

Environmental Product Declaration



In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Underfloor heating system

from

Brass & Fittings, S.L.



Programme:

Programme operator:

EPD registration number:

Publication date:

Valid until:

The International EPD® System, www.environdec.com

EPD International AB

S-P-04329

2021-07-27

2026-07-25

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



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:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product category rules (PCR): *PCR 2019:14 Construction products, version 1.11*

PCR review was conducted by:

The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via info@environdec.com.

Independent third-party verification of the declaration and data, according to ISO 14025:2006:

☒ External ☐ Internal

Covering

☐ EPD process certification ☒ EPD verification

Third party verifier:

Tecnalia R&I Certificacion, SL

Auditor: Cristina Gazulla Santos

info@tecnaliacertificacion.com

Accredited by: ENAC nº125/C-PR283 accreditation.

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 from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Brass & Fittings, S.L.

Description of the organisation:

Brass & Fittings is a company that, under the Pressman brand, since 2003 has been researching, innovating and distributing the highest quality plastic pipe and underfloor heating products that are marketed through the professional sales channel.

With an eye on offering sustainable, efficient and reliable installation solutions for professionals, Brass & Fittings products are characterized by providing high added value to their customers. With this objective, the effort to share knowledge about products, materials and applications is explained, in a way that contributes to the development of the sector or to the improvement of energy efficiency in its field of work.

Similarly, by carrying out training actions with its customers, the innovation generated by the company reaches to end users in an appropriate way to favour the objective of sustainable development.

Since its inception, B&F has focused on the quality of all its products, which is accredited by the twelve AENOR certifications that guarantee that its pipeline products and water circulation products comply with current regulations.

In particular, it has the relevant certifications for the following product ranges:

- Plastics piping systems for hot and cold water installations - Crosslinked polyethylene (PE-X). (UNE EN ISO 15875)
- Multilayer piping systems for hot and cold water installations inside buildings. (UNE EN ISO 21003)
- Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT) (UNE EN ISO 22391)
- Water based surface embedded heating and cooling systems (UNE EN ISO 1264)

Additionally, it also has certifications for its electroweldable polyethylene accessories, copper accessories and flexible hoses.

Name and location of production site:

Avenida Alcalde Francisco Caballero (pol ind Cogullada), 16
50014 Zaragoza (España)

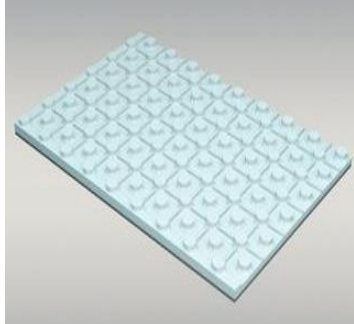
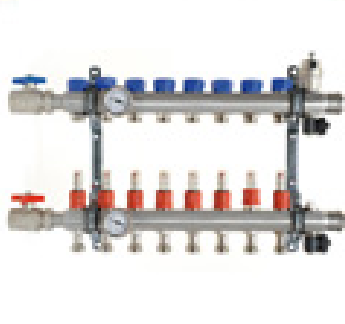
Contact:

Jose Miguel Azcona Gaztelu
Quality department
jmazcona@saltoki.es

Product information

Product name: Underfloor heating system

Product identification and product description: This EPD covers our main underfloor heating system. The system consists on insulating board (T45 or T55 TAC) the pipe system (PERT EVOH, PERT-AL-PERT or PEX-a EVOH) and the cabinet with 2 manifolds and 8 circuits.

		
Insulating board	Cabinet	Manifold

		
PERT EVOH pipes	PERT-AL-PERT multilayer pipes	PEX-a EVOH pipes

T45 and T55 TAC (old denomination W40 and W40 thermoacoustic): Expanded polystyrene underfloor heating board. T55 TAC board has an extra layer made of elastified neopor (graphited polystyrene) for greater acoustic insulation. The characteristics of this board are as follows:

CHARACTERISTIC	T45	T55 TAC
Dimensions	1,32x960 mm	1,32x960 mm
Thickness	20 45mm	20 45mm + 10mm
Density	40 kg/m ³	40 kg/m ³ +20Kg/m ³
Compressive strength	290-340 KPa	290-340 KPa
Thermal insulance	0,76 m ² ·K/W	1,05 m ² ·K/W

Cabinet: The cabinet is made of steel sheet, designed to be built-in, and with a side entrance. It has a door with a frame of the same material, lacquered in white and in separate packaging to be able to be stored until the end of the installation. Its assembly is very simple and can take two minutes without the use of tools.

Manifold: The pre-assembled stainless steel manifolds for applications in underfloor heating circuits are made of stainless steel according to EN 10088-2. The flow manifold has integrated flow regulators. The flowmeters have an independent regulation from 0.5 to 5 l / min for air conditioning applications. The manifold connections with the circuits are made up of 3/4 "threaded derivations Eurocone connection (DIN V3838), with a 50mm center distance.

The return manifold is equipped with M30x1.5 thermostatic circuit valves with manual operation, prepared for the installation of electrothermal actuators. The manifold connections with the circuits are made up of 3/4 "threaded derivations Eurocone connection (DIN V3838), with a 50mm center distance. The drain and the drain / fill valve have a plug to guarantee the tightness of the system and are integrated into the manifold. They are fully adjustable for easy access and quick connection.

Pipe systems: PERT EVOH, PERT-AL-PERT or PEX-a EVOH multilayer pipes. The system PEX refers to cross-linked polyethylene material and PERT refers to polyethylene material of raised temperature resistance.

The PERT EVOH and PEX-a EVOH multilayer pipes are compound of five-layer which materials from inside to outside are respectively PEX or PERT, adhesive, EVOH (ethyl vinyl alcohol) layer, adhesive and HDPE. The intermediate layer is a thin layer of EVOH (ethyl vinyl alcohol) that prevents the permeability of the pipe to the diffusion of oxygen through it. This intermediate layer prevents corrosion of the metal parts, which allows to extend the useful life of the entire installation.

The PERT-AL-PERT multilayers pipes are compound of five-layer which materials from inside to outside are respectively PERT, adhesive, aluminium, adhesive, PERT. These pipes have the great advantage that they combine properties of plastic pipes with the properties of metallic materials. They are very resistant to corrosion and chemical agents and are 100% impervious to oxygen.

The characteristics of the pipes analyzed are as follows:

CHARACTERISTIC	PERT EVOH	PERT-AL-PERT	PEX-a EVOH
PHYSICAL			
Density	951 kg/m ³	>930 kg/m ³	951 kg/m ³
Crosslinking Degree	>70%	-	>70%
Rugosity	0,007 mm	0,007 mm	0,007 mm
THERMAL			
Maximum service temperature	95 °C	95 °C	95 °C
Maximum point temperature	110 °C	110 °C	110 °C
Heat behavior	120 °C; 1h.	120 °C; 1h.	120 °C; 1h.
Coefficient of linear expansion	0,026 mm/m °K	0,025 mm/m °K	0,026 mm/m °K
Specific heat at 23 °C	2,3 KJ/Kg-K	-	2,3 KJ/Kg-K
Thermal conductivity	0,35-0,38 W/m-K	0,43 W/m-K	0,35-0,38 W/m-K
Temperatura VICAT	130-132 °C	-	130-132 °C
MECHANICAL			
Tensile strength	>22 N/mm ²	>25 N/mm ²	>22 N/mm ²
Elongation at break	>400 %	>400 %	>400 %
Modulus of elasticity at 20 °C	>800 N/mm ²	-	>800 N/mm ²
Resistance to internal pressure			
s=4,8 Mpa, 95 °C	>1 hours	>1 hours	>1 hours
s =4,7 Mpa, 95 °C	>22 hours	>22 hours	>22 hours
s =4,6 Mpa, 95 °C	>165 hours	>165 hours	>165 hours
s =4,4 Mpa, 95 °C	>1.000 hours	>1.000 hours	>1.000 hours
s =2,5 Mpa, 110 °C	>1 year	>1 year	>1 year

All this families are intended for building applications. The combinations analyzed in this EPD are the following:

- T45 insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.
- T45 insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circuits.
- T45 insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.
- T55 TAC insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.
- T55 TAC insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circuits.
- T55 TAC insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.

T45 and T55 TAC insulation board are designed and produced complied with standard EN 13163:2013 +A2:2017.

PERT EVOH pipes are designed and produced complied with standard UNE-EN ISO 15875.

PEX EVOH pipes are designed and produced complied with standard UNE-EN ISO 15875.

PERT-AL-PERT pipes are designed and produced complied with standard UNE EN ISO-21003.

UN CPC code: 54631 - Heating equipment installation services

LCA information

Declared unit: 1 m² of underfloor heating system. The results of this EPD are representative of the weighted average underfloor heating systems. A typical installation for a 100m² house has been considered. The selected pitch has been 12mm for a 16mm diameter tube and a ratio of 9 linear meters of pipe for each square meter of soil. The combinations analyzed in this EPD are the following:

Combinations analyzed	Weight (kg)
1 m ² of underfloor heating system: T45 insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.	2,32E+00
1 m ² of underfloor heating system: T45 insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circuits.	2,99E+00
1 m ² of underfloor heating system: T45 insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.	2,41E+00
1 m ² of underfloor heating system: T55 TAC insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.	2,55E+00
1 m ² of underfloor heating system: T55 TAC insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circuits.	3,22E+00
1 m ² of underfloor heating system: T55 TAC insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.	2,64E+00

Reference service life: RSL is not relevant for this EPD

Time representativeness: 2020

Database(s) and LCA software used: All the data used to model the process and obtain the Life Cycle Inventory are specific data and have been obtained by measurements made during the year 2020. They are representative of the different processes implemented during the manufacturing process. The data has been measured directly at production factories. In addition, the most complete and highest quality European life cycle inventory database, Ecoinvent 3.6, has been used, as this database contains the

most extensive and updated information and its scope coincides with the geographical, technological and temporal area of the project. The LCA was modelled with Simapro 9.1.1.1.

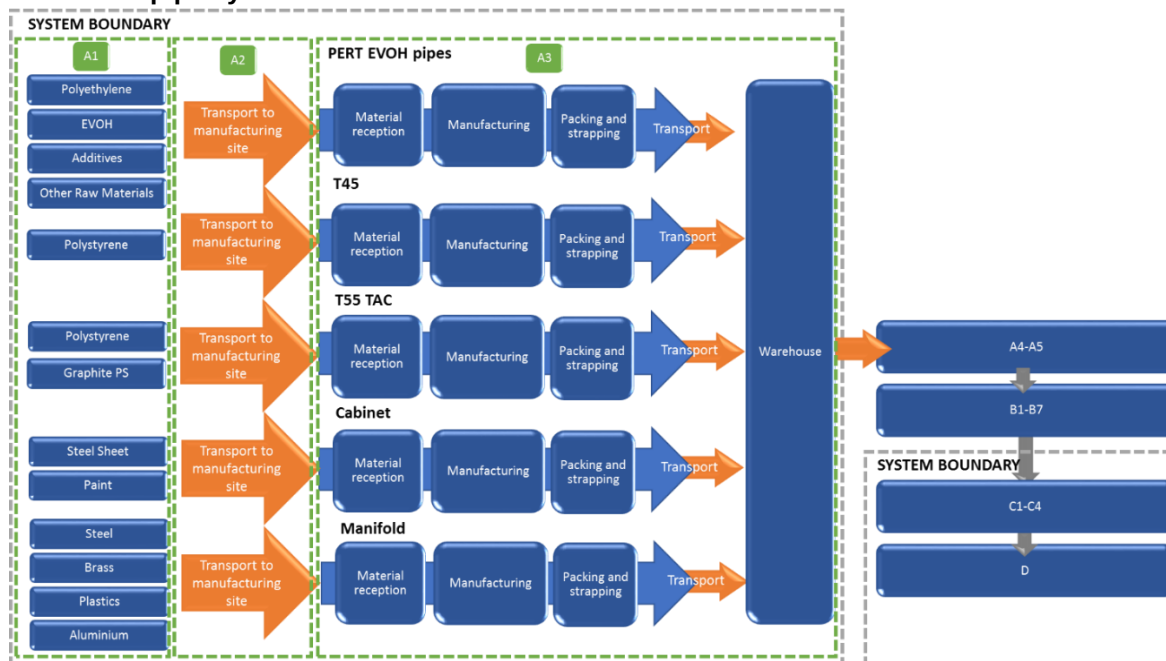
Description of system boundaries:

Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D). The life cycle stages A4–A5, B1–B7 were excluded from the LCA study.

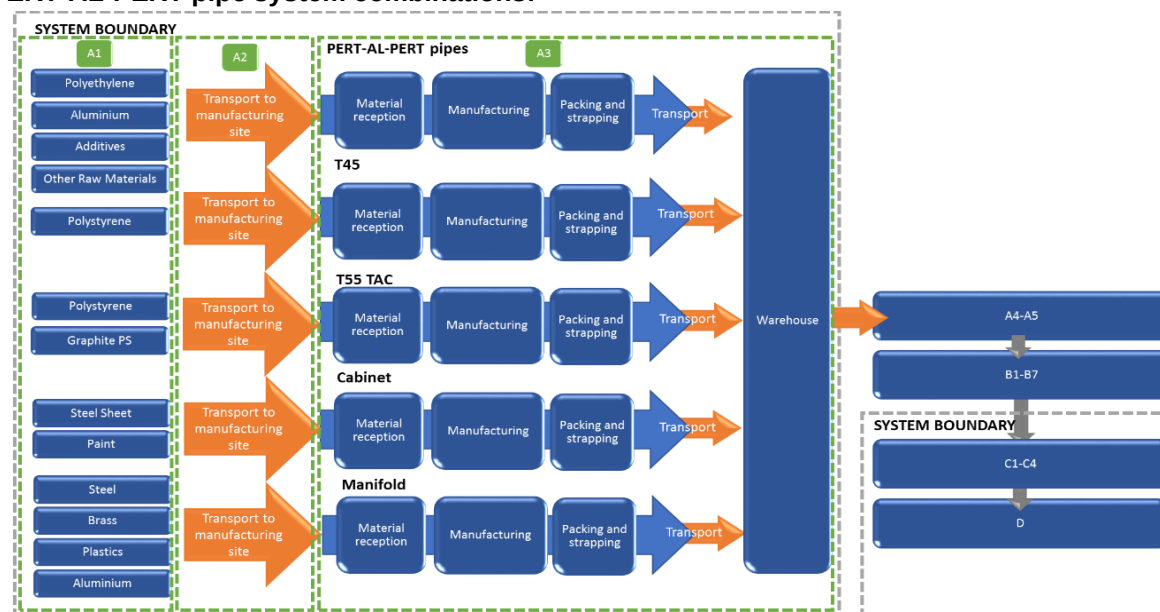
System diagram:

The diagrams for the different combinations of systems analysed in this EPD are shown below:

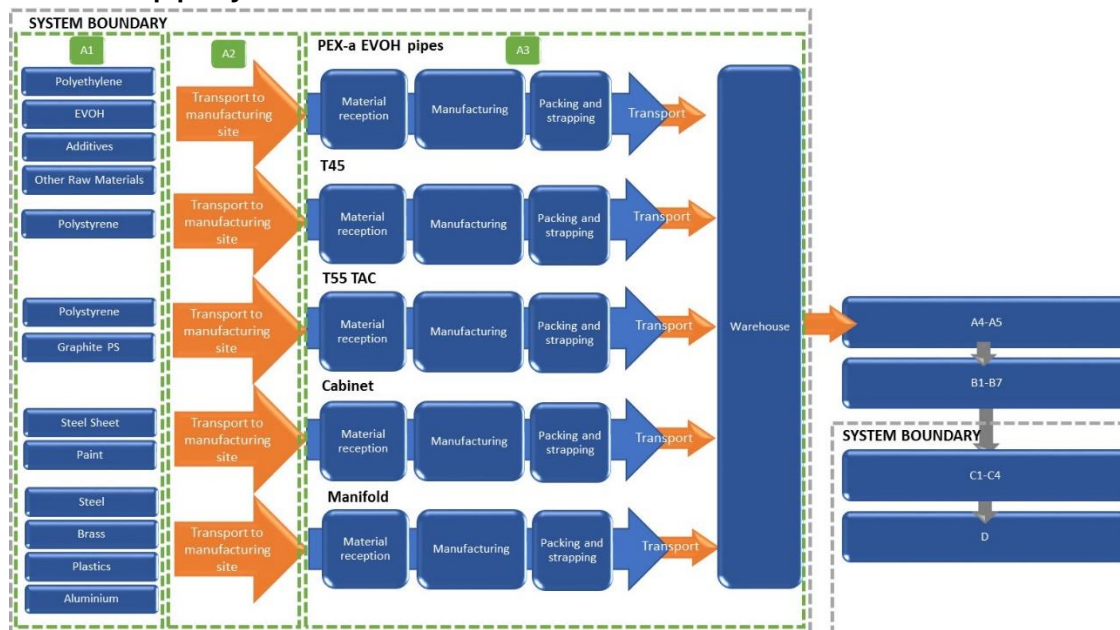
PERT EVOH pipe system combinations:



PERT-AL-PERT pipe system combinations:



PEX EVOH pipe system combinations:



Manufacturing process:

The production takes place in following steps:

- **T45 and T55 TAC (old denomination W40 and W40 thermoacoustic) insulating boards:**
It is a board for underfloor heating made with expanded polystyrene. Formed by vaporized and microfused thermoplate on its external faces. T55 TAC board has an extra layer made of elastified neopor (graphited polystyrene) for greater acoustic insulation.

The Transport of raw materials to each manufacturing site takes place by road and boat. The final products are delivered to Brass & Fittings's warehouse from for each manufacturing site by truck.

- **PERT EVOH pipe system:**
The manufacturing process of PERT EVOH pipes begins with the extrusion of polyethylene resin and additives. A layer of adhesive is spread on the outer surface and the EVOH layer is extruded. A new layer of adhesive is given, the outer polyethylene layer is extruded and the tube is rolled up. The pipes are cut and packed for further shipping to the warehouse.

The Transport of raw materials to each manufacturing site takes place by road and boat. The final products are delivered to Brass & Fittings's warehouse from for each manufacturing site by truck.

- **PERT-AL-PERT pipe system:**
The manufacturing process of PERT-AL-PERT pipes begins with the extrusion of polyethylene resin and additives. A layer of adhesive is spread on the outer surface and the aluminum layer is welded. A new layer of adhesive is given, the outer polyethylene layer is extruded and the tube is rolled up. The pipes are cut and packed for further shipping to the warehouse.

The Transport of raw materials to each manufacturing site takes place by road and boat. The final products are delivered to Brass & Fittings's warehouse from for each manufacturing site by truck.

➤ **PEX-a EVOH pipe system:**

The manufacturing process of PEX-a EVOH pipes begins with the extrusion of polyethylene resin and additives. A layer of adhesive is spread on the outer surface and the EVOH layer is extruded. A new layer of adhesive is given and the outer polyethylene layer is extruded. Subsequently the tube is rolled up and introduced into the crosslinking sauna. The pipes are cut and packed for further shipping to the warehouse.

The Transport of raw materials to each manufacturing site takes place by road and boat. The final products are delivered to Brass & Fittings' warehouse from for each manufacturing site by truck.

➤ **Cabinet:**

The manufacturing process of the door and frame starts from a steel sheet that is stamped and lacquered. Steel Fixing Profiles are manufactured by extrusion and machined. The set of elements is packed for further shipping to the warehouse.

The Transport of raw materials to each manufacturing site takes place by road and boat. The final products are delivered to Brass & Fittings' warehouse from for each manufacturing site by truck.

➤ **Manifolds:**

The manufacture of the collector starts from the cut of a stainless steel tube. This tube is machined and the rest of the collector components are assembled. These elements are the flow meters, the valves, the traps, the O-rings and the fittings. metal parts are forged and machined and plastic parts are injected. The set of elements is then assembled and packed for further shipping to the warehouse.

The Transport of raw materials to each manufacturing site takes place by road and boat. The final products are delivered to Brass & Fittings' warehouse from for each manufacturing site by truck.

More information: For more information please visit contact:

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Data quality

The environmental impact of the steel profiles and accessories has been calculated based on the international standards established for the development of environmental product declarations, such as ISO 14025 for the preparation of the environmental product declaration, ISO 14040 and ISO 14044 for the preparation of the life cycle analysis, UNE-EN 15804_2012+A2_2020 (MARCH 2020) and the Product Category Rules PCR -"2019:14 CONSTRUCTION PRODUCTS " (Version 1.1) of the CPC 42190. Data has been collected in 2020 and is representative of that year. Data for raw material supply, transport to fabrication plant and production (A1-A3) is based on specific consumption data for the each production factory. Generic background datasets were used for the downstream processes. SimaPro v9.1.1.1. software was used to prepare the life cycle analysis together with the Ecoinvent 3.6 database. Characterization factors from EN15804: 2012 + A2:2019.

Assumptions

The following assumptions have been made in this EPD:

- ✓ It does not include the manufacturing processes of the capital goods or spare parts and/or maintenance with a life of more than three years.
- ✓ The environmental impact of infrastructure for general management, office, and headquarters operations is not included.
- ✓ The impact caused by people (common activities, travel for work...) will not be considered.
- ✓ The processes associated with fuel production are intrinsically included in the indicators in ECOINVENT's database used in carrying out the LCA.
- ✓ The environmental impact of external transport has been calculated using lorries from the ECOINVENT 3.6 database. These lorries have been selected to reflect the most realistic scenario possible.

Cut-off rules

The standard ISO 14025 and the PCR "2019:14 CONSTRUCTION PRODUCTS" indicate that the life cycle inventory data should include a minimum of 95% of the total inputs (materials and energy) for each stage. This cut-off rule does not apply for hazardous materials and substances. No such cut-off criteria have been taken into account in this study.

Allocation

The consumption of materials and energy, as well as machine maintenance and auxiliary materials, have been allocated by the total tons of profiles and accessories produced.

LCA Scenarios and additional technical information

These are representative end of life scenarios for the analyzed product systems:

Dismantling/demolition (module C1):

Since they are not products with a structural use, the energy consumption of this phase is considered not relevant.

Transport (module C2)

With a collection rate of 100%, the transports are carried out by lorry (EURO 5) over 50 km.

Waste processing (modules C3 and C4)

Due to the complexity of separating the product at the end of its life for its correct management, it has been considered that 100% of the pipes and insulating boards are sent to landfill. Only the recovery of the brass parts of the manifold and the steel of the cabinet is considered, due to its economic value.

Recyclability potentials (module D)

Module D contains credits from the recycling of the brass and steel in module C3. For the recycling process is considered that the brass and steel are collected and recycled for use in substitution of virgin metals.

LCA Scenarios for end of life

Processes	Per Declared unit	
Collection process specified by type	0,05-0,07	Kg collected separately
	2,25-3,18	Kg collected with mixed construction waste
Recovery system specified by type	0,00	Kg for reuse
	0,05-0,07	Kg for recycling
	0,00	Kg for energy recovery
Disposal specified by type	2,25-3,18	Kg for final disposal
Assumptions for scenario transportation	lorry 16-32 metric ton, EURO5 Consumption: 0,03kg/km Distance: 50 km	

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

	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	GLO	GLO	GLO	ND	ND	ND	ND	ND	ND	ND	ND	ND	GLO	GLO	GLO	GLO	GLO
Specific data used	>95%							-	-	-	-	-	-	-	-	-	-
Variation – products	-					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	-					-	-	-	-	-	-	-	-	-	-	-	-

Content information (per 1m² of product):

Product components	T45, PERT EVOH, cabinet and manifolds			T45, PERT-AL-PERT cabinet and manifolds			T45, PEX-a EVOH cabinet and manifolds		
	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Polystyrene	1,44E+00	0,00%	0,00%	1,44E+00	0,00%	0,00%	1,44E+00	0,00%	0,00%
Polyethylene	7,06E-01	0,00%	0,00%	9,50E-01	0,00%	0,00%	7,87E-01	0,00%	0,00%
Additives	1,42E-02	0,00%	0,00%	6,74E-03	0,00%	0,00%	1,51E-02	0,00%	0,00%
Aluminum	0,00E+00	0,00%	0,00%	3,90E-01	0,00%	0,00%	0,00E+00	0,00%	0,00%
Adhesives	0,00E+00	0,00%	0,00%	4,50E-02	0,00%	0,00%	7,95E-03	0,00%	0,00%
Steel	1,48E-01	0,00%	0,00%	1,48E-01	0,00%	0,00%	1,48E-01	0,00%	0,00%
Painting	1,30E-02	0,00%	0,00%	1,30E-02	0,00%	0,00%	1,30E-02	0,00%	0,00%
Copper	2,84E-03	0,00%	0,00%	2,84E-03	0,00%	0,00%	2,84E-03	0,00%	0,00%
Plastic	3,42E-04	0,00%	0,00%	3,42E-04	0,00%	0,00%	3,42E-04	0,00%	0,00%
TOTAL	2,32E+00	0,00%	0,00%	2,99E+00	0,00%	0,00%	2,41E+00	0,00%	0,00%
Packaging materials	Weight, kg	Weight-% (versus the product)		Weight, kg	Weight-% (versus the product)		Weight, kg	Weight-% (versus the product)	
Cardboard	1,01E-01	4,35%		1,01E-01	3,37%		1,01E-01	4,19%	
Plastic	4,09E-03	0,18%		3,45E-02	1,15%		1,01E-02	0,42%	
Paper	0,00E+00	0,00%		9,76E-02	3,26%		0,00E+00	0,00%	
TOTAL	1,05E-01	4,52%		2,33E-01	7,79%		1,11E-01	4,61%	

Product components	T55 TAC, PERT EVOH, cabinet and manifolds			T55 TAC, PERT-AL-PERT cabinet and manifolds			T55 TAC, PEX-a EVOH cabinet and manifolds		
	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Polystyrene	1,67E+00	0,00%	0,00%	1,67E+00	0,00%	0,00%	1,67E+00	0,00%	0,00%
Polyethylene	7,06E-01	0,00%	0,00%	9,50E-01	0,00%	0,00%	7,87E-01	0,00%	0,00%
Additives	1,42E-02	0,00%	0,00%	6,74E-03	0,00%	0,00%	1,51E-02	0,00%	0,00%
Aluminum	0,00E+00	0,00%	0,00%	3,90E-01	0,00%	0,00%	0,00E+00	0,00%	0,00%
Adhesives	0,00E+00	0,00%	0,00%	4,50E-02	0,00%	0,00%	7,95E-03	0,00%	0,00%
Steel	1,48E-01	0,00%	0,00%	1,48E-01	0,00%	0,00%	1,48E-01	0,00%	0,00%
Painting	1,30E-02	0,00%	0,00%	1,30E-02	0,00%	0,00%	1,30E-02	0,00%	0,00%
Copper	2,84E-03	0,00%	0,00%	2,84E-03	0,00%	0,00%	2,84E-03	0,00%	0,00%
Plastic	3,42E-04	0,00%	0,00%	3,42E-04	0,00%	0,00%	3,42E-04	0,00%	0,00%
TOTAL	2,55E+00	0,00%	0,00E+00	3,22E+00	0,00%	0,00%	2,64E+00	0,00%	0,00%
Packaging materials	Weight, kg	Weight-% (versus the product)		Weight, kg	Weight-% (versus the product)		Weight, kg	Weight-% (versus the product)	
Cardboard	1,01E-01	3,95%		1,01E-01	3,37%		1,01E-01	3,82%	
Plastic	4,09E-03	0,16%		3,45E-02	1,15%		1,01E-02	0,38%	
Paper	0,00E+00	0,00%		9,76E-02	3,26%		0,00E+00	0,00%	
TOTAL	1,05E-01	4,11%		2,33E-01	7,79%		1,11E-01	4,20%	

Packaging: Product packaging includes plastic packing film, paper and cardboard.

No substances included in the Candidate List of Substances of Very High Concern for authorization under REACH Regulations are present in these underfloor heating systems manufactured by Brass&Fittings, either above the threshold for registration with the European Chemicals Agency or above 0,1% (wt/wt).

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per declared unit							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
1 m2 of underfloor heating system: T45 insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes							
GWP-fossil	kg CO ₂ eq.	9,28E+00	0,00E+00	1,94E-02	0,00E+00	2,46E-01	-2,70E-01
GWP-biogenic	kg CO ₂ eq.	1,05E-02	0,00E+00	1,03E-05	0,00E+00	2,48E-04	1,21E-03
GWP-luluc	kg CO ₂ eq.	1,55E-02	0,00E+00	6,76E-06	0,00E+00	4,83E-06	-6,43E-05
GWP-total	kg CO ₂ eq.	9,31E+00	0,00E+00	1,94E-02	0,00E+00	2,47E-01	-2,69E-01
ODP	kg CFC 11 eq.	4,16E-07	0,00E+00	4,40E-09	0,00E+00	6,77E-09	-1,20E-08
AP	mol H ⁺ eq.	3,35E-02	0,00E+00	7,91E-05	0,00E+00	1,68E-04	-2,15E-03
EP-freshwater	kg PO ₄ ³⁻ eq.	5,28E-04	0,00E+00	4,67E-07	0,00E+00	6,81E-07	-5,84E-05
EP-freshwater	kg P eq.	1,72E-04	0,00E+00	1,52E-07	0,00E+00	2,22E-07	-1,90E-05
EP-marine	kg N eq.	5,79E-03	0,00E+00	2,35E-05	0,00E+00	3,16E-04	-2,71E-04
EP-terrestrial	mol N eq.	6,25E-02	0,00E+00	2,59E-04	0,00E+00	6,67E-04	-3,12E-03
POCP	kg NMVOC eq.	2,81E-02	0,00E+00	7,94E-05	0,00E+00	2,42E-04	-1,57E-03
ADP-minerals&metals*	kg Sb eq.	7,08E-04	0,00E+00	5,24E-07	0,00E+00	1,64E-07	-6,94E-05
ADP-fossil*	MJ	2,06E+02	0,00E+00	2,92E-01	0,00E+00	4,98E-01	-2,70E+00
WDP	m ³ eq	5,74E+00	0,00E+00	8,12E-04	0,00E+00	2,39E-03	-3,76E-03
1 m2 of underfloor heating system: T45 insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
GWP-fossil	kg CO ₂ eq.	2,14E+01	0,00E+00	2,50E-02	0,00E+00	3,23E-01	-2,70E-01
GWP-biogenic	kg CO ₂ eq.	-3,24E-01	0,00E+00	1,33E-05	0,00E+00	3,25E-04	1,21E-03
GWP-luluc	kg CO ₂ eq.	1,79E-02	0,00E+00	8,72E-06	0,00E+00	6,33E-06	-6,43E-05
GWP-total	kg CO ₂ eq.	2,11E+01	0,00E+00	2,50E-02	0,00E+00	3,23E-01	-2,69E-01
ODP	kg CFC 11 eq.	7,83E-07	0,00E+00	5,67E-09	0,00E+00	8,87E-09	-1,20E-08
AP	mol H ⁺ eq.	1,15E-01	0,00E+00	1,02E-04	0,00E+00	2,20E-04	-2,15E-03
EP-freshwater	kg PO ₄ ³⁻ eq.	1,33E-03	0,00E+00	6,02E-07	0,00E+00	8,93E-07	-5,84E-05
EP-freshwater	kg P eq.	4,33E-04	0,00E+00	1,96E-07	0,00E+00	2,91E-07	-1,90E-05
EP-marine	kg N eq.	2,03E-02	0,00E+00	3,03E-05	0,00E+00	4,15E-04	-2,71E-04
EP-terrestrial	mol N eq.	2,23E-01	0,00E+00	3,35E-04	0,00E+00	8,74E-04	-3,12E-03
POCP	kg NMVOC eq.	7,38E-02	0,00E+00	1,02E-04	0,00E+00	3,18E-04	-1,57E-03
ADP-minerals&metals*	kg Sb eq.	7,47E-04	0,00E+00	6,75E-07	0,00E+00	2,15E-07	-6,94E-05
ADP-fossil*	MJ	3,25E+02	0,00E+00	3,76E-01	0,00E+00	6,52E-01	-2,70E+00
WDP	m ³ eq	6,86E+00	0,00E+00	1,05E-03	0,00E+00	3,11E-03	-3,76E-03
1 m2 of underfloor heating system: T45 insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
GWP-fossil	kg CO ₂ eq.	9,87E+00	0,00E+00	2,01E-02	0,00E+00	2,57E-01	-2,70E-01
GWP-biogenic	kg CO ₂ eq.	1,24E-02	0,00E+00	1,07E-05	0,00E+00	2,59E-04	1,21E-03
GWP-luluc	kg CO ₂ eq.	1,60E-02	0,00E+00	7,03E-06	0,00E+00	5,03E-06	-6,43E-05
GWP-total	kg CO ₂ eq.	9,90E+00	0,00E+00	2,01E-02	0,00E+00	2,57E-01	-2,69E-01
ODP	kg CFC 11 eq.	5,12E-07	0,00E+00	4,57E-09	0,00E+00	7,05E-09	-1,20E-08
AP	mol H ⁺ eq.	3,59E-02	0,00E+00	8,21E-05	0,00E+00	1,75E-04	-2,15E-03
EP-freshwater	kg PO ₄ ³⁻ eq.	5,58E-04	0,00E+00	4,85E-07	0,00E+00	7,10E-07	-5,84E-05
EP-freshwater	kg P eq.	1,82E-04	0,00E+00	1,58E-07	0,00E+00	2,31E-07	-1,90E-05
EP-marine	kg N eq.	6,47E-03	0,00E+00	2,44E-05	0,00E+00	3,30E-04	-2,71E-04
EP-terrestrial	mol N eq.	6,94E-02	0,00E+00	2,70E-04	0,00E+00	6,94E-04	-3,12E-03
POCP	kg NMVOC eq.	3,04E-02	0,00E+00	8,25E-05	0,00E+00	2,53E-04	-1,57E-03
ADP-minerals&metals*	kg Sb eq.	7,22E-04	0,00E+00	5,44E-07	0,00E+00	1,71E-07	-6,94E-05
ADP-fossil*	MJ	2,19E+02	0,00E+00	3,03E-01	0,00E+00	5,19E-01	-2,70E+00
WDP	m ³ eq	5,94E+00	0,00E+00	8,44E-04	0,00E+00	2,49E-03	-3,76E-03
1 m2 of underfloor heating system: T55 TAC insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
GWP-fossil	kg CO ₂ eq.	1,01E+01	0,00E+00	2,13E-02	0,00E+00	2,73E-01	-2,70E-01
GWP-biogenic	kg CO ₂ eq.	1,78E-02	0,00E+00	1,13E-05	0,00E+00	2,75E-04	1,21E-03
GWP-luluc	kg CO ₂ eq.	1,55E-02	0,00E+00	7,43E-06	0,00E+00	5,34E-06	-6,43E-05
GWP-total	kg CO ₂ eq.	1,02E+01	0,00E+00	2,13E-02	0,00E+00	2,73E-01	-2,69E-01
ODP	kg CFC 11 eq.	4,29E-07	0,00E+00	4,83E-09	0,00E+00	7,49E-09	-1,20E-08
AP	mol H ⁺ eq.	3,65E-02	0,00E+00	8,69E-05	0,00E+00	1,85E-04	-2,15E-03

EP-freshwater	kg PO ₄ ³⁻ eq.	5,73E-04	0,00E+00	5,13E-07	0,00E+00	7,54E-07	-5,84E-05
EP-freshwater	kg P eq.	1,87E-04	0,00E+00	1,67E-07	0,00E+00	2,46E-07	-1,90E-05
EP-marine	kg N eq.	6,24E-03	0,00E+00	2,58E-05	0,00E+00	3,50E-04	-2,71E-04
EP-terrestrial	mol N eq.	6,74E-02	0,00E+00	2,85E-04	0,00E+00	7,38E-04	-3,12E-03
POCP	kg NMVOC eq.	3,07E-02	0,00E+00	8,73E-05	0,00E+00	2,68E-04	-1,57E-03
ADP-minerals&metals*	kg Sb eq.	7,09E-04	0,00E+00	5,76E-07	0,00E+00	1,81E-07	-6,94E-05
ADP-fossil*	MJ	2,26E+02	0,00E+00	3,21E-01	0,00E+00	5,51E-01	-2,70E+00
WDP	m ³ eq	6,35E+00	0,00E+00	8,93E-04	0,00E+00	2,64E-03	-3,76E-03
1 m2 of underfloor heating system: T55 TAC insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
GWP-fossil	kg CO ₂ eq.	2,23E+01	0,00E+00	2,69E-02	0,00E+00	3,50E-01	-2,70E-01
GWP-biogenic	kg CO ₂ eq.	-3,17E-01	0,00E+00	1,43E-05	0,00E+00	3,52E-04	1,21E-03
GWP-luluc	kg CO ₂ eq.	1,79E-02	0,00E+00	9,39E-06	0,00E+00	6,84E-06	-6,43E-05
GWP-total	kg CO ₂ eq.	2,20E+01	0,00E+00	2,69E-02	0,00E+00	3,50E-01	-2,69E-01
ODP	kg CFC 11 eq.	7,96E-07	0,00E+00	6,10E-09	0,00E+00	9,59E-09	-1,20E-08
AP	mol H ⁺ eq.	1,18E-01	0,00E+00	1,10E-04	0,00E+00	2,37E-04	-2,15E-03
EP-freshwater	kg PO ₄ ³⁻ eq.	1,37E-03	0,00E+00	6,48E-07	0,00E+00	9,65E-07	-5,84E-05
EP-freshwater	kg P eq.	4,48E-04	0,00E+00	2,11E-07	0,00E+00	3,14E-07	-1,90E-05
EP-marine	kg N eq.	2,07E-02	0,00E+00	3,26E-05	0,00E+00	4,49E-04	-2,71E-04
EP-terrestrial	mol N eq.	2,28E-01	0,00E+00	3,60E-04	0,00E+00	9,45E-04	-3,12E-03
POCP	kg NMVOC eq.	7,64E-02	0,00E+00	1,10E-04	0,00E+00	3,44E-04	-1,57E-03
ADP-minerals&metals*	kg Sb eq.	7,47E-04	0,00E+00	7,27E-07	0,00E+00	2,32E-07	-6,94E-05
ADP-fossil*	MJ	3,45E+02	0,00E+00	4,05E-01	0,00E+00	7,05E-01	-2,70E+00
WDP	m ³ eq	7,48E+00	0,00E+00	1,13E-03	0,00E+00	3,35E-03	-3,76E-03
1 m2 of underfloor heating system: T55 TAC insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
GWP-fossil	kg CO ₂ eq.	1,07E+01	0,00E+00	2,20E-02	0,00E+00	2,83E-01	-2,70E-01
GWP-biogenic	kg CO ₂ eq.	1,97E-02	0,00E+00	1,17E-05	0,00E+00	2,85E-04	1,21E-03
GWP-luluc	kg CO ₂ eq.	1,60E-02	0,00E+00	7,70E-06	0,00E+00	5,54E-06	-6,43E-05
GWP-total	kg CO ₂ eq.	1,08E+01	0,00E+00	2,20E-02	0,00E+00	2,83E-01	-2,69E-01
ODP	kg CFC 11 eq.	5,25E-07	0,00E+00	5,00E-09	0,00E+00	7,77E-09	-1,20E-08
AP	mol H ⁺ eq.	3,89E-02	0,00E+00	9,00E-05	0,00E+00	1,92E-04	-2,15E-03
EP-freshwater	kg PO ₄ ³⁻ eq.	6,03E-04	0,00E+00	5,31E-07	0,00E+00	7,82E-07	-5,84E-05
EP-freshwater	kg P eq.	1,96E-04	0,00E+00	1,73E-07	0,00E+00	2,55E-07	-1,90E-05
EP-marine	kg N eq.	6,92E-03	0,00E+00	2,67E-05	0,00E+00	3,63E-04	-2,71E-04
EP-terrestrial	mol N eq.	7,43E-02	0,00E+00	2,95E-04	0,00E+00	7,66E-04	-3,12E-03
POCP	kg NMVOC eq.	3,30E-02	0,00E+00	9,04E-05	0,00E+00	2,78E-04	-1,57E-03
ADP-minerals&metals*	kg Sb eq.	7,22E-04	0,00E+00	5,96E-07	0,00E+00	1,88E-07	-6,94E-05
ADP-fossil*	MJ	2,39E+02	0,00E+00	3,32E-01	0,00E+00	5,72E-01	-2,70E+00
WDP	m ³ eq	6,56E+00	0,00E+00	9,24E-04	0,00E+00	2,73E-03	-3,76E-03
Acronyms	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.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per declared unit						
Indicator	A1-A3	C1	C2	C3	C4	D
1 m2 of underfloor heating system: T45 insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.						
GWP-GHG ¹	8,89E+00	0,00E+00	1,92E-02	0,00E+00	2,11E-01	-2,55E-01
1 m2 of underfloor heating system: T45 insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circuits.						
GWP-GHG ¹	2,06E+01	0,00E+00	2,47E-02	0,00E+00	2,76E-01	-2,55E-01
1 m2 of underfloor heating system: T45 insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.						
GWP-GHG ¹	9,47E+00	0,00E+00	1,99E-02	0,00E+00	2,20E-01	-2,55E-01
1 m2 of underfloor heating system: T55 TAC insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.						
GWP-GHG ¹	9,71E+00	0,00E+00	2,11E-02	0,00E+00	2,33E-01	-2,55E-01
1 m2 of underfloor heating system: T55 TAC insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circuits.						
GWP-GHG ¹	2,14E+01	0,00E+00	2,66E-02	0,00E+00	2,99E-01	-2,55E-01
1 m2 of underfloor heating system: T55 TAC insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.						
GWP-GHG ¹	1,03E+01	0,00E+00	2,18E-02	0,00E+00	2,42E-01	-2,55E-01

Use of resources

Results per declared unit							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
1 m2 of underfloor heating system: T45 insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circuits.							
PERE	MJ	2,78E+00	0,00E+00	4,12E-03	0,00E+00	2,29E-02	-6,60E-02
PERM	MJ	1,96E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	4,74E+00	0,00E+00	4,12E-03	0,00E+00	2,29E-02	-6,60E-02
PENRE	MJ	1,19E+02	0,00E+00	2,92E-01	0,00E+00	4,98E-01	-2,70E+00
PENRM	MJ	8,80E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,07E+02	0,00E+00	2,92E-01	0,00E+00	4,98E-01	-2,70E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,25E-01	0,00E+00	3,07E-05	0,00E+00	6,20E-04	-2,41E-04
1 m2 of underfloor heating system: T45 insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circuits.							
PERE	MJ	1,05E+01	0,00E+00	5,31E-03	0,00E+00	3,00E-02	-6,60E-02
PERM	MJ	3,51E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,40E+01	0,00E+00	5,31E-03	0,00E+00	3,00E-02	-6,60E-02
PENRE	MJ	2,26E+02	0,00E+00	3,76E-01	0,00E+00	6,52E-01	-2,70E+00
PENRM	MJ	9,95E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,25E+02	0,00E+00	3,76E-01	0,00E+00	6,52E-01	-2,70E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,62E-01	0,00E+00	3,96E-05	0,00E+00	8,12E-04	-2,41E-04

¹ The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

1 m2 of underfloor heating system: T45 insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
PERE	MJ	3,25E+00	0,00E+00	4,28E-03	0,00E+00	2,39E-02	-6,60E-02
PERM	MJ	1,96E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	5,21E+00	0,00E+00	4,28E-03	0,00E+00	2,39E-02	-6,60E-02
PENRE	MJ	1,28E+02	0,00E+00	3,03E-01	0,00E+00	5,19E-01	-2,70E+00
PENRM	MJ	9,16E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,19E+02	0,00E+00	3,03E-01	0,00E+00	5,19E-01	-2,70E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m³	1,29E-01	0,00E+00	3,19E-05	0,00E+00	6,46E-04	-2,41E-04
1 m2 of underfloor heating system: T55 TAC insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
PERE	MJ	2,88E+00	0,00E+00	4,53E-03	0,00E+00	2,54E-02	-6,60E-02
PERM	MJ	1,96E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	4,84E+00	0,00E+00	4,53E-03	0,00E+00	2,54E-02	-6,60E-02
PENRE	MJ	1,29E+02	0,00E+00	3,21E-01	0,00E+00	5,51E-01	-2,70E+00
PENRM	MJ	9,71E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,26E+02	0,00E+00	3,21E-01	0,00E+00	5,51E-01	-2,70E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m³	1,40E-01	0,00E+00	3,38E-05	0,00E+00	6,86E-04	-2,41E-04
1 m2 of underfloor heating system: T55 TAC insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circutes							
PERE	MJ	1,06E+01	0,00E+00	5,72E-03	0,00E+00	3,25E-02	-6,60E-02
PERM	MJ	3,51E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,41E+01	0,00E+00	5,72E-03	0,00E+00	3,25E-02	-6,60E-02
PENRE	MJ	2,36E+02	0,00E+00	4,05E-01	0,00E+00	7,05E-01	-2,70E+00
PENRM	MJ	1,09E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,45E+02	0,00E+00	4,05E-01	0,00E+00	7,05E-01	-2,70E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m³	1,76E-01	0,00E+00	4,27E-05	0,00E+00	8,78E-04	-2,41E-04
1 m2 of underfloor heating system: T55 TAC insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
PERE	MJ	3,35E+00	0,00E+00	4,69E-03	0,00E+00	2,63E-02	-6,60E-02
PERM	MJ	1,96E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	5,31E+00	0,00E+00	4,69E-03	0,00E+00	2,63E-02	-6,60E-02
PENRE	MJ	1,38E+02	0,00E+00	3,32E-01	0,00E+00	5,72E-01	-2,70E+00
PENRM	MJ	1,01E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,39E+02	0,00E+00	3,32E-01	0,00E+00	5,72E-01	-2,70E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m³	1,44E-01	0,00E+00	3,50E-05	0,00E+00	7,12E-04	-2,41E-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						

Waste production and output flows

Waste production

Results per declared unit							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
1 m2 of underfloor heating system: T45 insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Hazardous waste disposed	kg	1,46E-04	0,00E+00	7,65E-07	0,00E+00	5,94E-07	-3,53E-05
Non-hazardous waste disposed	kg	1,06E+00	0,00E+00	1,40E-02	0,00E+00	2,17E+00	-2,63E-02
Radioactive waste disposed	kg	1,55E-04	0,00E+00	1,99E-06	0,00E+00	3,28E-06	-3,06E-06
1 m2 of underfloor heating system: T45 insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Hazardous waste disposed	kg	1,82E-04	0,00E+00	9,86E-07	0,00E+00	7,78E-07	-3,53E-05
Non-hazardous waste disposed	kg	3,01E+00	0,00E+00	1,80E-02	0,00E+00	2,84E+00	-2,63E-02
Radioactive waste disposed	kg	2,87E-04	0,00E+00	2,57E-06	0,00E+00	4,30E-06	-3,06E-06
1 m2 of underfloor heating system: T45 insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Hazardous waste disposed	kg	1,63E-04	0,00E+00	7,94E-07	0,00E+00	6,18E-07	-3,53E-05
Non-hazardous waste disposed	kg	1,36E+00	0,00E+00	1,45E-02	0,00E+00	2,26E+00	-2,63E-02
Radioactive waste disposed	kg	2,00E-04	0,00E+00	2,07E-06	0,00E+00	3,42E-06	-3,06E-06
1 m2 of underfloor heating system: T55 TAC insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Hazardous waste disposed	kg	1,47E-04	0,00E+00	8,41E-07	0,00E+00	6,57E-07	-3,53E-05
Non-hazardous waste disposed	kg	1,08E+00	0,00E+00	1,53E-02	0,00E+00	2,40E+00	-2,63E-02
Radioactive waste disposed	kg	1,56E-04	0,00E+00	2,19E-06	0,00E+00	3,63E-06	-3,06E-06
1 m2 of underfloor heating system: T55 TAC insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Hazardous waste disposed	kg	1,83E-04	0,00E+00	1,06E-06	0,00E+00	8,41E-07	-3,53E-05
Non-hazardous waste disposed	kg	3,03E+00	0,00E+00	1,94E-02	0,00E+00	3,07E+00	-2,63E-02
Radioactive waste disposed	kg	2,88E-04	0,00E+00	2,76E-06	0,00E+00	4,65E-06	-3,06E-06
1 m2 of underfloor heating system: T55 TAC insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Hazardous waste disposed	kg	1,64E-04	0,00E+00	8,70E-07	0,00E+00	6,82E-07	-3,53E-05
Non-hazardous waste disposed	kg	1,38E+00	0,00E+00	1,59E-02	0,00E+00	2,49E+00	-2,63E-02
Radioactive waste disposed	kg	2,02E-04	0,00E+00	2,26E-06	0,00E+00	3,77E-06	-3,06E-06

Output flows

Results declared unit							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
1 m2 of underfloor heating system: T45 insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	2,46E-01	0,00E+00	0,00E+00	1,55E+01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
1 m2 of underfloor heating system: T45 insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	5,79E-02	0,00E+00	0,00E+00	1,55E+01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

1 m2 of underfloor heating system: T45 insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,72E-02	0,00E+00	0,00E+00	1,55E+01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
1 m2 of underfloor heating system: T55 TAC insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes							
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	2,46E-01	0,00E+00	0,00E+00	1,55E+01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
1 m2 of underfloor heating system: T55 TAC insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	5,79E-02	0,00E+00	0,00E+00	1,55E+01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
1 m2 of underfloor heating system: T55 TAC insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.							
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,72E-02	0,00E+00	0,00E+00	1,55E+01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Information on biogenic carbon content

Results per declared unit				
BIOGENIC CARBON CONTENT	Unit	QUANTITY		
		1 m2 of underfloor heating system: T45 insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.	1 m2 of underfloor heating system: T45 insulation board, PERT-AL-PERT pipe system and manifold cabinet with 2 manifolds and 8 circutes.	1 m2 of underfloor heating system: T45 insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.
Biogenic carbon content in product	kg C	0,00E+00	0,00E+00	0,00E+00
Biogenic carbon content in packaging	kg C	5,05E-02	9,93E-02	5,05E-02

Results per declared unit				
BIOGENIC CARBON CONTENT	Unit	QUANTITY		
		1 m2 of underfloor heating system: T55 TAC insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes..	1 m2 of underfloor heating system: T55 TAC insulation board, PERT EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.	1 m2 of underfloor heating system: T55 TAC insulation board, PEX-a EVOH pipe system and manifold cabinet with 2 manifolds and 8 circutes.
Biogenic carbon content in product	kg C	0,00E+00	0,00E+00	0,00E+00
Biogenic carbon content in packaging	kg C	5,05E-02	9,93E-02	5,05E-02

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

Additional information

The technical datasheet can be found in the following contact:

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Quality department
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Information related to Sector EPD

This is an individual EPD®

Differences versus previous versions

This is the first version of the EPD®.

References

- General Programme Instruction of the International EPD®System. Version 3.01.
- ISO 14020:2000 Environmental labels and declarations-General principles.
- ISO 14025:2010 Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures.
- ISO 14040:2006 Environmental Management-Life Cycle Assessment-Principles and framework.
- ISO 14044:2006 Environmental Management-Life Cycle Assessment-Requirements and guidelines.
- PCR 2019:14 Construction products. version 1.11
- EN 15804:2012+A2:2019 Sustainability of construction works-Environmental Product Declarations-Core rules for the product category of construction products

VERIFICATION STATEMENT CERTIFICATE

CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN

Certificate No. / Certificado nº: EPD05502

TECNALIA R&I CERTIFICACION S.L., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:

TECNALIA R&I CERTIFICACION S.L., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:

BRASS & FITTINGS, S.L.
Polígono Cogullada
Avenida Alcalde Caballero, 16
50014 - ZARAGOZA (SPAIN)

for the following product(s):

para el siguiente(s) producto(s):

UNDERFLOOR HEATING SYSTEM

(insulating board (T45 or T55 TAC), the pipe system (PERT EVOH, PERT-AL-PERT or PEX-a EVOH) and the cabinet with 2 manifolds and 8 circuits).

SISTEMAS DE SUELOS RADIANTES

(tablero aislante (T45 o T55 TAC), sistema de tubería (PERT EVOH, PERT-AL-PERT o PEX-a EVOH) y armario con 2 colectores y 8 circuitos).

with registration number **S-P-04329** in the International EPD® System (www.environdec.com).

con número de registro **S-P-04329** en el Sistema Internacional EPD® (www.environdec.com).

it's in conformity with:

es conforme con:

- **ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.**
- **EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.**
- **General Programme Instructions for the International EPD® System v.3.01.**
- **PCR 2019:14 Construction products v1.11.**
- **UN CPC Code: 54631 - Heating equipment installation services.**

Issued date / Fecha de emisión: 27/07/2021

Update date / Fecha de actualización: 27/07/2021

Valid until / Válido hasta: 25/07/2026

Serial Nº / Nº Serie: EPD0550200-E

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Este certificado no es válido sin su correspondiente EPD.

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Carlos Nazabal Alsua
Manager


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