

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804 + A1



1 General information

1.1 Note on this document

The original document was written in German. All other language versions are translations of the original document.

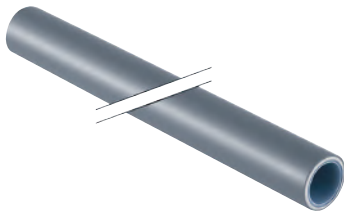
1.2 Declaration holder

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Geberit is one of the pioneers when it comes to sustainability in the sanitary industry. Sustainable has formed an integral component of the corporate strategy for around 30 years. The Geberit Group has a group certificate in accordance with ISO 9001 (quality), ISO 14001 (environment) und ISO 45001 (occupational health and safety). Life cycle assessments were produced for key products from an early stage and Ecodesign has been an integral component of the product development process since 2008. You can find current and comprehensive information on sustainability in the current annual report or at www.geberit.com/nachhaltigkeit.

1.3 Declared product


This declaration applies to all Geberit FlowFit multilayer pipes (ML) without a protective tube or insulation, see chapter "Range and conversion factors", page 3. A piece of Geberit system pipe ML, in bars in a length of 5 m and with an outer diameter of d20 mm (art. no. 619.021.00.1) has been used as a reference article.



1.4 Verification and validity

Programme holder: Geberit International AG
 Declaration number: GEB_EPD_9007206810207243
 Validity: 01/11/2020 to 30/10/2025
 Data calculated by: Quantis, www.quantis-intl.com

Environmental declarations for construction products may not be comparable if they do not comply with the EN 15804. It is only possible to make a limited comparison of life cycle assessment results which are based on different background databases.

The European standard EN 15804 + A1 is used as the core PCR.	
Independent verification of the declaration and information in accordance with EN ISO 14025:2010	
<input type="checkbox"/> Internal	<input checked="" type="checkbox"/> External
 Dr. Frank Werner	

2 Product

2.1 Description and application purpose

Geberit FlowFit is a supply system consisting of pipes and fittings, which are connected to permanently leakproof pipes by means of lateral pressing.

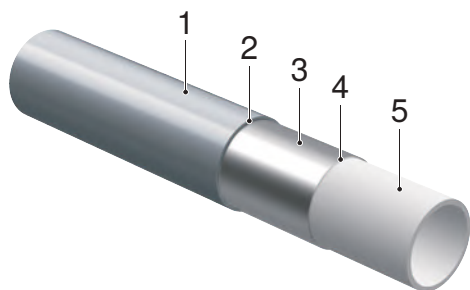
The system pipes are multilayer pipes made of plastic and aluminium (Geberit system pipe ML) or polybutene pipes (Geberit system pipe PB). The pipes are connected by means of plastic fittings. Metal fittings are used to connect to various connections. A separate environmental product declaration has been created for each of these system elements.

Application purpose:

- for drinking water installations within buildings (Geberit system pipe PB and Geberit system pipe ML)
- for heating and cooling water installations within building structures (Geberit system pipe ML)

2.1.1 Geberit system pipe ML

The Geberit system pipe ML (multilayer) is made of 3 layers. The protective jacket is made of polyethylene with increased temperature resistance (PE-RT). A longitudinally butt-welded aluminium layer forms the stabilising core. The medium-transporting grey inner pipe (highlighted in white in the figure) is also made of PE-RT. The pipes are available in 7 outer diameters (d16–63 mm) and as rods in a length of 3 or 5 m or in coils of 4 different lengths (50–250 m). The pipe ends are closed with protection plugs (made of PE-LD).



- | | |
|---|-----------------------------|
| 1 | Protective jacket (PE-RT) |
| 2 | Bonding agent |
| 3 | Aluminium layer (aluminium) |
| 4 | Bonding agent |
| 5 | Inner pipe (PE-RT) |

For the composition by raw materials, see chapter "Product composition", page 5.

2.2 Range and conversion factors

The reference product for this declaration is the Geberit system pipe ML, in bars in a length of 5 m and with an outer diameter of d20 mm (art. no. 619.021.00.1). This article was chosen as a reference because with a diameter of 20 mm, it is the most commonly used solution for supply systems. The life cycle assessment results in chapter 4 can be converted to the other sales articles listed using the net weight with the conversion factor in accordance with the following table. Due to the lower aluminium content in the coils, their life cycle assessment is 17–56 % below the value calculated on the basis of the following table.

2 Product

		DN	d [mm]	L (m)	Net weight [g/ item]	Conversion factor
Geberit system pipe ML, in bars	619.010.00.1	12	16	3	354	0.45
	619.011.00.1	15	20	3	454	0.58
	619.012.00.1	20	25	3	666	0.85
	619.013.00.1	25	32	3	926	1.18
	619.014.00.1	32	40	3	1277	1.63
	619.015.00.1	40	50	3	1976	2.53
	619.016.00.1	50	63	3	2794	3.57
	619.020.00.1	12	16	5	606	0.78
	619.021.00.1	15	20	5	782	1.00
	619.022.00.1	20	25	5	1126	1.44
	619.023.00.1	25	32	5	1563	2.00
	619.024.00.1	32	40	5	2195	2.81
	619.025.00.1	40	50	5	3325	4.25
	619.026.00.1	50	63	5	4761	6.09
Geberit system pipe ML, in coils	619.050.00.1	12	16	50	4908	6.28
	619.051.00.1	15	20	50	6449	8.25
	619.052.00.1	20	25	50	8934	11.43
	619.054.00.1	25	32	25	15107	19.33
	619.060.00.1	12	16	120	11779	15.07
	619.061.00.1	15	20	100	12899	16.51
	619.070.00.1	12	16	250	24539	31.40

3 Life cycle assessment – calculation criteria

3.1 System boundaries

This environmental product declaration is a Cradle-to-gate-with-options declaration including transport and waste processing during the disposal phase. The use and demolition are not considered.

Product			Construction process		Use	End-of-life			
Raw material	Transport to the manufacturer	Manufacturing	Distribution	Installation within the building		Demolition	Transport to waste processing	Reuse, recovery, recycling	Disposal
A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4
x	x	x	x	x	–	–	x	x	x

x Considered/relevant

– Not considered/not relevant

3.2 Product composition

The reference article consists of the following raw materials:

Raw material	Quantity [g]
Plastics	361
Aluminium	378
Additives	43
Total	782
Recycled content (post-consumer)	19 %

The packaging includes: 52 g of wood and 31 g of plastic (including protection plugs).

The articles shown in this environmental product declaration do not contain PVC or halogen compounds.

List of substances contained in the product, which are included in the "Candidate List of Substances of Very High Concern for Authorisation" if the content exceeds the limits for their registration by the European Chemicals Agency:

- none

3.3 Assumptions and background information

(A1) For the raw material supply, the entire raw and recycled material input was modelled using corresponding data, including the losses of 1–6 % relating to material and production. Secondary materials comprise those environmental influences that arise from the collection of waste and from recycling. The following recycled content was recorded: 40 % for aluminium and 10 % for cardboard.

(A2) For transportation from suppliers in Europe and Asia to Geberit, standard transport distances were assumed for each country and load factors contained in the background data were used. Class Euro 5 diesel lorries are used as the means of transport within Europe. Intercontinental transportation consists of freighters and subsequent local distribution by lorry.

(A3) Products are manufactured in one or more Geberit factories within Europe, which are all certified in accordance with ISO 9001, 14001 and 45001. A current ISO certificate can be downloaded online. All suppliers sign the Geberit suppliers' code of conduct and undergo a detailed selection and inspection procedure.

The electricity consumption plays an important role in in-house production. Average values from the respective factories and a country-specific combination of power sources are assumed.

The production and provision of packaging materials and means of production (technical lubricants) were also modelled in phase A3. The consumption of additional auxiliary materials and water is negligible. Production waste is taken into account. However, the scrap flows associated with the production flows are not listed in A3 as they are handled with a conservative allocation factor of 0.

Background data from the ecoinvent database was used for the third-party components.

(A4) Transportation from Geberit to customers within Europe is done by logistics partners through the modern, efficient central warehouse in Pfullendorf (DE), which is certified in accordance with ISO 9001, 14001 and 45001. Class Euro 5 and 6 lorries are mainly used for the transport. Distribution in countries outside Europe is mainly done by means of freighters together with lorries to distribute the products locally. In the main market in Europe, the average transport distance is 650 km and the loading weight is 8 t/lorry.

(A5) The installation is easy and needs no additional auxiliary materials and practically no energy. The packaging waste generated can be completely reused or converted into energy in the respective country depending on the disposal infrastructure.

The energy is recovered from plastic and wood in the packaging in an incineration plant. The assumed energy content per kg is 43.9 MJ for plastics, 16.9 MJ for cardboard and paper and 16.36 MJ for wood (10 % moisture). The energy efficiency is 42 % for heat and 14 % for electricity.

(B1-B7) No further statements are made concerning the use phase.

(C1-C4) Waste that is reused is removed from the product system without causing any environmental impact from the first life cycle. No credits are accounted for cases where production of such waste was avoided. With respect to disposal, it has been assumed that all waste is collected once it has been taken from the building site and is sorted appropriately. 100 % of all metal parts are recycled. The plastic parts are incinerated (with the assumptions already described). A transport distance of 20 km is assumed for both disposal options.

3.4 Data basis and data quality

This environmental product declaration is based on a comprehensive life cycle assessment according to ISO 14044:2006. A detailed background report, which meets the requirements of EN 15804, is used for verification. Inventory data is based predominantly on data that was provided by Geberit International AG in 2020. ecoinvent data (version 3.4, 2017, www.ecoinvent.org) and the system model "cut-off by classification" were used for all further data. The quality of the data can therefore be considered to be good.

4 Life cycle assessment – results

The following tables contain the results based on a piece of the declared product.

4.1 Environmental impacts

	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4
Global warming (GWP)	kg CO ₂ -eq	5.69E+00	2.20E-02	2.74E+00	4.84E-02	2.98E-02	0	1.39E-03	1.25E+00	0
Ozone depletion (ODP)	kg CFC-11-eq	2.40E-07	4.33E-09	1.40E-07	9.53E-09	8.10E-11	0	2.73E-10	1.43E-09	0
Photochemical ozone creation (POCP)	kg C ₂ H ₄ -eq	2.56E-03	3.50E-06	9.11E-04	7.71E-06	4.78E-07	0	2.21E-07	2.08E-06	0
Acidification (AP)	kg SO ₂ -eq	3.71E-02	7.10E-05	1.41E-02	1.56E-04	1.32E-05	0	4.47E-06	1.23E-04	0
Eutrophication (EP)	kg PO ₄ ³⁻ -eq	1.82E-02	1.57E-05	4.29E-03	3.45E-05	1.68E-05	0	9.88E-07	1.04E-04	0
Depletion of abiotic resources (ADP), fossil fuels	MJ	7.75E+01	3.67E-01	3.07E+01	8.07E-01	8.46E-03	0	2.31E-02	1.61E-01	0
Depletion of abiotic resources (ADP), elements	kg Sb-eq	6.88E-04	4.29E-08	1.31E-05	9.44E-08	1.27E-09	0	2.71E-09	1.61E-08	0

A1	Raw material	A5	Installation
A2	Transport to the manufacturer	C2	Transport to waste processing
A3	Manufacturing	C3	Reuse, recovery, recycling
A4	Distribution	C4	Disposal

4.2 Resource use

	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4
Use of primary energy, renewable, w/o raw material use	MJ	1.28E+01	6.24E-03	4.17E+00	1.37E-02	2.31E-04	0	3.93E-04	3.22E-03	0
Use of primary energy, renewable, raw material use	MJ	0	0	8.51E-01	0	0	0	0	0	0
Use of primary energy, renewable, total	MJ	1.28E+01	6.24E-03	5.02E+00	1.37E-02	2.31E-04	0	3.93E-04	3.22E-03	0
Use of primary energy, non-renewable, w/o raw material use	MJ	6.78E+01	3.77E-01	3.45E+01	8.31E-01	8.76E-03	0	2.38E-02	1.65E-01	0
Use of primary energy, non-renewable, raw material use	MJ	1.79E+01	0	1.41E+00	0	0	0	0	0	0
Use of primary energy, non-renewable, total	MJ	8.56E+01	3.77E-01	3.60E+01	8.31E-01	8.76E-03	0	2.38E-02	1.65E-01	0
Use of secondary materials	kg	1.51E-01	0	0	0	0	0	0	0	0
Use of renewable secondary fuels	MJ	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ	0	0	0	0	0	0	0	0	0
Use of net fresh water	m ³	7.26E-01	5.97E-04	3.09E-01	1.45E-03	1.06E-04	0	4.16E-05	2.34E-03	0

4.3 Output flows and waste

	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4
Hazardous waste	kg	4.14E-03	1.81E-07	1.32E-04	3.97E-07	4.30E-08	0	1.14E-08	1.25E-06	0
Radioactive waste	kg	1.49E-04	2.50E-06	1.06E-04	5.50E-06	2.09E-08	0	1.58E-07	3.21E-07	0
Non-hazardous waste	kg	7.94E-01	3.10E-02	4.34E-01	6.81E-02	9.54E-04	0	1.95E-03	2.15E-02	0
Components for re-use	kg	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	0	0	0	3.78E-01	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0
Exported energy – electricity	MJ	0	0	0	0	1.79E-01	0	0	2.61E+00	0
Exported energy – heat	MJ	0	0	0	0	5.37E-01	0	0	7.84E+00	0



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