15, 70565 Stuttgart, Germany

Description of the organisation:
BRUGG Pipes (BRUGG Rohrsysteme AG and its sister companies) specializes in producing and selling pipe systems for transporting energy in liquids and gases highly efficient and safely on a global scale. Areas of expertise comprise local and district heating, cooling, cold water, industrial applications as well as gas stations and tank systems. Based in Kleindöttingen, Switzerland, BRUGG Pipes operates five additional production sites across Germany, Poland and USA with a total of over 800 employees. As one of the world market leaders and with decades of professional experience, BRUGG Pipes stands for reliability, efficiency and flexible solutions. BRUGG Pipes is an independent company within the BRUGG GROUP. For more information see: https://www.bruggpipes.com/

Product-related or management system-related certifications:

The production site in Wunstorf operates a quality management system in accordance with ISO 9001:2015-09, 2015 (TÜV NORD CERT GmbH, 2025, certificate no. 44 100 212655) and an occupational health and safety management system in accordance with ISO 45001:2018-03, 2018 (TÜV NORD CERT GmbH, 2024, certificate no. 44 126 212655).

PRODUCT INFORMATION

Product name: Flexible Pipe Systems (Foamed with Metal Pipes)

Product identification:
The EPD covers multiple flexible pipe systems (foamed with metal pipes). It is based on the representative product CASAFLEX UNO (60/142) with a weight of 5.0 kg/m of pipe. It is the most sold variant among the group of flexible pipe systems (foamed with metal pipes). A list of all included products can be found in Annex A.

Visual representation (e.g., an image) of the product:

UN CPC code: 53251 – Local pipelines

Product description:
The monitorable district heating pipe CASAFLEX is used for the house connection to the district heating network - the underground pipe usually runs directly through the foundation wall to the transfer station, which then distributes the heat throughout the house. CASAFLEX is also ideal as a primary supply line for district and local heating.

CASAFLEX UNO has a helically corrugated inner pipe made of stainless steel. The corrugated pipe is designed according to fluidic aspects. The thermal insulation consists of a chlorofluorocarbon (CFC)-free and flexible polyisocyanurate (PIR) rigid foam with excellent thermal insulation properties; a barrier film is arranged under the polyethylene low-density (PE-LD) casing pipe, which prevents diffusion of cell gases. The bendability of CASAFLEX UNO makes it easy to adapt to almost any adaptation to almost all route conditions. CASAFLEX DUO is very similar to CASAFLEX UNO, but it contains two inner pipes instead of just one.

FLEXWELL FHK is the registered name of a flexible pipe system from BRUGG Pipes, used to transport district heat and domestic hot water. It has one helically corrugated inner carrier pipe made of austenitic stainless steel. The materials used are extremely resistant to corrosion, making this product ideal for transporting a wide variety of media such as heating water, domestic hot water, drinking water, condensate, and others. Thermal insulation is ensured by a layer of CFC-free, flexible PUR foam. It is surrounded by a corrugated steel casing. A bitumen polymer layer acts as anti-corrosion protection. A protective PE-LD casing protects the pipe against mechanical action and humidity.

FLEXWELL CRYO PIPE-PUR is produced in one dimension only. The material composition is comparable to FLEXWELL FHK in the dimension 200/310. As such it has one helically corrugated inner carrier pipe made of austenitic stainless steel. The materials used are extremely resistant to corrosion, making this product ideal for transporting a wide variety of media such as heating water, domestic hot water, drinking water, condensate, and others. Thermal insulation is ensured by a layer of CFC-free, flexible PUR foam. It is surrounded by a corrugated steel casing. A bitumen polymer layer acts as anti-corrosion protection. A protective PE-LD casing protects the pipe against mechanical action and humidity.

Name and location of production site(s): BRUGG Rohrsysteme GmbH: Adolf-Oesterheld-Straße 31, D-31515 Wunstorf, Germany

References to any relevant websites for more information or explanatory materials, if applicable:
https://www.bruggpipes.com

CONTENT DECLARATION

Description of the main components and/or materials: Quantity for 1 m of the representative product as well as the range of the content of the included products. Packaging for 1 m of pipe was considered as well.

Product content	Mass, kg	Range of mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Steel	1.9	0.45 - 22	13	0	0
PIR	1.1	0.2 – 1.5	0	0	0
PE-LD	1.9	0.48 – 4.9	0	0	0
Other	0.082	0.021 – 6.9	0	0	0
TOTAL	5.0	1.3 - 35	13	0	0

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
Pipe cover (polypropylene)	0.00016	0.003	0

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

Information on the environmental and hazardous/toxic properties of a substances contained in the product:
None of the substances used during production are classified as persistent, bioaccumulative and toxic (PBT) or substances of very high concern (SVHC) according to Regulation No. 1907/2006 Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Hazardous substances from the candidate list of SVHC	EC No.	CAS No.	Mass-% per product or declared unit
N/A	N/A	N/A	N/A

LCA INFORMATION

Compliance with standards

The LCA and EPD have been created to comply with:

- ISO 14040:2006 and ISO 14044:2006+A1:2018 which describe the principles, framework, requirements and provides guidelines for life cycle assessment (LCA) (ISO 14040:2006-07, 2006) (ISO 14044:2006-07, 2006)
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures, which establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations (ISO 14025:2006-07, 2006)
- ISO 14020:2022 Environmental labels and declarations – General principles, which describes the guiding principles for the development and use of environmental labels and declarations (ISO 14020:2022-12, 2022)
- EN 15804+A2:2019/AC:2021: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products (DIN EN 15804:2022-03, 2022)
- EN 15941: Sustainability of construction works – Data quality for environmental assessment of products and construction works (DIN EN 15941:2024-10, 2024)
- PCR 2019:14, v2.0.1 – Construction products (Environdec, 2025a)
- GPI for the International EPD System v5.0.1 – containing instructions regarding methodology and the content that must be included in EPDs registered under the International EPD System (Environdec, 2025b)

Declared unit:

The declared unit is 1 m of flexible pipe system (foamed with metal pipes).

The EPD is based on the representative product CASAFLEX UNO (60/142) with a weight of 5.0 kg/m of pipe plus packaging. It is the most sold variant of an otherwise larger group of flexible pipe systems (foamed with metal pipes).

For other products included in the EPD, please refer to the section ”Additional Environmental Information” where conversion factors for each sub-group are provided per 1 kg of pipe. The results per kg of pipe may be scaled up to 1 meter by multiplying with the pipe weight in kg/m, which is provided in the Annex.

Reference service life: The reference service life is 30 years according to (DIN EN 15632-1:2022-08, 2022).

Time representativeness: The reference year of the study is the calendar year 2023, covering 12 months of data.

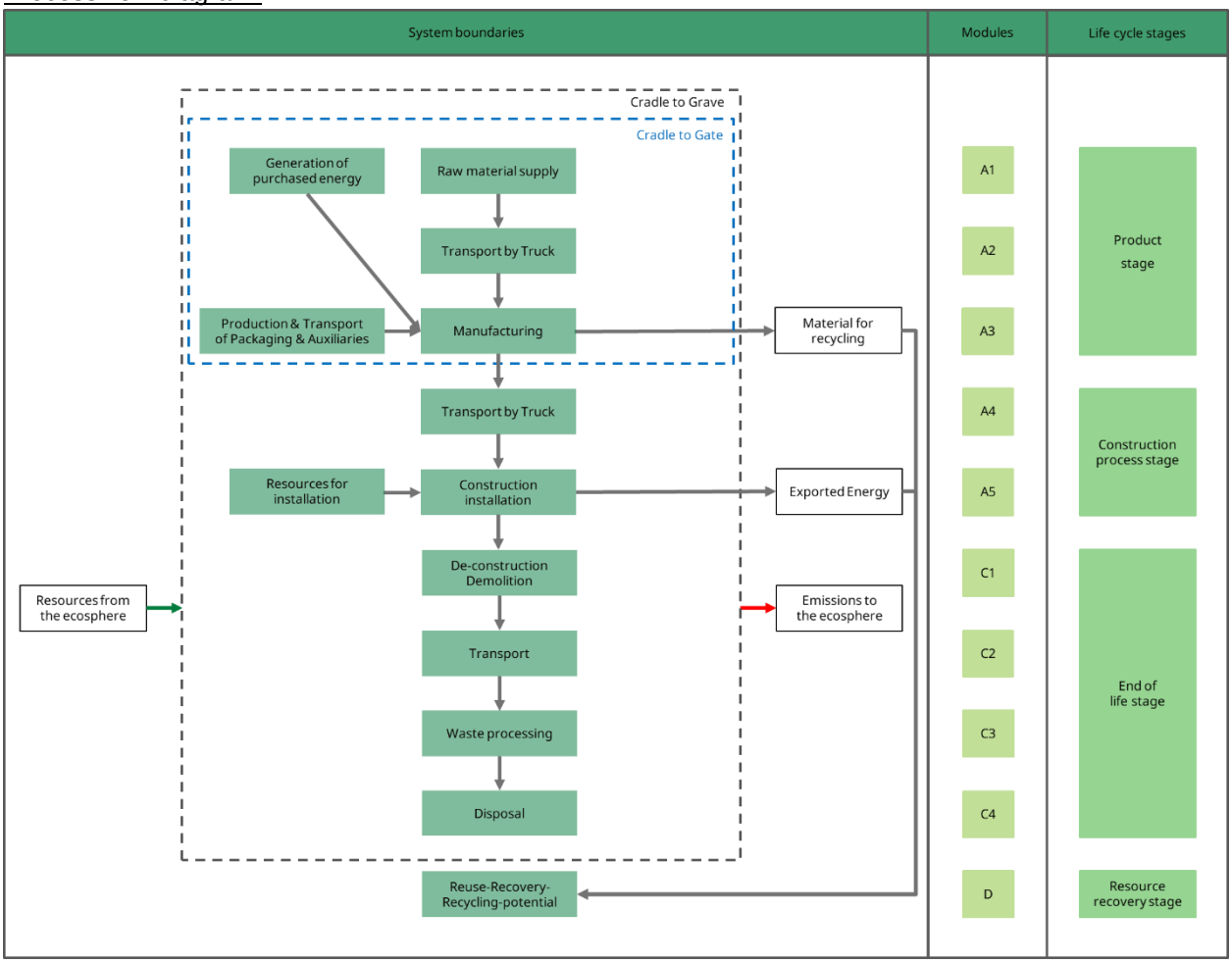
Geographical scope: The geographical scope is Europe.

Database(s) and LCA software used: The database used is ecoinvent v3.11 (Wernet et al. 2016 and ecoinvent 2024) with the EN15804 reference package based on Environmental Footprint (EF) 3.1. The LCA software used is Umberto 11.

EPD/LCA Tool used: N/A

Description of system boundaries:
The system boundary is cradle to gate with options, modules C1–C4, module D. The optional modules included are A4–A5, so in total modules A1–A3 + C + D and A4–A5 are included. The use stage was not included because the pipes remain unchanged in the ground for several decades.

Process flow diagram:



Product stage
Modules A1–A3 cover the supply of raw materials, packaging and auxiliary materials as well as their transport by truck to the production site in Wunstorf, Germany. The production of CASAFLEX UNO (60/142) and the associated electricity consumption are accounted for, as is the treatment of production waste and direct emissions.
The production of flexible pipe systems (foamed with metal pipes) is characterized by comparable production steps in a continuous manufacturing process. The assembly takes place at the respective production facility in Wunstorf, Germany. The steps to manufacture CASAFLEX UNO (60/142) are:

- Step 1: Shaping the inner pipe: The tape for the chrome nickel corrugated inner pipe is cut to size and shaped. It is then welded, tested and corrugated.
- Step 2: Wrapping the inner pipe: The inner pipe and the monitoring wires are wrapped with the expanded metal mesh.

- Step 3: Wrapping the expanded metal mesh: The expanded metal is wrapped with the multi-layer barrier film.
- Step 4: Foaming: The PIR foam is injected into the barrier film wrapping.
- Step 5: Application of the PE-LD protective casing: The PE-LD granulate is melted, applied to the pipe and cooled.

The distribution, installation, use and end of life (EoL) scenarios are considered to be similar for all pipes.
The pipe cover is regarded as packaging material. It is made of fossil-based polypropylene.

Construction process stage

Module A4 covers the distribution of the product by truck to construction sites in Europe. The pipes are transported wrapped around a steel drum, with a diameter of 4.5m and a weight of 2.2 tons. Per drum 400 m of pipe are transported, resulting in an additional weight of 5.5 kg transported per meter of pipe. For the transport of the empty steel drum back to BRUGG pipes, the same transportation distance is assumed. Table 1 shows the scenario information in module A4.

Table 1 *Scenario information for transport in module A4 per declared unit of product*

Scenario information	Value	Unit
Vehicle type	Lorry, 16-32 metric ton, EURO 6	
Fuel type	Diesel	
Fuel use	4.3E-02	l/tkm
Distance	730	km
Average load factor	26	%
Density of products	310	kg/m³
Volume capacity utilization factor	< 1	

Module A5 covers the installation of 1 m of flexible pipe systems (foamed with metal pipes) in the trench. It includes the machines and energy consumption for soil excavation and burial of the pipe, and the processes for stamping and compacting the soil. In addition, the supply of sand for covering the pipe in the trench is accounted for and the transport of excess soil to a local depot. Table 2 shows the scenario information in module A5.

Table 2 *Scenario information for construction installation in module A5 per declared unit of product*

Scenario information	Value	Unit
Sand for backfilling	160	kg
Diesel, in building machine	0.99	l
Excess soil	120	kg
Polypropylene waste for energy recovery	0.00016	kg
Distance of sand transported to trench	10	km
Distance to depot for excess soil	5	km
Distance to waste processing facility	50	km

End of life stage
Modules C1 to C4 describe a potential EoL scenario in Europe. The most common scenario in Europe is that the pipes remain in the ground once they are no longer used. This situation was also assumed for the EoL scenario in this study.

Resource recovery stage
In Module D, credits are considered for the avoided primary steel production, as well as burdens for recycling. Only the steel scrap from A3 is considered, since the pipe itself remains in the ground and is not recycled. Additionally, benefits were calculated for module D considering the substitution potential of recovered energy from the thermal treatment of PET and PE-LD waste in A3 and the substitution potential of recovered energy from the thermal treatment of packaging waste i.e. the PP pipe cover in A5.

Estimation and assumptions:
Assumptions had to be made for the installation scenario in module A5 as the specific procedure is characterized by a high degree of uncertainty. The use stage was not included because the pipes remain in the ground unchanged for several decades. The most common EoL scenario in Europe is that the pipes remain in the ground once they are no longer used. This situation was also assumed for the EoL scenario in this study.
Approach B of PCR 2019:14 Annex C was used to calculate the primary energy use indicators.

Cut-off rules:
The cut-off criteria follow EN15804:2012+A2:2019 and the PCR 2019:14 Construction products version 2.0.1. The product system covers a minimum of 95 % of total inflows (mass and energy) and environmental impacts per module.
Infrastructure/ capital goods are not included in the core processes. They are considered in generic datasets from the LCI-database used for upstream and downstream processes. The results of the environmental performance indicators were issued with a disclaimer.

Allocation:
For the impacts of recycling and energy recovery of wastes in module A3 the waste allocation procedure according to PCR 2019:14 v2.0.1 has been applied.

A physical allocation was performed taking into account the annual quantity of all produced pipes in meters at the production sites in the reference year. The annual consumption of electricity, auxiliary materials and direct emissions at the productions site were allocated to one meter of flexible pipe system (foamed with metal pipes).

Since the scenarios in this EPD are calculated on a kg basis and then upscaled to 1 meter to match the declared unit of the representative product, the same consumption per kg of pipe as for the representative product was assumed.

Electricity mix (A1-A3):
The consumed electricity at the production site in Wunstorf, Germany is sourced solely from the power grid without Guarantees of Origin. The German residual electricity mix was used in modules A1-A3. The residual electricity mix is the mix when all contract-specific electricity that has been sold to other customers has been subtracted from the total consumption mix. It is represented by the ecoinvent dataset “electricity, medium voltage (DE, electricity, medium voltage, residual mix)”.
The impact of GWP-GHG is 0.82 kg CO_2 eq./kWh.

Table 3 *Electricity mix in the background dataset used for the production site in Wunstorf, Germany*

Type	Total share [%]
Coal	56
Natural gas	32
Nuclear power	7.5
Municipal waste	3.2
Oil	1.7
Coal gas	0.03
Blast furnace gas	< 0.005
Total	100

The GWP-GHG indicator is 0.82 kg CO_2 eq./kWh.

Data quality:

The EPD is based on data collected by BRUGG Pipes from one site over one year from January 2023. The EPD is representative of the production of flexible pipe system (foamed with metal pipes) at the production site in Wunstorf. The distribution, installation and end-of-life stage of the EPD covers Europe, since the pipes are only sold in Europe. BRUGG Pipes uses the same technology to produce the corrugated steel pipes, that are part of all pipes included in this EPD. The amount of PE-LD and PIR foam used varies between the pipes, causing the up to 19 % variation from the mean for GWP per kg pipe. Due to the selection of 1 meter as declared unit and the big weight differences between the included pipe, the variation in GWP and the other core indicators per meter of pipe is up to 641% for modules A-C. The EPD uses background data from the ecoinvent database v3.11, 2024. No EPD data for the specific primary input materials was available. The quality of the relevant data used for the EPD in terms of its time, geography and technology representativeness using EN 15804:2012+A2:2019, Annex E, Table E.2 is mostly very good for foreground data and good for background data. The relevant data assessed included no poor or very poor data.

Table 4 *Additional information on processes contributing more than 10% to the GWP-GHG results of modules A1-A3*

Process	Source Type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Generation of electricity and natural gas used in manufacturing of product	EPD Owner, Database	EPD Owner, Ecoinvent v3.11	2023 - 2024	Primary data, Representative secondary data	8.7%
Transport of raw materials to manufacturing site	EPD Owner, Database	EPD Owner, Ecoinvent v3.11	2023 - 2024	Primary data, Representative secondary data	0%
Production of raw materials	Database	Ecoinvent v3.11	2024	Representative secondary data	0%
Other processes	EPD Owner, Databases	EPD Owner, Ecoinvent v3.11	2023 - 2024	Primary data, Representative secondary data	0%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Averages and variability

The EPD is based on multiple flexible pipe systems (foamed with metal pipes), based on the representative product CASAFLEX UNO (60/142). To obtain the environmental performance per declared unit of a specific product covered by this EPD, each impact category (e.g. GWP-GHG) of the representative product must be multiplied by the corresponding conversion factor of its product class, as specified in the section of additional environmental information and the weight of the product listed in Annex A.

The variation in GWP-GHG was computed in relation to the representative product. The large variation in the results is related to the chosen declared unit (one meter of pipe), as the mass of the pipes varies a lot for different pipe dimensions. If the results were to be declared for one kg of pipe, the variation would be in the range of -7 %/+19 %.

Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU	EU	DE	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Primary data used	<10 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-76% / +641%*			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	N/A (single site)			-	-	-	-	-	-	-	-	-	-	-	-	-	-

* The variation range represents the respective difference between the results of the representative product CASAFLEX UNO (60/142) and the lowest and highest result of all the products covered in the EPD. The results of these products are expressed in relation with the representative product, taking into account the conversion factors in the section of additional environmental information and the weight of the products in Annex A.

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.
The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	2.1E+01	2.2E+00	6.2E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-2.2E-01
GWP-fossil	kg CO_2 eq.	2.1E+01	2.2E+00	6.2E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-2.2E-01
GWP-biogenic	kg CO_2 eq.	6.8E-02	1.4E-03	3.3E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.7E-04
GWP-luluc	kg CO_2 eq.	1.7E-02	7.4E-04	1.9E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-6.5E-05
ODP	kg CFC 11 eq.	9.9E-07	4.7E-08	9.0E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-1.4E-09
AP	mol H^+ eq.	1.0E-01	4.7E-03	3.0E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-8.3E-04
EP-freshwater	kg P eq.	1.6E-02	1.5E-04	4.8E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-1.4E-04
EP-marine	kg N eq.	1.9E-02	1.1E-03	1.1E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-1.9E-04
EP-terrestrial	mol N eq.	2.1E-01	1.2E-02	1.3E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-2.0E-03
POCP	kg NMVOC eq.	8.3E-02	7.4E-03	4.2E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-6.9E-04
ADP-minerals&metals*	kg Sb eq.	1.4E-03	7.6E-06	1.1E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-1.8E-06
ADP-fossil*	MJ	4.0E+02	3.1E+01	8.2E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-2.3E+00
WDP*	m^3	8.2E+00	1.6E-01	7.6E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-4.5E-02
Acronyms	GWP-total = Total Global Warming Potential; 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								

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

The results of the impact categories abiotic depletion of minerals and metals, and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	2.1E+01	2.2E+00	6.2E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-2.2E-01

As module C is included in the EPD, the use of the results of modules A1-A3, and A4-A5 is discouraged without considering the results of module C.

Resource use indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3.9E+01	5.1E-01	1.3E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-1.9E-01
PERM	MJ	1.5E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PERT	MJ	4.1E+01	5.1E-01	1.3E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-1.9E-01
PENRE	MJ	2.9E+02	3.1E+01	8.2E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-2.3E+00
PENRM	MJ	1.1E+02	0.0E+00	-5.2E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PENRT	MJ	4.0E+02	3.1E+01	8.2E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-2.3E+00
SM	kg	6.3E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	MJ	4.3E-03	1.8E-04	2.6E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-1.5E-05
NRSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
FW	m^3	2.6E-01	3.8E-03	1.8E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-8.1E-04
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Waste indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	8.9E+00	4.5E-02	1.6E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-5.7E-02
Non-hazardous waste disposed	kg	1.6E+02	9.6E-01	2.8E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-7.6E-01
Radioactive waste disposed	kg	4.3E-04	9.2E-06	2.1E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-3.7E-07

Output flow indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Material for recycling	kg	9.7E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Materials for energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Exported energy, electricity	MJ	3.1E-02	0.0E+00	6.6E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Exported energy, thermal	MJ	2.2E-01	0.0E+00	1.3E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Additional LCA results (other environmental performance results) of the product(s)

LCA result of one declared unit product (A-C)	Unit	Min	Percentage deviation of Min to Representative	Representative	Max	Percentage deviation of Max to Representative
GWP-fossil	kg CO2 eq.	9.0E+00	-70%	3.0E+01	2.6E+02	772%
GWP-biogenic	kg CO2 eq.	1.7E-02	-77%	7.3E-02	1.9E-01	162%
GWP-luluc	kg CO2 eq.	5.0E-03	-74%	1.9E-02	1.8E-01	813%
GWP-total	kg CO2 eq.	9.0E+00	-70%	3.0E+01	2.6E+02	771%
ODP	kg CFC 11 eq.	3.2E-07	-70%	1.1E-06	9.2E-06	749%
AP	mol H^+ eq.	3.4E-02	-74%	1.3E-01	1.2E+00	796%
EP-freshwater	kg P eq.	3.4E-03	-80%	1.7E-02	1.1E-01	552%

EP- marine	kg N eq.	8.4E-03	-73%	3.2E-02	2.6E-01	717%
EP-terrestrial	mol N eq.	9.0E-02	-74%	3.4E-01	2.8E+00	703%
POCP	kg NMVOC eq.	3.8E-02	-72%	1.3E-01	1.1E+00	736%
ADP-minerals&metals*	kg Sb eq.	2.4E-04	-82%	1.4E-03	4.3E-03	213%
ADP-fossil*	MJ	1.5E+02	-70%	5.1E+02	3.8E+03	643%
WDP*	m^3	4.0E+00	-75%	1.6E+01	1.2E+02	653%

The large variation in the results is related to the chosen declared unit (one meter of pipe), as the mass of the pipes varies a lot for different pipe dimensions. To address the variation in mass and the slight variations in the product compositions, conversion factors are provided in the section additional environmental information.

ADDITIONAL ENVIRONMENTAL INFORMATION

Conversion factors for the flexible pipe systems (foamed with metal pipes) CASAFLEX UNO, CASAFLEX DUO, FLEXWELL FHK and FLEXWELL CRYO PIPE-PUR per kg of product class can be found in the following section. To obtain the environmental performance per declared unit of a specific product covered by this EPD, each impact category (e.g. GWP-GHG) of the representative product CASAFLEX UNO (60/142)must be multiplied by the conversion factor of the respective product class and the weight of the product listed in Annex A. The results of modules C1-C4 are zero for all products.

CASAFLEX UNO

Table 5 *Conversion factors for the mandatory impact categories per kg of CASAFLEX UNO variant*

Indicator	A1-A3	A4	A5	D
GWP-fossil	0.20	0.20	0.20	0.20
GWP-biogenic	0.20	0.20	0.20	0.20
GWP-luluc	0.20	0.20	0.20	0.20
GWP-total	0.20	0.20	0.20	0.20
ODP	0.20	0.20	0.20	0.20
AP	0.20	0.20	0.20	0.20
EP-freshwater	0.20	0.20	0.20	0.20
EP-marine	0.20	0.20	0.20	0.20
EP-terrestrial	0.20	0.20	0.20	0.20
POCP	0.20	0.20	0.20	0.20
ADP-minerals& metals	0.20	0.20	0.20	0.20
ADP-fossil	0.20	0.20	0.20	0.20
WDP	0.20	0.20	0.20	0.20

Table 6 *Conversion factors for the additional mandatory impact category indicators per kg of CASAFLEX UNO variant*

Indicator	A1-A3	A4	A5	D
GWP-GHG	0.20	0.20	0.20	0.20

Table 7 *Conversion factors for the ressource use indicators per kg of CASAFLEX UNO variant*

Indicator	A1-A3	A4	A5	D
PERE	0.20	0.20	0.20	0.20
PERM	0.20	0.20	0.20	0.20
PERT	0.20	0.20	0.20	0.20
PENRE	0.20	0.20	0.20	0.20
PENRM	0.20	0.20	0.20	0.20
PENRT	0.20	0.20	0.20	0.20
SM	0.20	0.00	0.00	0.00
RSF	0.20	0.20	0.20	0.20
NRSF	0.00	0.00	0.00	0.00
FW	0.20	0.20	0.20	0.20

Table 8 *Conversion factors for the waste indicators per kg of CASAFLEX UNO variant*

Indicator	A1-A3	A4	A5	D
Hazardous waste disposed	0.20	0.20	0.20	0.20
Non-hazardous waste disposed	0.20	0.20	0.20	0.20
Radioactive waste disposed	0.20	0.20	0.20	0.20

Table 9 *Conversion factors for the output flow indicators per kg of CASAFLEX UNO variant*

Indicator	A1-A3	A4	A5	D
Components for re-use	0.00	0.00	0.00	0.00
Material for recycling	0.00	0.00	0.00	0.00
Materials for energy recovery	0.00	0.00	0.00	0.00

Exported energy, electricity	0.20	0.00	0.20	0.00
Exported energy, thermal	0.20	0.00	0.20	0.00

CASAFLEX DUO

Table 10 *Conversion factors for the mandatory impact categories per kg of CASAFLEX DUO variant*

Indicator	A1-A3	A4	A5	D
GWP-fossil	0.21	0.20	0.20	0.20
GWP-biogenic	0.15	0.20	0.20	0.20
GWP-luluc	0.22	0.20	0.20	0.20
GWP-total	0.21	0.20	0.20	0.20
ODP	0.20	0.20	0.20	0.20
AP	0.22	0.20	0.20	0.20
EP-freshwater	0.23	0.20	0.20	0.20
EP-marine	0.22	0.20	0.20	0.20
EP-terrestrial	0.22	0.20	0.20	0.20
POCP	0.21	0.20	0.20	0.20
ADP-minerals& metals	0.24	0.20	0.20	0.20
ADP-fossil	0.20	0.20	0.20	0.20
WDP	0.22	0.20	0.20	0.20

Table 11 *Conversion factors for the additional mandatory impact category indicators per kg of CASAFLEX DUO variant*

Indicator	A1-A3	A4	A5	D
GWP-GHG	0.21	0.20	0.20	0.20

Table 12 *Conversion factors for the ressource use indicators per kg of CASAFLEX DUO variant*

Indicator	A1-A3	A4	A5	D
PERE	0.23	0.20	0.20	0.20
PERM	0.22	0.20	0.20	0.20

PERT	0.23	0.20	0.20	0.20
PENRE	0.21	0.20	0.20	0.20
PENRM	0.19	0.20	0.20	0.20
PENRT	0.20	0.20	0.20	0.20
SM	0.13	0.20	0.20	0.20
RSF	0.22	0.20	0.20	0.20
NRSF	0.00	0.00	0.00	0.00
FW	0.22	0.20	0.20	0.20

Table 13 *Conversion factors for the waste indicators per kg of CASAFLEX DUO variant*

Indicator	A1-A3	A4	A5	D
Hazardous waste disposed	0.24	0.20	0.20	0.20
Non-hazardous waste disposed	0.20	0.20	0.20	0.20
Radioactive waste disposed	0.21	0.20	0.20	0.20

Table 14 *Conversion factors for the output flow indicators per kg of CASAFLEX DUO variant*

Indicator	A1-A3	A4	A5	D
Components for re-use	0.00	0.00	0.00	0.00
Material for recycling	0.00	0.00	0.00	0.00
Materials for energy recovery	0.00	0.00	0.00	0.00
Exported energy, electricity	0.20	0.00	0.20	0.00
Exported energy, thermal	0.20	0.00	0.20	0.00

FLEXWELL FHK

Table 15 *Conversion factors for the mandatory impact categories per kg of FLEXWELL FHK variant*

Indicator	A1-A3	A4	A5	D
GWP-fossil	0.21	0.20	0.20	0.20

GWP-biogenic	0.07	0.20	0.20	0.20
GWP-luluc	0.25	0.20	0.20	0.20
GWP-total	0.21	0.20	0.20	0.20
ODP	0.21	0.20	0.20	0.20
AP	0.25	0.20	0.20	0.20
EP-freshwater	0.18	0.20	0.20	0.20
EP-marine	0.22	0.20	0.20	0.20
EP-terrestrial	0.22	0.20	0.20	0.20
POCP	0.21	0.20	0.20	0.20
ADP-minerals& metals	0.08	0.20	0.20	0.20
ADP-fossil	0.17	0.20	0.20	0.20
WDP	0.22	0.20	0.20	0.20

Table 16 *Conversion factors for the additional mandatory impact category indicators per kg of FLEXWELL FHK variant*

Indicator	A1-A3	A4	A5	D
GWP-GHG	0.21	0.20	0.20	0.20

Table 17 *Conversion factors for the ressource use indicators per kg of FLEXWELL FHK variant*

Indicator	A1-A3	A4	A5	D
PERE	0.21	0.20	0.20	0.20
PERM	0.03	0.20	0.20	0.20
PERT	0.20	0.20	0.20	0.20
PENRE	0.22	0.20	0.20	0.20
PENRM	0.06	0.20	0.20	0.20
PENRT	0.17	0.20	0.20	0.20
SM	0.44	0.20	0.20	0.20
RSF	0.27	0.20	0.20	0.20
NRSF	0.00	0.00	0.00	0.00
FW	0.17	0.20	0.20	0.20

Table 18 *Conversion factors for the waste indicators per kg of FLEXWELL FHK variant*

Indicator	A1-A3	A4	A5	D
Hazardous waste disposed	0.24	0.20	0.20	0.20
Non-hazardous waste disposed	0.13	0.20	0.20	0.20
Radioactive waste disposed	0.25	0.20	0.20	0.20

Table 19 *Conversion factors for the output flow indicators per kg of FLEXWELL FHK variant*

Indicator	A1-A3	A4	A5	D
Components for re-use	0.00	0.00	0.00	0.00
Material for recycling	0.00	0.00	0.00	0.00
Materials for energy recovery	0.00	0.00	0.00	0.00
Exported energy, electricity	0.20	0.00	0.20	0.00
Exported energy, thermal	0.20	0.00	0.20	0.00

FLEXWELL CRYO PIPE-PUR

Table 20 *Conversion factors for the mandatory impact categories per kg of FLEXWELL CRYO PIPE-PUR variant*

Indicator	A1-A3	A4	A5	D
GWP-fossil	0.21	0.20	0.20	0.20
GWP-biogenic	0.07	0.20	0.20	0.20
GWP-luluc	0.25	0.20	0.20	0.20
GWP-total	0.21	0.20	0.20	0.20
ODP	0.21	0.20	0.20	0.20
AP	0.25	0.20	0.20	0.20
EP-freshwater	0.18	0.20	0.20	0.20
EP-marine	0.22	0.20	0.20	0.20
EP-terrestrial	0.22	0.20	0.20	0.20

POCP	0.21	0.20	0.20	0.20
ADP-minerals& metals	0.08	0.20	0.20	0.20
ADP-fossil	0.17	0.20	0.20	0.20
WDP	0.22	0.20	0.20	0.20

Table 21 *Conversion factors for the additional mandatory impact category indicators per kg of FLEXWELL CRYO PIPE-PUR variant*

Indicator	A1-A3	A4	A5	D
GWP-GHG	0.21	0.20	0.20	0.20

Table 22 *Conversion factors for the ressource use indicators per kg of FLEXWELL CRYO PIPE-PUR variant*

Indicator	A1-A3	A4	A5	D
PERE	0.21	0.20	0.20	0.20
PERM	0.03	0.20	0.20	0.20
PERT	0.20	0.20	0.20	0.20
PENRE	0.22	0.20	0.20	0.20
PENRM	0.06	0.20	0.20	0.20
PENRT	0.17	0.20	0.20	0.20
SM	0.44	0.20	0.20	0.20
RSF	0.27	0.20	0.20	0.20
NRSF	0.00	0.00	0.00	0.00
FW	0.17	0.20	0.20	0.20

Table 23 *Conversion factors for the waste indicators per kg of FLEXWELL CRYO PIPE-PUR variant*

Indicator	A1-A3	A4	A5	D
Hazardous waste disposed	0.24	0.20	0.20	0.20
Non-hazardous waste disposed	0.13	0.20	0.20	0.20
Radioactive waste disposed	0.25	0.20	0.20	0.20

Table 24 *Conversion factors for the output flow indicators per kg of FLEXWELL CRYO PIPE-PUR variant*

Indicator	A1-A3	A4	A5	D
Components for re-use	0.00	0.00	0.00	0.00
Material for recycling	0.00	0.00	0.00	0.00
Materials for energy recovery	0.00	0.00	0.00	0.00
Exported energy, electricity	0.20	0.00	0.20	0.00
Exported energy, thermal	0.20	0.00	0.20	0.00

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq.)
GWP-total	Total Global Warming Potential (kg CO_2 eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H^+ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
Resource Use Indicators	
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)
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 (m^3)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)

MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)
Lifecycle Stages / Modules	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
EC No.	European Community Number
CAS No.	Chemical Abstracts Service Number
MJ	Megajoule
kg	Kilogram
m^3	Cubic Meter
NMVOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO_2 eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO_2 eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared
GVW	Gross Vehicle Weight
PE-LD	Polyethylene low-density
PIR	Polyisocyanurate

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VERSION HISTORY

Original Version of the EPD, 2025-10-03

Annex A: List of included products

All products covered by this EPD are listed in the tables below with their specific dimensions.

Table 25 *Different dimensions of CASAFLEX UNO*

Type	DN	Inner pipe [mm]	Outer diameter [mm]	Weight [kg/m]	Bending radius [m]	Volume Inner pipe [l/m]
22/ 91	20	25 x 22 x 0.3	91	1.30	1.0	0.44
30/111	25	34 x 30 x 0.3	111	1.93	1.0	0.80
39/126	32	44 x 39 x 0.4	126	2.60	1.2	1.35
48/126	40	55 x 48 x 0.5	126	2.92	1.2	2.04
60/142	50	66 x 60 x 0.5	142	5.0	1.5	3.12
75/162	65	86 x 75 x 0.6	162	4.80	1.8	5.12
98/162	80	109 x 98 x 0.8	162	5.70	2.0	8.43
127/202	100	143 x 127 x 0.9	210	8.80	2.8	14.30

Table 26 *Different dimensions of CASAFLEX DUO*

Type	DN	Inner pipe [mm]	Outer diameter [mm]	Weight [kg/m]	Bending radius [m]	Volume [l/m]
22 + 22/111	20	25 x 22 x 0.3	111	2.5	1.1	0.44
30 + 30/126	25	34 x 30 x 0.3	126	3.1	1.4	0.80
39 + 39/142	32	44 x 39 x 0.4	142	3.7	1.5	1.35
48 + 48/162	40	55 x 48 x 0.5	162	4.2	1.8	2.04
60 + 60/182	50	66 x 60 x 0.5	182	5.1	2.0	3.12

Table 27 *Different dimensions of FLEXWELL FHK*

Type	DN	Inner pipe [mm]	Outer diameter [mm]	Weight [kg/m]	Bending radius [cm]	Volume Inner pipe [l/m]
30/91	25	30.0 x 0.3	94	3.9	1.0	0.81
39/116	32	38.9 x 0.4	121	5.7	1.2	1.35
60/148	50	60.0 x 0.5	156	9.1	1.5	3.12

75/171	65	75.8 x 0.6	178	12.2	2.0	5.12
98/171	80	98.0 x 0.8	178	12.8	2.0	8.43
98/220	80	98.0 x 0.8	233	19.3	4.0	8.43
127/220	100	127.0 x 0.9	233	19.8	4.0	14.30
147/220	125	147.0 x 1.0	233	20.3	4.0	17.30
200/310	150	197.5 x 1.2	313	33.2	6.0	33.50

Table 28 *Different dimensions of FLEXWELL CRYO PIPE-PUR*

Type	DN	Inner diameter [mm]	Outer diameter [mm]	Weight [kg/m]	Bending radius [m]	Volume Inner pipe [l/m]
FCP PUR 200 / 310	150	200	310	34.7	5	-

Annex B: Manufacturing of other included products

The steps to manufacture all CASAFLEX pipes are:

- Step 1: Shaping the inner pipe: The tape for the chrome nickel corrugated inner pipe is cut to size and shaped. It is then welded, tested and corrugated.
- Step 2: Wrapping the inner pipe: The inner pipe and the monitoring wires are wrapped with the expanded metal mesh.
- Step 3: Wrapping the expanded metal mesh: The expanded metal is wrapped with the multi-layer barrier film.
- Step 4: Foaming: The PIR foam is injected into the barrier film wrapping.
- Step 5: Application of the PE-LD protective casing: The PE-LD granulate is melted, applied to the pipe and cooled.

The other included pipes differ in the following ways:

- FLEXWELL FHK uses a second corrugated steel pipe instead of the expanded metal mesh and PUR foam instead of PIR foam, which means that the proportions between the foaming components differ slightly. A bitumen layer is used instead of the films. In general, the production steps are the same, just the exact raw materials and there proportions differ.
- The FLEXWELL CRYO PIPE-PUR is very similar to the biggest variant of FLEXWELL FHK, so the same differences as described above apply to this pipe as well.

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