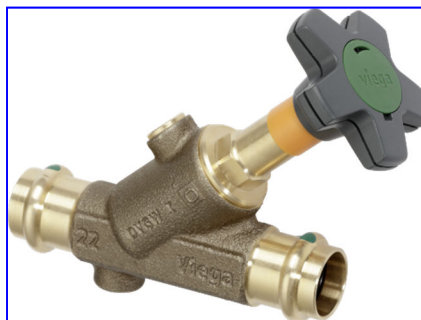


Environmental Product Declaration (EPD)

Declaration code EPD-VAR-GB-81.0



Viega GmbH
& Co. KG

connecting technology



Valves



Basis:

DIN EN ISO 14025
EN 15804 + A2

Company EPD
Environmental
Product Declaration

Publication date:
10.06.2024

Valid until:
10.06.2029






[www.ift-rosenheim.de/
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Environmental Product Declaration (EPD)



Declaration code EPD-VAR-GB-81.0

Programme operator	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 83026 Rosenheim, Germany		
Practitioner of LCA	Viega GmbH & Co. KG Viega Platz 1 57439 Attendorn, Germany		
Declaration holder	Viega GmbH & Co. KG Viega Platz 1 57439 Attendorn, Germany www.viega.de		
Declaration code	EPD-VAR-GB-81.0		
Designation of declared product	Valves		
Scope	PG1 - Metal gas valves; PG2 - System faucets made of stainless steel, gunmetal or silicon bronze and accessories for drinking water and heating installations; PG3 - Stop valves to support system installations		
Basis	This EPD was prepared on the basis of EN ISO 14025:2011 and DIN EN 15804:2012+A2:2019. In addition, the "Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen" (General guideline for preparation of Type III Environmental Product Declarations) applies. The declaration is based on the PCR Documents "PCR Part A" PCR-A-1.0:2023 and "Valves" PCR-AR-1.0:2023.		
Validity	Publication date: 10.06.2024	Last revision: 10.06.2024	Valid until: 10.06.2029
	This verified Company Environmental Product Declaration (company EPD) applies solely to the specified products and is valid for a period of five years from the date of publication in accordance with DIN EN 15804.		
LCA Basis	The LCA was prepared in accordance with DIN EN ISO 14040 and DIN EN ISO 14044. The base data includes the data collected at two production plants of Viega GmbH & Co. KG, and the generic data derived from the Ecoinvent 3 data base (v3.9.1 with aggregated inputs of 2022) and Ecoinvent EN 15804. LCA calculations were carried out for the included "cradle to grave" including all upstream chains (e.g. raw material extraction, etc.).		
Notes	The ift-Guidance Sheet "Conditions and Guidance for the Use of ift Test Documents" applies. The declaration holder assumes full liability for the underlying data, certificates and verifications.		
 Christoph Seehauser Deputy Head for Sustainability		 Dr. Torsten Mielecke Chairman of Expert Committee ift-EPD and PCR	 Prof. Dr. Eric Brehm External verifier

1 General Product Information

Product definition The EPD relates to the product group connecting technology and applies to:

1 kg Valves of company Viega GmbH & Co. KG

These are divided into the following product groups:

Product group (PG)		Piece weights*
PG1	Gas valves	0.004 - 25.180 kg
PG2	Easytop system faucets	0.010 - 6.148 kg
PG3	Valves (US)	0.004 - 0.111 kg

Table 1 Product groups*

*The relevant piece weights [kg/piece] are specified in the conversion table of the Annex B in accordance with Part B of the PCR.

The declared unit is obtained by summing up:

PG	Assessed product	Weight	Declared unit
PG1	Average	6.614 kg	1 kg
PG2	Average	3.790 kg	1 kg
PG3	Average	0.150 kg	1 kg

Table 2 Functional unit per reference product

Averaging is explained in the background report.

The average unit is declared as follows:

Directly used material flows are determined by means of manufactured masses (kg) and allocated to the declared unit. All other inputs and outputs in the production were scaled to the declared unit in their entirety since there is no typical functional unit due to the high number of variants. The reference period is the year 2022.

The validity of the EPD is restricted to the systems listed in Table 1.

Product description

Gas valves

Gas valves made of metal. All components have a higher thermal load capacity (HTB) and are tested for leaks. Can be combined directly with all Viega press connector systems for gas. Further combinations with connections on G, R and Rp threads possible.

Easytop system faucets

System faucets made of stainless steel, gunmetal or silicon bronze and accessories for drinking water and heating installations. Can be combined directly with many Viega press connector systems. Further combinations with connections on G and Rp threads and flange transitions.

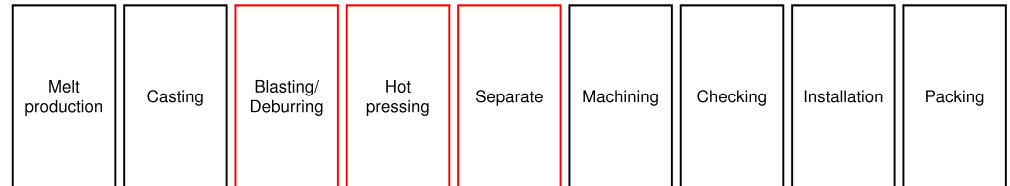
Electronics are used for circulation control valves for hydraulic balancing, for water lines made of silicon bronze, for DHW cold circulation lines (PWC-C) and for DHW hot circulation lines (PWH-C), can be shut off, with drain plug.

Valves (US)

Stop valves to support ProPress, MegaPress or PureFlow system installations.

For a detailed product description refer to the manufacturer specifications or the product specifications of the respective offer/quotation.

Product manufacture



does not apply to all articles

Illustration 1 Manufacturing process

Application

Gas valves

Gas valves made of metal. All components have a higher thermal load capacity (HTB) and are tested for leaks. Can be combined directly with all Viega press connector systems for gas. Further combinations with connections on G, R and Rp threads possible.

The gas valves include press connectors with SC-Contur, sealing elements, dimensions and tools. These products are used for gases according to DVGW Technical Rule G 260

Easytop system faucets

System faucets made of stainless steel, gunmetal or silicon bronze and accessories for drinking water and heating installations. Can be combined directly with many Viega press connector systems. Further combinations with connections on G and Rp threads and flange transitions.

The system faucets include angle-seat valves (free-flow valves), KRV valves (combined free-flow valves with check valves), check valves, sampling valves for sampling of cold drinking water (PWC) and hot drinking water (PWH/PWH-C) as well as circulation regulating valves (thermostatic regulating valves and static regulating valves), ball valves, free-flow valves, concealed straight-seat valves and concealed residential water meter units.

Valves (US)

Stop valves to support ProPress, MegaPress or PureFlow system installations.

Test evidence / reports

The following verifications are held:

- NSF/ANSI/CAN 61:Drinking Water System Components - Health Effects
- NSF International NSF/ANSI/CAN Standard 61 - Drinking Water System Components - Health Effects

For updated verifications (including other national approvals) refer to [Valves | viega.de](https://www.viega.de/Valves).

Management systems	The following management systems are held: <ul style="list-style-type: none">• Quality management system as per DIN EN ISO 9001:2015• Energy management system as per DIN EN ISO 50001:2018• Environmental management system as per DIN EN ISO 14001:2015• Occupational health and safety management system as per DIN EN ISO 45001:2018
Additional information	For additional verifications of applicability or conformity refer to the CE marking and the documents accompanying the product, if applicable.

2 Materials used

Primary materials	The raw materials used can be found in Section 6.2 Inventory analysis (Inputs).
Declarable substances	Substances according to REACH candidate list are included (declaration of 19.03.2024). Further information on the listed substance and the corresponding SCIP number are available on request from the manufacturer.

All relevant safety data sheets are available from Viega GmbH & Co. KG.

3 Construction process stage

Processing recommendations, installation	Observe the instructions for assembly/installation, operation, maintenance and disassembly, provided by the manufacturer. For this, see www.viega.de .
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4 Use stage

Emissions to the environment	No emissions to indoor air, water and soil are known. There may be VOC emissions.
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Reference service life (RSL)	<p>The RSL information was provided by the manufacturer. The RSL must be established under specified reference conditions of use and relate to the declared technical and functional performance of the product within the building. It must be determined according to all specific rules given in European product standards or, if none are available, according to a c-PCR. It must also take into account ISO 15686-1, -2, -7 and -8. If there is guidance on deriving RSLs from European Product Standards or a c-PCR, then such guidance must take precedence.</p> <p>If it is not possible to determine the service life as the RSL in accordance with ISO 15686, the BBSR table "Nutzungsdauer von Bauteilen zur Lebenszyklusanalyse nach BNB" (service life of building components for life cycle assessment in accordance with the sustainable construction evaluation system) can be used. For further information and explanations refer to www.nachhaltigesbauen.de.</p> <p>For this EPD the following applies: For a "cradle to grave" EPD and Module D (A + B + C + D), a reference service life (RSL) must be specified. According to the manufacturer, a 12-year service life has been specified for the valves made by Viega GmbH & Co. KG.</p>
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The service life is dependent on the characteristics of the product and in-use conditions. The conditions and characteristics described in the EPD are applicable, in particular the characteristics listed below:

- Outdoor conditions: Weather conditions can have a negative effect on the service life.
- Indoor environment: No impacts (e.g. humidity, temperature) known that have a negative effect on the service life.

The service life solely applies to the characteristics specified in this EPD or the corresponding references.

The RSL does not reflect the actual life time, which is usually determined by the service life and the redevelopment of a building. It does not give any information on the useful life, warranty referring to performance characteristics or guarantees.

5 End-of-life stage

Possible end-of-life stages

The valves are sent to central collection points. There the products are usually shredded and sorted into their constituents. The end-of-life stage depends on the site where the products are used and is therefore subject to the local regulations. Observe the locally applicable regulatory requirements.

In this EPD, the modules of after-use are presented according to the market situation. Specific parts of metals are recycled. Residual fractions are sent to landfill or, in part, thermally recycled.

Disposal routes

The LCA includes the average disposal routes.

All life cycle scenarios are detailed in the Annex.

6 Life Cycle Assessment (LCA)

Environmental product declarations are based on life cycle assessments (LCAs) which use material and energy flows for the calculation and subsequent representation of environmental impacts.

As a basis for this, life cycle assessments were prepared for valves. The LCAs are in conformity with the requirements set out in DIN EN 15804 and the international standards DIN EN ISO 14040, DIN EN ISO 14044 and EN ISO 14025 as well as based on ISO 21930.

The LCA is representative of the products presented in the Declaration and the specified reference period.

6.1 Definition of goal and scope

Aim

The goal of the LCA is to demonstrate the environmental impacts of the products. In accordance with DIN EN 15804, the environmental impacts covered by this Environmental Product Declaration are presented for the entire product life cycle in the form of basic information. No other additional environmental impacts are specified.

Data quality, data availability and geographical and time-related system boundaries

The specific data originate exclusively from the 2022 fiscal year. They were collected on-site at the plant located in Ennest, Germany as well as McPherson, US and originate in parts from company records and partly from values directly obtained by measurement.

The generic data originate from the Ecoinvent 3 data base (v3.9.1 with aggregated inputs from 2022) and Ecoinvent EN 15804. The last update of both databases was in 2023. The data are not more than 0 years old, as expressed in the ILCD field. No other generic data were used for the calculation.

Generic data are selected as accurately as possible in terms of geographic reference. If no country-specific data sets are available or if the regional reference cannot be determined, European or globally valid data sets are used.

Data gaps were either filled with comparable data or conservative assumptions, or the data were cut off in compliance with the 1% rule.

The life cycle was modelled using the sustainability software tool "Umberto 11" for the development of life cycle assessments.

The data quality complies with the requirements of prEN 15941:2022.

Scope / system boundaries

The system boundaries refer to the supply of raw materials and purchased parts, manufacture/production, use and end-of-life stage of the valves. No additional data from pre-suppliers/subcontractors or other sites were taken into consideration.

Cut-off criteria

All company data collected, i.e. all commodities/input and raw materials used, the thermal energy and electricity consumption, were taken into consideration.

The boundaries cover only the product-relevant data. Building sections/parts of facilities that are not relevant to the manufacture of the products, were excluded.

The transport distances of the pre-products used were taken into consideration as a function of 100% of the mass of the products. The following means of transportation was adopted:

- Gas valves & system faucets:
 - >32 t truck/semitrailer, Euro 6, diesel, 53% capacity utilization
- Valves:
 - >32 t truck/semitrailer, Euro 6, diesel, 53 % capacity utilization, 1,892 km
 - Airplane: 4.848 km
 - Ship: 18.328 km

Other transport distances of the pre-products were not taken into consideration.

The criteria for the exclusion of inputs and outputs as set out in DIN EN 15804 are fulfilled. From the data analysis it can be assumed that the total of negligible processes per life cycle stage does not exceed 1% of the mass/primary energy. This way the total of negligible processes does not exceed 5% of the energy and mass input. The life cycle calculation also includes material and energy flows that account for less than 1%.

6.2 Inventory analysis

Aim	All material and energy flows are described below. The processes covered are presented as input and output parameters and refer to the declared units.
Life cycle stages	The Annex shows the entire life cycle of Valves. The product stage "A1 – A3", construction process stage "A4 – A5", use stage "B1 – B7", end-of-life stage "C1 – C4" and the benefits and loads beyond the system boundaries "D" are considered.
Benefits	<p>The below benefits have been defined as per DIN EN 15804:</p> <ul style="list-style-type: none"> • Benefits from recycling • Benefits (thermal and electrical) from incineration
Allocation of co-products	<p>Allocations occur during production.</p> <p>Allocation was based on the masses (units) of products produced.</p>
Allocations for re-use, recycling and recovery	If the products are reused/recycled and recovered during the product stage (rejects), the elements are shredded, if necessary and then sorted into their constituents. This is done by various process plants, e.g. magnetic separators. The system boundaries were set following their disposal, reaching the end-of-waste status.
Allocations beyond life cycle boundaries	<p>The use of recycled materials in the manufacturing process was based on the current market-specific situation. In parallel to this, a recycling potential was taken into consideration that reflects the economic value of the product after recycling (recyclate).</p> <p>The system boundary set for the recycled material refers to collection.</p>
Secondary material	The use of secondary material in module A3 by Viega GmbH & Co. KG was considered. Secondary material is not used.
Inputs	<p>The LCA includes the following production-relevant inputs per of 1 kg Valves:</p> <p>Energy</p> <ul style="list-style-type: none"> • For the input material natural gas, "natural gas, high pressure (DE & US), domestic supply with seasonal storage" was assumed. • For the electricity mix, "electricity, high voltage, production mix (DE & US-MRO)" was assumed. • For compressed air, "compressed air, 1000 kPa gauge, RoW, production" was used. • For electricity (cooling), "cooling energy, GLO, market" was assumed. <p>A portion of the process heat is used for space heating. This can, however, not be quantified, hence a "worst case" figure was taken into account for the product.</p>



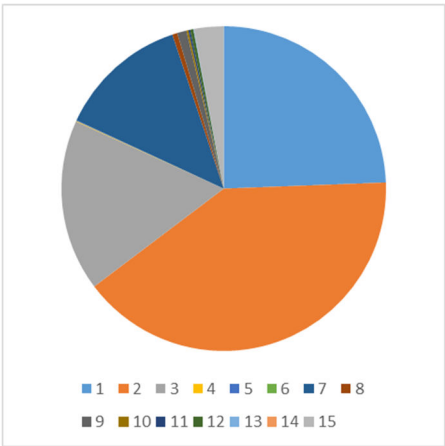
Water

"Tap water, RoW, production" was used for water consumption. Water consumption in the social sector is excluded.
The consumption of fresh water specified in Section 6.3 originates (among others) from the process chain of the pre-products and the process water for cooling.

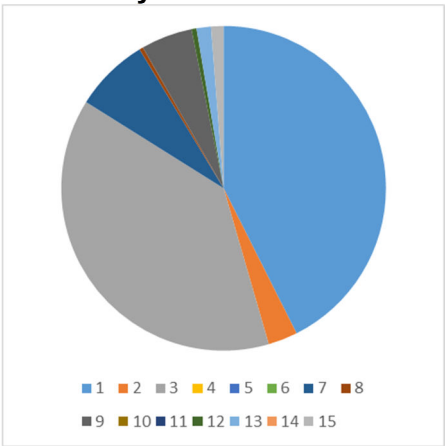
Raw material/Pre-products

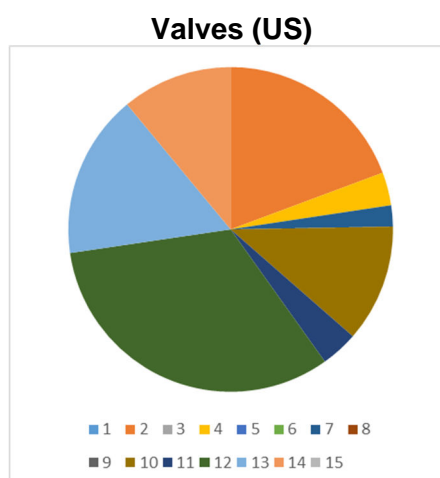
The chart below shows the use of raw materials/pre-products per cent.

Gas valves



System faucets



**Illustration 2** Percentage of individual materials per declared unit

Ref.	Material	Mass in %		
		Gas valves	System faucets	Valves (US)
1	Gunmetal	24%	43%	0%
2	SiBr	40%	3%	19%
3	Brass	17%	38%	0%
4	Copper	0%	0%	3%
5	Aluminium	0%	0%	0%
6	Nickel	0%	0%	0%
7	Stainless steel	13%	7%	2%
8	POM	1%	0%	0%
9	PP	1%	5%	0%
10	PA	0%	0%	12 %
11	ABS	0%	0%	4%
12	EPDM	0%	0%	33%
13	PE	0%	1%	16%
14	PPSU	0%	0%	11%
15	Electronics	3%	1%	0%

Table 3 Percentage of individual materials per declared unit**Ancillary materials and consumables**

There are no ancillary materials and consumables used.

Product packaging

The amounts used for product packaging are as follows:

Material	Mass in kg		
	Gas valves	System faucets	Valves (US)
PE film, PE foam	0.004	0.006	0.106
Paper, cardboard, carton	0.037	0.017	0.019
Wooden pallets	0.003	0.000	0.000

Table 4 Weight in kg of packaging per declared unit

Biogenic carbon content

Only the biogenic carbon content of the associated packaging is reported, as the total mass of biogenic carbon-containing materials is less than 5% of the total mass of the product and associated packaging. According to EN 16449, the following amounts of biogenic carbon are generated for packaging:

Product	Part	Content in kg C
Gas valves	In the corresponding packaging	0.018
System faucets	In the corresponding packaging	0.0086
Valves (US)	In the corresponding packaging	0.0085

Table 5 Biogenic carbon content of the packaging at the factory gate per declared unit

Outputs

The LCA includes the following production-relevant outputs per of 1 kg valve:

Waste

Secondary raw materials were included in the benefits.
See Section 6.3 Impact assessment.

Waste water

No waste water is produced during the manufacturing process.

6.3 Impact assessment

Aim

The impact assessment covers both inputs and outputs. The impact categories applied are stated below:

Core indicators

The models for impact assessment were applied as described in DIN EN 15804-A2.

The impact categories presented for the core indicators in the EPD are as follows:

- Climate change - total (GWP-t)
- Climate change - fossil (GWP-f)
- Climate change - biogenic (GWP-b)
- Climate change - land use & land use change (GWP-l)
- Ozone depletion (ODP)
- Acidification (AP)
- Eutrophication freshwater (EP-fw)
- Eutrophication salt water (EP-m)
- Eutrophication land (EP-t)
- Photochemical ozone creation (POCP)
- Depletion of abiotic resources - fossil fuels (ADPF)
- Depletion of abiotic resources - minerals and metals (ADPE)
- Water use (WDP)





Resource management

The models for impact assessment were applied as described in DIN EN 15804-A2.

The following resource use indicators are presented in the EPD:

- Renewable primary energy as energy source (PERE)
- Renewable primary energy for material use (PERM)
- Total use of renewable primary energy (PERT)
- Non-renewable primary energy as energy source (PENRE)
- Renewable primary energy for material use (PENRM)
- Total use of non-renewable primary energy (PENRT)
- Use of secondary materials (SM)
- Use of renewable secondary fuels (RSF)
- Use of non-renewable secondary fuels (NRSF)
- Net use of freshwater resources (FW)



Waste

The waste generated during the production of 1 kg Valves is evaluated and shown separately for the fractions trade wastes, special wastes and radioactive wastes. Since waste handling is modelled within the system boundaries, the amounts shown refer to the deposited wastes. A portion of the waste indicated is generated during the manufacture of the pre-products.

The models for impact assessment were applied as described in DIN EN 15804-A2.

The waste categories and indicators for output material flows presented in the EPD are as follows:

- Disposed hazardous waste (HWD)
- Non-hazardous waste disposed (NHWD)
- Radioactive waste disposed (RWD)
- Components for re-use (CRU)
- Materials for recycling (MFR)
- Materials for energy recovery (MER)
- Exported electrical energy (EEE)
- Exported thermal energy (EET)



Additional environmental impact indicators

The models for impact assessment were applied as described in DIN EN 15804+A2.

The additional impact categories presented in the EPD are as follows:

- Particulate matter emissions (PM)
- Ionizing radiation, human health (IRP)
- Ecotoxicity – freshwater (ETP-fw)
- Human toxicity, carcinogenic effects (HTP-c)
- Human toxicity, non-carcinogenic effects (HTP-nc)
- Impacts associated with land use/soil quality (SQP)

Product Manager



IRP



ETP-fw



HTP-c



HTP-nc



SQP





Results per 1 kg gas valves

Results per 1 kg gas service																
	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Core indicators																
GWP-t	kg CO ₂ equivalent	6.62E+01	6.47E-02	1.02E-01	0.00E+00	0.00E+00	0.00E+00	9.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-02	1.22E-01	4.88E-04	-5.49E+01
GWP-f	kg CO ₂ equivalent	6.58E+01	6.47E-02	3.36E-03	0.00E+00	0.00E+00	0.00E+00	9.24E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-02	1.16E-01	4.84E-04	-5.45E+01
GWP-b	kg CO ₂ equivalent	2.30E-01	2.26E-05	9.85E-02	0.00E+00	0.00E+00	0.00E+00	6.08E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.47E-06	6.79E-03	2.95E-06	-3.27E-01
GWP-l	kg CO ₂ equivalent	1.31E-01	3.32E-05	2.16E-07	0.00E+00	0.00E+00	0.00E+00	1.78E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.21E-06	6.24E-05	3.53E-07	-1.09E-01
ODP	kg CFC-11-eq.	2.03E-05	1.09E-09	2.38E-11	0.00E+00	0.00E+00	0.00E+00	1.34E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-10	5.18E-10	1.14E-11	-3.55E-06
AP	mol H ⁺ -eq.	5.75E-01	1.76E-04	2.46E-05	0.00E+00	0.00E+00	0.00E+00	4.86E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.59E-05	3.18E-04	3.45E-06	-5.15E-01
EP-fw	kg P-eq.	9.11E-02	5.42E-06	2.12E-07	0.00E+00	0.00E+00	0.00E+00	8.39E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.52E-07	1.42E-05	1.27E-07	-8.07E-02
EP-m	kg N-eq.	9.22E-02	4.62E-05	3.79E-05	0.00E+00	0.00E+00	0.00E+00	1.06E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-05	9.22E-05	1.29E-06	-7.92E-02
EP-t	mol N-eq.	1.00E+00	4.78E-04	9.60E-05	0.00E+00	0.00E+00	0.00E+00	1.08E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-04	9.31E-04	1.38E-05	-8.67E-01
POCP	kg NMVOC-eq.	2.86E-01	2.53E-04	6.02E-05	0.00E+00	0.00E+00	0.00E+00	3.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.47E-05	2.79E-04	4.67E-06	-2.45E-01
ADPF*2	MJ	8.60E+02	9.80E-01	1.39E-02	0.00E+00	0.00E+00	0.00E+00	1.23E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-01	4.27E-01	1.06E-02	-7.09E+02
ADPE*2	kg Sb equivalent	2.31E-02	0.00E+00	4.71E-09	0.00E+00	0.00E+00	0.00E+00	2.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E-08	1.23E-06	1.01E-09	-2.02E-02
WDP*2	m³ world-eq. deprived	4.59E+01	4.89E-03	5.49E-04	0.00E+00	0.00E+00	0.00E+00	1.08E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.74E-04	9.30E-03	5.85E-05	-3.24E+01
Resource management																
PERE	MJ	1.63E+02	1.23E-02	6.41E-01	0.00E+00	0.00E+00	0.00E+00	3.64E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03	4.52E-02	1.80E-04	-1.19E+02
PERM	MJ	6.40E-01	0.00E+00	-6.40E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.64E+02	1.23E-02	8.73E-04	0.00E+00	0.00E+00	0.00E+00	3.64E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03	4.52E-02	1.80E-04	-1.19E+02
PENRE	MJ	8.60E+02	9.80E-01	9.59E-02	0.00E+00	0.00E+00	0.00E+00	1.23E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-01	1.12E+00	3.93E-02	-7.09E+02
PENRM	MJ	8.00E-01	0.00E+00	-8.20E-02	0.00E+00	0.00E+00	0.00E+00	4.72E-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.89E-01	-2.87E-02	0.00E+00
PENRT	MJ	8.60E+02	9.80E-01	1.39E-02	0.00E+00	0.00E+00	0.00E+00	1.23E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-01	4.27E-01	1.06E-02	-7.09E+02
SM	kg	3.77E-01	4.11E-04	5.06E-06	0.00E+00	0.00E+00	0.00E+00	3.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.48E-05	3.94E-04	4.04E-06	-3.40E-01
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	9.77E-01	1.34E-04	8.90E-06	0.00E+00	0.00E+00	0.00E+00	2.24E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-05	2.72E-04	1.06E-05	-6.97E-01
Categories of waste																
HWD	kg	3.48E+00	7.19E-04	4.22E-05	0.00E+00	0.00E+00	0.00E+00	4.54E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-04	1.44E-03	9.09E-06	-2.91E+00
NHWD	kg	1.79E+02	2.30E-02	9.66E-04	0.00E+00	0.00E+00	0.00E+00	1.48E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.62E-03	5.52E-02	2.71E-04	-1.61E+02
RWD	kg	2.23E-03	0.00E+00	1.21E-08	0.00E+00	0.00E+00	0.00E+00	3.58E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.34E-08	4.13E-07	3.33E-09	-1.78E-03
Output material flows																
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	4.98E-02	0.00E+00	8.63E-07	0.00E+00	0.00E+00	0.00E+00	7.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-06	8.75E-01	7.38E-08	-3.45E-02
MER	kg	2.37E-04	0.00E+00	4.81E-10	0.00E+00	0.00E+00	0.00E+00	3.02E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.52E-09	5.47E-08	3.32E-10	-1.99E-04
EE	MJ	9.44E-01	0.00E+00	2.01E-06	0.00E+00	0.00E+00	0.00E+00	1.13E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.76E-05	3.88E-04	1.82E-06	-8.03E-01

Key:

GWP-t – Global warming potential – total **GWP-f** – global warming potential fossil fuels **GWP-b** – global warming potential - biogenic **GWP-l** – global warming potential - land use and land use change **ODP** – ozone depletion potential **AP** - acidification potential **EP-fw** - eutrophication potential - aquatic freshwater **EP-m** - eutrophication potential - aquatic marine **EP-t** - eutrophication potential - terrestrial **POCP** - photochemical ozone formation potential **ADPF^{*2}** - abiotic depletion potential – fossil resources **ADPE^{*2}** - abiotic depletion potential – minerals&metals **WDP^{*2}** – Water (user) deprivation potential **PERE** - Use of renewable primary energy **PERM** - use of renewable primary energy resources **PERT** - total use of renewable primary energy resources **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources **PENRT** - total use of non-renewable primary energy resources **SM** - use of secondary material **RSF** - use of renewable secondary fuels **NRSF** - use of non-renewable secondary fuels **FW** - net use of fresh water **HWD** - hazardous waste disposed **NHWD** - non-hazardous waste disposed **RWD** - radioactive waste disposed **CRU** - components for re-use **MFR** - materials for recycling **MER** - materials for energy recovery **EE** - exported energy electrical & thermal



Results per 1 kg gas valves

	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Additional environmental impact indicators																
PM	Disease incidence	3.95E-06	6.28E-09	1.25E-08	0.00E+00	0.00E+00	0.00E+00	5.40E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-09	6.56E-09	7.43E-11	-3.30E-06
IRP* ¹	kBq U235-eq.	8.71E+00	8.90E-04	5.69E-05	0.00E+00	0.00E+00	0.00E+00	1.32E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-04	1.67E-03	1.38E-05	-7.06E+00
ETP-fw* ²	CTUe	1.79E+03	5.18E-01	1.99E-01	0.00E+00	0.00E+00	0.00E+00	1.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.13E-02	5.62E-01	4.60E-03	-1.55E+03
HTP-c* ²	CTUh	7.92E-08	0.00E+00	7.71E-11	0.00E+00	0.00E+00	0.00E+00	6.89E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.57E-12	6.67E-11	2.72E-13	-7.07E-08
HTP-nc* ²	CTUh	4.74E-06	2.87E-11	3.24E-10	0.00E+00	0.00E+00	0.00E+00	2.61E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E-10	1.88E-09	3.08E-12	-4.41E-06
SQP* ²	dimensionless	3.55E+02	9.64E-01	1.27E-02	0.00E+00	0.00E+00	0.00E+00	6.27E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-01	6.87E-01	2.40E-02	-2.78E+02

Key:

PM – particulate matter emissions potential IRP*¹ – ionizing radiation potential – human health ETP-fw*² - Ecotoxicity potential – freshwater HTP-c*² - Human toxicity potential – cancer effects HTP-nc*² - Human toxicity potential – non-cancer effects SQP*² – soil quality potential

Disclaimers:

*1 This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, from radon and from some building materials is also not measured by this indicator.

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



Results per 1 kg system faucets

Results per 1 kg system outputs																
	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Core indicators																
GWP-t	kg CO ₂ equivalent	3.57E+01	6.41E-02	4.81E-02	0.00E+00	0.00E+00	0.00E+00	9.17E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-02	3.14E-01	4.36E-04	-2.47E+01
GWP-f	kg CO ₂ equivalent	3.54E+01	6.41E-02	4.57E-03	0.00E+00	0.00E+00	0.00E+00	9.09E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-02	3.10E-01	4.33E-04	-2.44E+01
GWP-b	kg CO ₂ equivalent	2.09E-01	2.23E-05	4.35E-02	0.00E+00	0.00E+00	0.00E+00	6.31E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.47E-06	3.98E-03	2.63E-06	-1.78E-01
GWP-l	kg CO ₂ equivalent	7.51E-02	3.29E-05	5.88E-07	0.00E+00	0.00E+00	0.00E+00	1.50E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.21E-06	5.15E-05	3.15E-07	-5.65E-02
ODP	kg CFC-11-eq.	3.03E-05	1.08E-09	2.32E-11	0.00E+00	0.00E+00	0.00E+00	2.30E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-10	6.65E-10	1.02E-11	-1.55E-06
AP	mol H ⁺ -eq.	9.67E-02	1.75E-04	1.70E-05	0.00E+00	0.00E+00	0.00E+00	-6.46E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.59E-05	3.33E-04	3.08E-06	-1.78E-01
EP-fw	kg P-eq.	2.66E-02	5.37E-06	2.34E-07	0.00E+00	0.00E+00	0.00E+00	-2.97E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.52E-07	1.36E-05	1.13E-07	-3.03E-02
EP-m	kg N-eq.	3.80E-02	4.58E-05	2.52E-05	0.00E+00	0.00E+00	0.00E+00	3.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-05	1.07E-04	1.15E-06	-3.34E-02
EP-t	mol N-eq.	3.68E-01	4.73E-04	6.81E-05	0.00E+00	0.00E+00	0.00E+00	1.51E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-04	1.05E-03	1.23E-05	-3.50E-01
POCP	kg NMVOC-eq.	1.15E-01	2.50E-04	3.50E-05	0.00E+00	0.00E+00	0.00E+00	1.12E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.47E-05	3.02E-04	4.17E-06	-1.01E-01
ADPF ^{*2}	MJ	5.51E+02	9.71E-01	1.56E-02	0.00E+00	0.00E+00	0.00E+00	1.76E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-01	4.05E-01	9.44E-03	-3.33E+02
ADPE ^{*2}	kg Sb equivalent	8.24E-03	0.00E+00	4.93E-09	0.00E+00	0.00E+00	0.00E+00	-1.07E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E-08	1.22E-06	9.06E-10	-8.38E-03
WDP ^{*2}	m ³ world-eq. deprived	5.27E+01	4.85E-03	7.91E-04	0.00E+00	0.00E+00	0.00E+00	1.70E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.74E-04	1.63E-02	5.22E-05	-3.14E+01
Resource management																
PERE	MJ	1.62E+02	1.22E-02	2.73E-01	0.00E+00	0.00E+00	0.00E+00	4.90E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03	4.32E-02	1.61E-04	-1.01E+02
PERM	MJ	2.72E-01	0.00E+00	-2.72E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.62E+02	1.22E-02	9.07E-04	0.00E+00	0.00E+00	0.00E+00	4.90E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03	4.32E-02	1.61E-04	-1.01E+02
PENRE	MJ	5.49E+02	9.71E-01	1.39E-01	0.00E+00	0.00E+00	0.00E+00	1.76E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-01	2.75E+00	1.07E-01	-3.33E+02
PENRM	MJ	2.56E+00	0.00E+00	-1.23E-01	0.00E+00	0.00E+00	0.00E+00	7.99E-16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.34E+00	-9.76E-02	0.00E+00
PENRT	MJ	5.51E+02	9.71E-01	1.56E-02	0.00E+00	0.00E+00	0.00E+00	1.76E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-01	4.05E-01	9.44E-03	-3.33E+02
SM	kg	1.06E-01	4.07E-04	3.69E-05	0.00E+00	0.00E+00	0.00E+00	-2.71E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.48E-05	3.86E-04	3.61E-06	-1.40E-01
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	1.09E+00	1.33E-04	3.86E-06	0.00E+00	0.00E+00	0.00E+00	3.55E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-05	5.37E-04	9.49E-06	-6.45E-01
Categories of waste																
HWD	kg	2.21E+00	7.12E-04	3.59E-05	0.00E+00	0.00E+00	0.00E+00	6.45E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-04	2.21E-03	8.11E-06	-1.41E+00
NHWD	kg	3.30E+01	2.28E-02	1.07E-03	0.00E+00	0.00E+00	0.00E+00	-1.67E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.62E-03	5.32E-02	2.42E-04	-5.40E+01
RWD	kg	1.64E-03	0.00E+00	1.26E-08	0.00E+00	0.00E+00	0.00E+00	4.99E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.34E-08	3.72E-07	2.98E-09	-1.02E-03
Output material flows																
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	5.15E-02	0.00E+00	3.66E-03	0.00E+00	0.00E+00	0.00E+00	6.88E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-06	8.22E-01	6.59E-08	-1.77E-02
MER	kg	1.16E-04	0.00E+00	5.38E-10	0.00E+00	0.00E+00	0.00E+00	1.57E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.52E-09	5.46E-08	2.96E-10	-9.62E-05
EE	MJ	4.68E-01	0.00E+00	3.03E-03	0.00E+00	0.00E+00	0.00E+00	9.04E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.76E-05	2.21E-04	1.63E-06	-3.58E-01

Key:

GWP-t – Global warming potential – total **GWP-f** – global warming potential fossil fuels **GWP-b** – global warming potential - biogenic **GWP-l** – global warming potential - land use and land use change **ODP** – ozone depletion potential **AP** - acidification potential **EP-fw** - eutrophication potential - aquatic freshwater **EP-m** - eutrophication potential - aquatic marine **EP-t** - eutrophication potential - terrestrial **POCP** - photochemical ozone formation potential **ADPF^{*2}** - abiotic depletion potential – fossil resources **ADPE^{*2}** - abiotic depletion potential – minerals&metals **WDP^{*2}** – Water (user) deprivation potential **PERE** - Use of renewable primary energy **PERM** - use of renewable primary energy resources **PERT** - total use of renewable primary energy resources **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources **PENRT** - total use of non-renewable primary energy resources **SM** - use of secondary material **RSF** - use of renewable secondary fuels **NRSF** - use of non-renewable secondary fuels **FW** - net use of fresh water **HWD** - hazardous waste disposed **NHWD** - non-hazardous waste disposed **RWD** - radioactive waste disposed **CRU** - components for re-use **MFR** - materials for recycling **MER** - materials for energy recovery **EE** - exported energy electrical & thermal



Results per 1 kg system faucets

	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Additional environmental impact indicators																
PM	Disease incidence	1.78E-06	6.22E-09	7.95E-09	0.00E+00	0.00E+00	0.00E+00	2.42E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-09	5.51E-09	6.63E-11	-1.49E-06
IRP* ¹	kBq U235-eq.	5.93E+00	8.81E-04	5.89E-05	0.00E+00	0.00E+00	0.00E+00	1.68E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-04	1.50E-03	1.24E-05	-3.83E+00
ETP-fw* ²	CTUe	6.93E+02	5.13E-01	1.16E-01	0.00E+00	0.00E+00	0.00E+00	2.80E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.13E-02	8.80E-01	4.11E-03	-6.60E+02
HTP-c* ²	CTUh	1.46E-08	0.00E+00	4.90E-11	0.00E+00	0.00E+00	0.00E+00	-8.78E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.57E-12	7.27E-11	2.43E-13	-2.57E-08
HTP-nc* ²	CTUh	-2.58E-07	2.85E-11	1.99E-10	0.00E+00	0.00E+00	0.00E+00	-1.19E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E-10	2.37E-09	2.75E-12	-1.23E-06
SQP* ²	dimensionless	1.17E+02	9.55E-01	1.20E-02	0.00E+00	0.00E+00	0.00E+00	7.30E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-01	6.14E-01	2.14E-02	-1.09E+02

Key:

PM – particulate matter emissions potential IRP*¹ – ionizing radiation potential – human health ETP-fw*² - Ecotoxicity potential – freshwater HTP-c*² - Human toxicity potential – cancer effects HTP-nc*² - Human toxicity potential – non-cancer effects SQP*² – soil quality potential

Disclaimers:

*1 This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, from radon and from some building materials is also not measured by this indicator.

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



Results per 1 kg Valves (US)

Roads per Highway (CR)																
	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Core indicators																
GWP-t	kg CO ₂ equivalent	5.88E+01	6.98E-02	1.12E-01	0.00E+00	0.00E+00	0.00E+00	2.51E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-02	1.78E+00	1.90E-04	-2.94E+01
GWP-f	kg CO ₂ equivalent	5.88E+01	6.98E-02	6.43E-02	0.00E+00	0.00E+00	0.00E+00	2.51E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-02	1.78E+00	1.89E-04	-2.93E+01
GWP-b	kg CO ₂ equivalent	-9.51E-03	2.43E-05	4.75E-02	0.00E+00	0.00E+00	0.00E+00	2.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.47E-06	7.50E-04	1.15E-06	-9.64E-03
GWP-I	kg CO ₂ equivalent	1.11E-02	3.58E-05	5.78E-07	0.00E+00	0.00E+00	0.00E+00	3.17E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.21E-06	2.58E-05	1.38E-07	-7.17E-03
ODP	kg CFC-11-eq.	1.13E-03	1.18E-09	5.42E-11	0.00E+00	0.00E+00	0.00E+00	3.75E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-10	1.92E-09	4.47E-12	-6.63E-04
AP	mol H ⁺ -eq.	1.80E-01	1.90E-04	9.31E-05	0.00E+00	0.00E+00	0.00E+00	4.97E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.59E-05	4.79E-04	1.35E-06	-1.19E-01
EP-fw	kg P-eq.	1.42E-02	5.84E-06	3.13E-07	0.00E+00	0.00E+00	0.00E+00	4.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.52E-07	8.88E-06	4.96E-08	-9.05E-03
EP-m	kg N-eq.	2.32E-02	4.98E-05	2.11E-04	0.00E+00	0.00E+00	0.00E+00	1.29E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-05	2.50E-04	5.04E-07	-7.62E-03
EP-t	mol N-eq.	2.48E-01	5.15E-04	5.02E-04	0.00E+00	0.00E+00	0.00E+00	1.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-04	2.17E-03	5.39E-06	-9.73E-02
POCP	kg NMVOC-eq.	8.58E-02	2.73E-04	1.70E-04	0.00E+00	0.00E+00	0.00E+00	4.55E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.47E-05	5.56E-04	1.82E-06	-2.99E-02
ADPF*2	MJ	2.92E+02	1.06E+00	2.47E-02	0.00E+00	0.00E+00	0.00E+00	1.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-01	1.58E-01	4.13E-03	-5.67E+01
ADPE*2	kg Sb equivalent	1.75E-03	0.00E+00	7.19E-09	0.00E+00	0.00E+00	0.00E+00	9.65E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E-08	4.79E-07	3.96E-10	-1.63E-03
WDP*2	m³ world-eq. deprived	7.96E+00	5.28E-03	1.80E-03	0.00E+00	0.00E+00	0.00E+00	2.98E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.74E-04	7.13E-02	2.28E-05	-4.32E+00
Resource management																
PERE	MJ	2.57E+01	1.33E-02	3.05E-01	0.00E+00	0.00E+00	0.00E+00	1.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03	2.51E-02	7.03E-05	-1.33E+01
PERM	MJ	3.04E-01	0.00E+00	-3.04E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.60E+01	1.33E-02	1.13E-03	0.00E+00	0.00E+00	0.00E+00	1.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03	2.51E-02	7.03E-05	-1.33E+01
PENRE	MJ	2.75E+02	1.06E+00	2.20E+00	0.00E+00	0.00E+00	0.00E+00	1.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-01	1.56E+01	3.13E-01	-5.67E+01
PENRM	MJ	1.76E+01	0.00E+00	-2.17E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.51E+01	-3.09E-01	0.00E+00
PENRT	MJ	2.92E+02	1.06E+00	2.47E-02	0.00E+00	0.00E+00	0.00E+00	1.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-01	4.28E-01	4.13E-03	-5.67E+01
SM	kg	1.25E-01	4.43E-04	1.21E-05	0.00E+00	0.00E+00	0.00E+00	3.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.48E-05	4.04E-04	1.58E-06	-8.48E-02
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	1.87E-01	1.45E-04	4.36E-05	0.00E+00	0.00E+00	0.00E+00	6.95E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-05	2.57E-03	4.15E-06	-1.02E-01
Categories of waste																
HWD	kg	5.34E-01	7.76E-04	1.51E-04	0.00E+00	0.00E+00	0.00E+00	2.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-04	8.27E-03	3.55E-06	-2.93E-01
NHWD	kg	5.65E+01	2.48E-02	1.42E-03	0.00E+00	0.00E+00	0.00E+00	1.86E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.62E-03	3.83E-02	1.06E-04	-3.34E+01
RWD	kg	2.46E-04	0.00E+00	1.56E-08	0.00E+00	0.00E+00	0.00E+00	1.06E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.34E-08	2.58E-07	1.30E-09	-1.15E-04
Output material flows																
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	3.54E-02	0.00E+00	9.50E-07	0.00E+00	0.00E+00	0.00E+00	2.15E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-06	2.37E-01	2.88E-08	-4.19E-03
MER	kg	2.09E-05	0.00E+00	1.43E-09	0.00E+00	0.00E+00	0.00E+00	5.09E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.52E-09	6.01E-08	1.30E-10	-1.46E-05
EE	MJ	8.44E-02	0.00E+00	5.81E-06	0.00E+00	0.00E+00	0.00E+00	3.27E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.76E-05	2.13E-04	7.11E-07	-4.37E-02

Key:

GWP-t – Global warming potential – total **GWP-f** – global warming potential fossil fuels **GWP-b** – global warming potential - biogenic **GWP-l** – global warming potential - land use and land use change **ODP** – ozone depletion potential **AP** - acidification potential **EP-fw** - eutrophication potential - aquatic freshwater **EP-m** - eutrophication potential - aquatic marine **EP-t** - eutrophication potential - terrestrial **POCP** - photochemical ozone formation potential **ADPF^{*2}** - abiotic depletion potential – fossil resources **ADPE^{*2}** - abiotic depletion potential – minerals&metals **WDP^{*2}** – Water (user) deprivation potential **PERE** - Use of renewable primary energy **PERM** - use of renewable primary energy resources **PERT** - total use of renewable primary energy resources **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources **PENRT** - total use of non-renewable primary energy resources **SM** - use of secondary material **RSF** - use of renewable secondary fuels **NRSF** - use of non-renewable secondary fuels **FW** - net use of fresh water **HWD** - hazardous waste disposed **NHWD** - non-hazardous waste disposed **RWD** - radioactive waste disposed **CRU** - components for re-use **MFR** - materials for recycling **MER** - materials for energy recovery **EE** - exported energy electrical & thermal



Results per 1 kg Valves (US)

	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Additional environmental impact indicators																
PM	Disease incidence	7.33E-07	6.78E-09	6.49E-08	0.00E+00	0.00E+00	0.00E+00	3.32E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-09	3.34E-09	2.90E-11	-3.94E-07
IRP*¹	kBq U235-eq.	9.95E-01	9.60E-04	7.10E-05	0.00E+00	0.00E+00	0.00E+00	4.55E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-04	1.02E-03	5.40E-06	-4.28E-01
ETP-fw*²	CTUe	2.34E+02	5.58E-01	7.11E-01	0.00E+00	0.00E+00	0.00E+00	7.71E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.13E-02	3.59E+00	1.80E-03	-1.42E+02
HTP-c*²	CTUh	6.57E-08	0.00E+00	4.00E-10	0.00E+00	0.00E+00	0.00E+00	1.91E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.57E-12	1.67E-10	1.06E-13	-4.24E-08
HTP-nc*²	CTUh	1.61E-06	3.10E-11	1.41E-09	0.00E+00	0.00E+00	0.00E+00	1.66E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E-10	5.88E-09	1.20E-12	-1.41E-06
SQP*²	dimensionless	6.68E+01	1.04E+00	3.62E-02	0.00E+00	0.00E+00	0.00E+00	2.24E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-01	2.61E-01	9.36E-03	-4.03E+01

Key:

PM – particulate matter emissions potential **IRP*¹** – ionizing radiation potential – human health **ETP-fw*²** - Ecotoxicity potential – freshwater **HTP-c*²** - Human toxicity potential – cancer effects **HTP-nc*²** - Human toxicity potential – non-cancer effects **SQP*²** – soil quality potential

Disclaimers:

*1 This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, from radon and from some building materials is also not measured by this indicator.

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

6.4 Interpretation, LCA presentation and critical review

Evaluation

The environmental impacts of

- Gas valves
- System faucets
- Valves (US)

differ from each other.

The differences in the environmental impact of the products lie in the various pre-products and raw materials used and in the mass of the pre-products and raw materials used in each case. Increasing the proportion of recycling can reduce these environmental impacts.

The main environmental impact of production is caused by electronic components at gas valves and system faucets. Regarding the valves, they result in particular from the seal and the aircraft transportation.

The LCA covers the complete life cycle. As the products do not generate any emissions in the use stage, here the value is 0.00. The replacement was balanced separately in B4 for 1 year as a scenario. Otherwise, there is no environmental impact during the use phase.

For the aforementioned products gas valves and system faucets, higher credits result due to the metal at the end of life (depending on the environmental indicator). The greatest environmental impacts result from raw material extraction (A1).

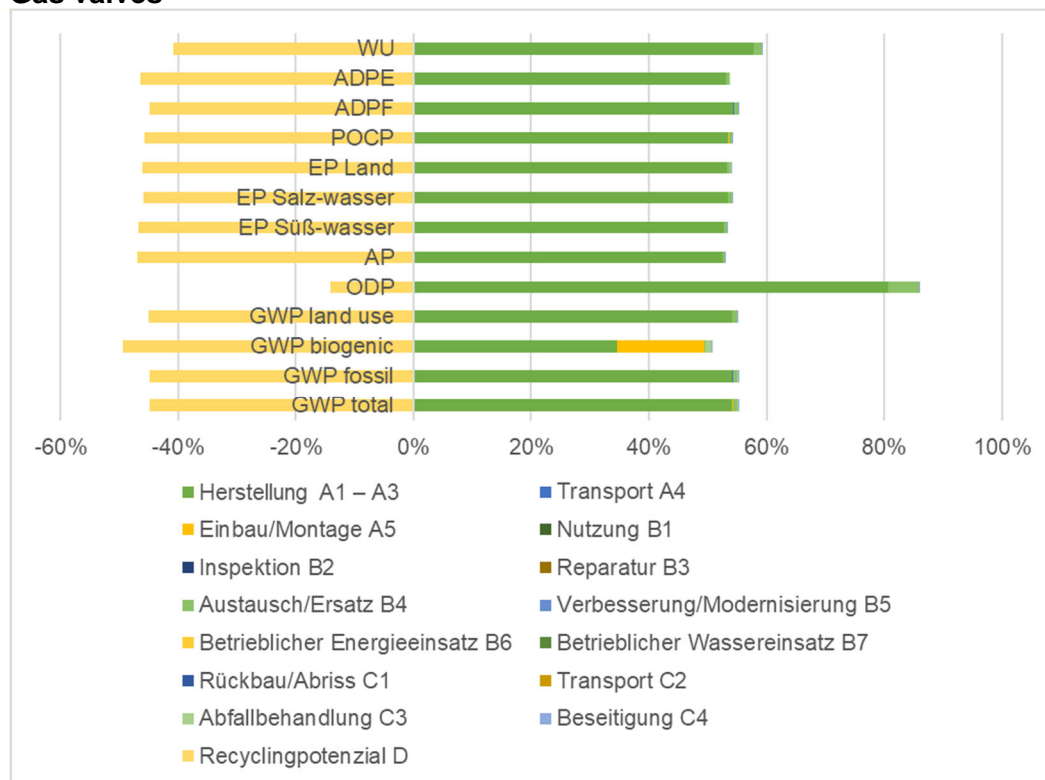
The charts below show the allocation of the main environmental impacts.

The values obtained from the LCA calculation are suitable for the certification of buildings.

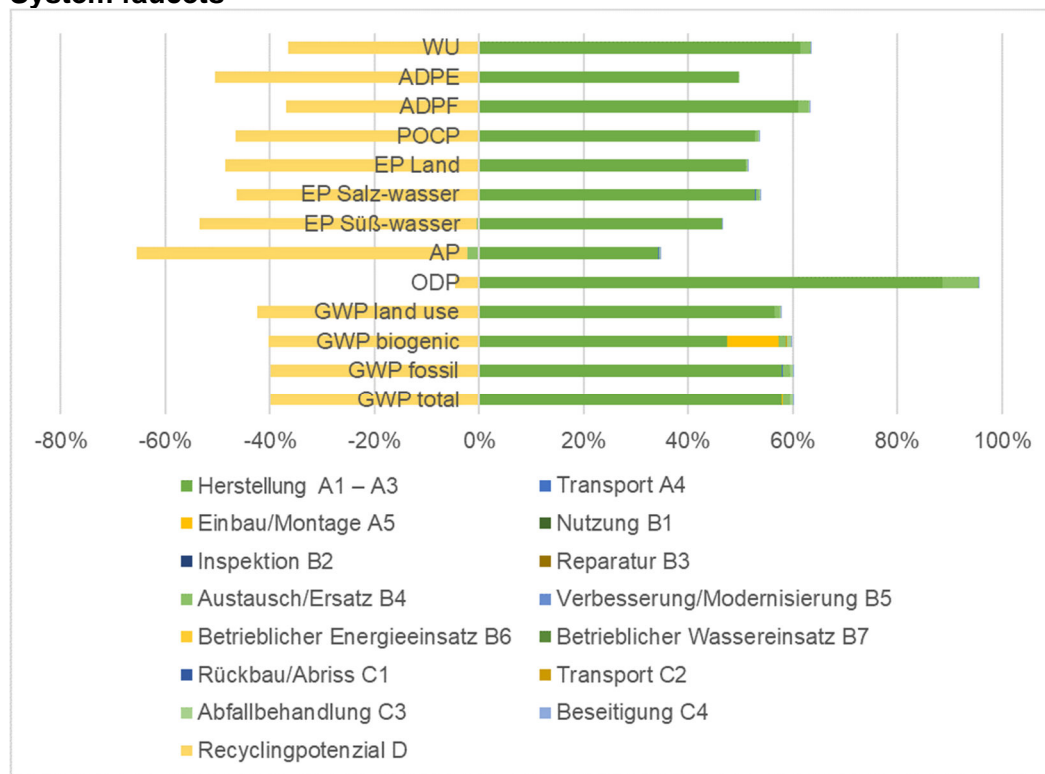
Diagrams

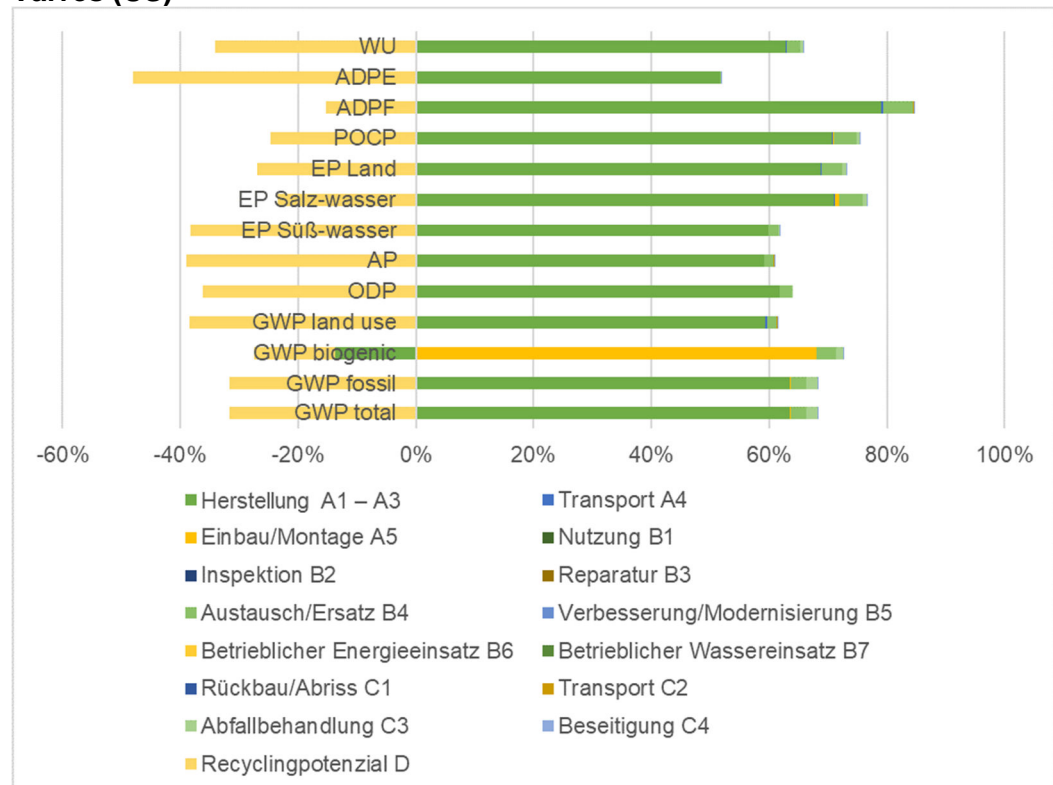
The diagrams below show the B modules with reference to the specified RSL within the building service life of 50 years.

Gas valves



System faucets



Valves (US)**Illustration 3** Percentage of the modules in selected environmental impact indicators**Report**

The LCA report underlying this EPD was developed according to the requirements of DIN EN ISO 14040 and DIN EN ISO 14044 as well as DIN EN 15804 and DIN EN ISO 14025. It is deposited with ift Rosenheim. The results and conclusions reported to the target group are complete, correct, without bias and transparent. The results of the study are not designed to be used for comparative statements intended for publication.

Critical review

The critical review of the LCA and of the report took place in the course of verification of the EPD and was carried out by the external auditor Prof. Dr. Eric Brehm.

7 General information regarding the EPD**Comparability**

This EPD was prepared according to DIN EN 15804 and is therefore only comparable to those EPDs that also comply with the requirements set out in DIN EN 15804.

Any comparison must refer to the building context and the same boundary conditions of the various life cycle stages.

For comparing EPDs of construction products, the rules set out in DIN EN 15804, Clause 5.3, apply.

The detailed individual results of the products were summarised on the basis of conservative assumptions and differ from the average results. Identification of the product groups and the resulting variations are documented in the background report.



Product group connecting technology

Communication The communications format of this EPD meets the requirements of EN 15942:2012 and is therefore the basis for B2B communication. Only the nomenclature has been changed according to DIN EN 15804.

Verification Verification of the Environmental Product Declaration is documented in accordance with the ift "Richtlinie zur Erstellung von Typ III Umweltproduktdeklarationen" (Guidance on preparing Type III Environmental Product Declarations) in accordance with the requirements set out in DIN EN ISO 14025.

The declaration is based on the PCR Documents "PCR Part A" PCR-A-1.0:2023 and "Valves" PCR-AR-1.0:2023.

The European standard EN 15804 serves as the core PCR ^{a)}
Independent verification of the declaration and statement according to EN ISO 14025:2010
Independent third party verifier: ^{b)} Eric Brehm
^{a)} Product category rules ^{b)} Optional for business-to-business communication Mandatory for business-to-consumer communication (see EN ISO 14025:2010. 9.4).

Revisions of this document

No.	Date	Note	Person in charge	Verifier
1	10.06.2024	External verification	Pscherer	Brehm

8 Bibliography

1. **Research project.** "EPDs für transparente Bauelemente" (EPDs for transparent building components) - Final report. Rosenheim: ift Rosenheim GmbH, 2011. SF-10.08.18.7-09.21/II 3-F20-09-1-067.
2. **DIN EN 12457 - Parts 1-4:2003-01.** Characterization of waste - Leaching; Compliance test for leaching of granular waste materials and sludges - Part 1-4: Berlin: Beuth Verlag GmbH, 2003.
3. **ift-Guideline NA-01/4.** General guideline for preparation of Type III Environmental Product Declarations Rosenheim: ift Rosenheim GmbH, 2023.
4. **Klöpffer, W und Grahl, B.** Ökobilanzen (LCA). Weinheim: Wiley-VCH-Verlag, 2009.
5. **Gefahrstoffverordnung - GefStoffV. (Hazardous substances regulation).** Verordnung zum Schutz vor Gefahrstoffen (Regulation on protection against hazardous substances). Berlin: BGBl. (Federal Gazette) I S. 3758, 2017.
6. **Chemikalien-Verbotsverordnung - ChemVerbotsV. (Chemicals Prohibition Regulation).** Verordnung über Verbote und Beschränkungen des Inverkehrbringens gefährlicher Stoffe, Zubereitungen und Erzeugnisse Chemikaliengesetz (Regulation on bans and restrictions of the placing on the market of hazardous substances, formulations and products covered by the Chemicals Law). Berlin: BGBl. (Federal Gazette) I S. 1328, 2017.
7. **DIN EN ISO 14040:2018-05.** Environmental management - Life cycle assessment - Principles and framework. Berlin: Beuth Verlag GmbH, 2018.
8. **DIN EN ISO 14044:2006-10.** Environmental management - Life cycle assessment - Requirements and guidelines. Berlin: Beuth Verlag GmbH, 2006.
9. **EN ISO 14025:2011-10.** Environmental labels and declarations - Type III environmental declarations - Principles and procedures. Berlin: Beuth Verlag GmbH, 2011.
10. **DIN EN ISO 14067:2019-02.** Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification. Berlin: Beuth Verlag GmbH, 2019.
11. **DIN EN 15804:2012+A2:2019+AC:2021.** Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products: Berlin: Beuth Verlag GmbH, 2022.
12. **Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety).** Leitfaden Nachhaltiges Bauen (Guidance on Sustainable Building). Berlin: s.n., 2016.
13. **ISO 21930:2017-07.** Sustainability in building construction - Environmental declaration of building products. Berlin: Beuth Verlag, 2017.
14. **Chemikaliengesetz – ChemG (Chemicals Act).** Law on protection against hazardous substances - Subdivided into Chemicals Law and a series of regulations; of relevance here: Law on protection against hazardous substances. Berlin: BGBl. (Federal Gazette) I S. 1146, 2017.
15. **IKP Universität Stuttgart and PE Europe GmbH.** GaBi 10: Software and database for LCA. Leinfelden-Echterdingen: s.n., 2020.
16. **ift Rosenheim GmbH.** Conditions and Guidance for the Use of ift Test Documents. Rosenheim: s.n., 2016.
17. **PCR Part A.** Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804. Rosenheim: ift Rosenheim, 2018.
18. **PCR Part B - Valves.** Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804. Rosenheim : ift Rosenheim, 2023.

9 Annex

Description of life cycle scenarios for Valves

Product stage			Con- struction process stage		Use stage*							End-of-life stage				Benefits and loads beyond system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	production	Transport	Construction/installation process	Use	maintenance	Repair	replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	Reuse Recovery Recycling potential
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

* For declared B-modules, the calculation of the results is performed taking into account the specified RSL related to one year

Table 6 Overview of applied life cycle stages

The scenarios were calculated taking into account the defined RSL (see Point 4 Use stage).

The scenarios were furthermore based on the research project “EPDs for transparent building components”. (1)

Note: The standard scenarios selected are presented in bold type. They were also used for calculating the indicators in the summary table.

- ✓ Included in the LCA
- Not included in the LCA

Product group connecting technology

A4 Transport

No.	Scenario	Description
A4.1	National	Transport mix 35-53% capacity used ¹ , approx. 600 km
A4.2	International/EU country	Transport mix 35-53% capacity used ¹ , approx. 2,000 km
A4.3	International/Non-EU	Transport mix 35-53% capacity used ¹ , approx. 19,000 km

¹ Capacity used: utilized loading capacity of the truck

The transport distances shown represent a transport average with the following transport mix. The scenarios include the return transport, if applicable.

Shipping method	Network fleet structure	Share in %		
		A4.1	A4.2	A4.3
Parcel service provider (CEP - Courier-Express- Parcel service)	Van 7.5 - 16 t (Euro 6), diesel, 35% capacity utilization	2	0	0.5
Forwarding agency and own truck fleet	> 32 t truck/semitrailer (Euro 6), diesel, 53 % capacity utilization	98	90	85
Air freights	Cargo and passenger aircrafts, kerosene	0	9	11
Seagoing vessels/containers	Seagoing/container vessels to receiving port, heavy oil	0	1	3.5

A4 Transport to construction site	Transport weight [kg] per declared unit	Density [kg/m³]	Capacity load factor ²
PG1 - Gas valves	1.04	8.80	<1
PG2 - System faucets	1.02		
PG3 - Valves	1.13		

² Capacity load factor:

- = 1 Product completely fills the packaging (without air inclusion)
- <1 Packaging contains unused volume (e.g.: air, filling material)
- > 1 Product is packed in compressed form

A4 Transport to construction site	Unit	A4.1	A4.2	A4.3
Core indicators				
GWP-t	kg CO ₂ equivalent	6.27E-05	3.33E-04	2.81E-03
GWP-f	kg CO ₂ equivalent	6.26E-05	3.33E-04	2.81E-03
GWP-b	kg CO ₂ equivalent	2.18E-08	8.84E-08	7.09E-07
GWP-I	kg CO ₂ equivalent	3.21E-08	1.06E-07	7.96E-07
ODP	kg CFC-11-eq.	1.06E-12	5.45E-12	4.58E-11
AP	mol H ⁺ -eq.	1.71E-07	1.16E-06	1.03E-05
EP-fw	kg P-eq.	5.24E-09	1.74E-08	1.31E-07
EP-m	kg N-eq.	4.47E-08	3.98E-07	3.63E-06
EP-t	mol N-eq.	2.45E-07	1.62E-06	1.42E-05
POCP	kg NMVOC-eq.	4.62E-07	4.21E-06	3.85E-05
ADPF	MJ	9.49E-04	4.78E-03	4.00E-02
ADPE	kg Sb equivalent	1.81E-10	5.55E-10	4.09E-09
WDP	m³ world-eq. deprived	4.74E-06	1.66E-05	1.27E-04
Resource management				
PERE	MJ	1.19E-05	4.13E-05	3.15E-04
PERM	MJ	0.00	0.00	0.00
PERT	MJ	1.19E-05	4.13E-05	3.15E-04
PENRE	MJ	9.49E-04	4.78E-03	4.00E-02
PENRM	MJ	0.00	0.00	0.00

Product group connecting technology

PENRT	MJ	9.49E-04	4.78E-03	4.00E-02
SM	kg	3.98E-07	1.33E-06	1.00E-05
RSF	MJ	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00
FW	m³	1.30E-07	4.63E-07	3.54E-06
Categories of waste				
HWD	kg	6.96E-07	2.36E-06	1.78E-05
NHWD	kg	2.23E-05	7.40E-05	5.57E-04
RWD	kg	2.05E-10	7.39E-10	5.69E-09
Output material flows				
CRU	kg	0.00	0.00	0.00
MFR	kg	7.38E-09	2.84E-08	2.27E-07
MER	kg	4.16E-11	1.35E-10	1.02E-09
EE	MJ	1.68E-07	5.81E-07	4.41E-06
Additional environmental impact indicators				
PM	Disease incidence	6.08E-12	1.94E-11	1.43E-10
IRP	kBq U235-eq.	8.61E-07	3.15E-06	2.44E-05
ETPfw	CTUe	5.01E-04	2.44E-03	2.02E-02
HTPc	CTUh	2.78E-14	9.74E-14	7.45E-13
HTPnc	CTUh	6.85E-13	3.61E-12	3.04E-11
SQP	dimensionless	9.33E-04	2.92E-03	2.12E-02

A5 Construction/installation process

No.	Scenario	Description												
A5	Manual	<p>According to the manufacturer. the products are installed with battery-operated pressing pliers (0.0009 kWh/kg, electricity mix (GLO)).</p> <p>In case of deviating consumption during installation/assembly of the products which forms part of the site management, they are covered at the building level.</p> <p>The following quantities of waste materials are produced during installation.</p> <table> <tr> <th>Product group</th><th>Waste materials in kg</th><th>of which quantities collected for waste recycling (output materials) in kg</th></tr> <tr> <td>PG1 - Gas valves</td><td>0.044</td><td>0.011</td></tr> <tr> <td>PG2 - System faucets</td><td>0.023</td><td>0.012</td></tr> <tr> <td>PG3 - Valves</td><td>0.125</td><td>0.010</td></tr> </table> <p>Ancillary materials, consumables, use of water, use of other resources, material losses as well as direct emissions during installation are negligible.</p> <p>It is assumed that the packaging material in the Module construction / installation is sent to waste handling. Waste is only thermally recycled in line with the conservative approach. Benefits from A5 are specified in module D.</p> <ul style="list-style-type: none"> Electricity replaces electricity mix (GLO, high voltage, market group); Thermal energy replaces thermal energy from natural gas (district or industrial, natural gas, RoW). Silicon bronze recyclate from A5 replaces 100 % "bronze, RoW, production" (gas valves) Gunmetal recyclate from A5 replaces 100 % "copper scrap, RoW, market" (system faucets). EPDM recyclate from A5 replaces 100% "Tetrafluoroethylene, RoW, production" (valves). <p>Transport to the recycling plants is included.</p> <p>Since this is a single scenario, the results are shown in the relevant summary table.</p>	Product group	Waste materials in kg	of which quantities collected for waste recycling (output materials) in kg	PG1 - Gas valves	0.044	0.011	PG2 - System faucets	0.023	0.012	PG3 - Valves	0.125	0.010
Product group	Waste materials in kg	of which quantities collected for waste recycling (output materials) in kg												
PG1 - Gas valves	0.044	0.011												
PG2 - System faucets	0.023	0.012												
PG3 - Valves	0.125	0.010												



Product group connecting technology

B1 Use (not relevant)

Refer to Section 4 Use stage - Emissions to the environment.
No emissions are known which may occur during the use stage of the products because press fitting is without contact to air, water and soil.

Since this is a single scenario, the results are shown in the relevant summary table.

B2 Cleaning, maintenance and repair (not relevant)

No cleaning or maintenance is required.

Ancillary materials, consumables, use of energy and water, material losses and waste as well as transport distances during cleaning are negligible.

Since this is a single scenario, the results are shown in the relevant summary table.

B3 Repair (not relevant)

No repair of the components of the building part is required.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from Viega GmbH & Co. KG.

Ancillary materials, consumables, use of energy and water, waste, material losses and transport distances during repair are negligible.

Since this is a single scenario, the results are shown in the relevant summary table.

B4 Replacement

No.	Scenario	Description
B4	Multiple replacement	Four exchanges in 50 years (12 years RSL)* Energy consumption 0.0009 kWh/kg.

*Assumptions for evaluation of possible environmental impacts; statements made do not constitute any guaranty or warranty of performance.

The statements made in this EPD are only informative to allow evaluation at the building level.

It is assumed that four replacement will be necessary during the 12-year reference service life and the 12-year building service life. The environmental impacts of replacement are due to the product, construction and disposal stages.

The results were based on one year, taking into account the RSL.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from Viega GmbH & Co. KG.

Since this is a single scenario, the results are shown in the relevant summary table.

B5 Modification/refurbishment (not relevant)

According to the manufacturer, the elements are not included in the improvement / modernisation activities for buildings.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance from Viega GmbH & Co. KG.

Ancillary materials, consumables, use of energy and water, material losses, waste as well as transport distances during installation are negligible.

Since this is a single scenario, the results are shown in the relevant summary table.

B6 Operational energy use (not relevant)

There is no energy used during normal use.

Ancillary materials, consumables and water, waste materials and other scenarios are negligible.

Since this is a single scenario, the results are shown in the relevant summary table.

B7 Operational water use (not relevant)

No water consumption when used as intended. Water consumption for cleaning is specified in Module B2.1.

Ancillary materials, consumables, waste materials and other scenarios are negligible.

Since this is a single scenario, the results are shown in the relevant summary table.

Product group connecting technology

C1 Deconstruction, demolition

No.	Scenario	Description
C1	Deconstruction	Connecting technology 99% deconstruction. Further deconstruction rates are possible, give adequate reasons.

No relevant inputs or outputs apply to the scenario selected. The energy consumed for deconstruction is negligible. Any arising consumption is marginal.

Since this is a single scenario, the results are shown in the relevant summary table.

In case of deviating consumption the removal of the products forms part of site management and is covered at the building level.

C2 Transport

No.	Scenario	Description
C2	Transport	Transport to collection point with >32 t truck (Euro 4), diesel, 29.96 t payload, 53% capacity used, 50 km (1)

Since this is a single scenario, the results are shown in the relevant summary table.

C3 Waste management

No.	Scenario	Description
C3	Current market situation	Share for recirculation of materials: <ul style="list-style-type: none"> • Stainless steel 98% in melt (UBA, 2017) • Remaining metals (SiBr, brass, gunmetal, nickel) 97% in melt (UBA, 2017) • Copper 100% in melt (Copper Institute) • Aluminium 95% in melt (GDA, 2018) • Plastics 60 % thermal recycling in incineration plants (Zukunft Bauen, 2017) • Plastics 40 % recycled (Zukunft Bauen, 2017) • Electronics 87% recycled (based on waste electrical and electronic equipment, UBA, 2018) Remainder to landfill/disposal,

No electricity consumption for the recycling plant per declared unit was taken into account for waste treatment due to the low proportion and lack of sources.

The below table presents the disposal processes and their percentage by mass/weight. The calculation is based on the above mentioned shares in percent related to the declared unit of the product system.

Product group connecting technology

C3 Disposal	Unit	Gas valves	System faucets	Valves (US)
Collection process, collected separately	kg	0.99	0.99	0.99
Collection process, collected as mixed construction waste	kg	0.01	0.01	0.01
Recovery system, for re-use	kg	0.00	0.00	0.00
Recovery system, for recycling	kg	0.94	0.92	0.69
Recovery system, for energy recovery	kg	0.01	0.04	0.30
Disposal	kg	0.05	0.04	0.02

Since this is a single scenario, the results are shown in the summary table.

C4 Disposal

No.	Scenario	Description
C4	Disposal	The non-recoverable quantities and losses in the recovery/recycling chain (C1 and C3) are modeled as "inert waste (Europe without Switzerland, treatment of inert waste, sanitary landfill)".

Since this is a single scenario, the results are shown in the summary table.

D Benefits and loads from beyond the system boundaries

No.	Scenario	Description
D	Recycling potential	<ul style="list-style-type: none"> Stainless steel scrap from A5 and C3 excluding the scrap used in A3 replaces 100% of chrome steel (RoW); Copper scrap from C3 excluding the scrap used in A3 replaces 100% of copper cathode (GLO); Silicon bronze scrap from A5 and C3 excluding the scrap used in A3 replaces 100% of bronze (RoW); Gunmetal scrap from C3 excluding the scrap used in A3 replaces 100% of gunmetal; Brass scrap from C3 excluding the scrap used in A3 replaces 100% of brass; Aluminium scrap from C3 excluding the scrap used in A3 replaces 100% of aluminum, sheet metal rolls (RoW); Nickel scrap from C3 excluding the scrap used in A3 replaces 100% of nickel (GLO); Electronics scrap from C3 excluding the scrap used in A3 replaces 100% of electronic components (GLO); Plastic recycle from C3 excluding the plastics used in A3 replaces 60% of Polypropylene (gas valves and system faucets); Plastic recycle from C3 excluding the plastics used in A3 and A5 replaces 60% of tetrafluoroethylenes (valves); Benefits from incineration plant: Electricity replaces electricity mix (GLO), thermal energy replaces thermal energy from natural gas (RoW).

Since this is a single scenario, the results are shown in the summary table.

10 Annex B

Conversion table for unit weights

System faucets

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
246301	Systemvalves accesories	2334 drain valve ¼ E 1 9	drain valve	2334	¼	471569	80.5	0.0805
282307	Systemvalves accesories	2236 equipmentset - 0 489	equipment set	2236	-	275068	314	0.314
348861	Systemvalves accesories	227021 lever 30 5 499	lever	227021	30	588847	40	0.04
348956	Systemvalves accesories	227023 cover cap 30 5 l 9	cover cap	227023	30	590338	5.3	0.0053
349841	System-Gas ball valves	2671 gas ball valve with SC 18 2G1 9	gas ball valve with SC	2671	18	587437	382	0.382
349871	System-Gas ball valves	26713 gas ball valve with SC 3/4x22 2G1 9	gas ball valve with SC	26713	¾ X 22	587468	490	0.49
349891	System-Gas ball valves	26715 gas ball valve ¾ 2G1 9	gas ball valve	26715	¾	586928	506	0.506
380081	Systemvalves accesories	10138 actuator Set- 0 1 9	actuator	10138	SET -	785468	380	0.38
421071	Shut-off valve for single-pipe gas meters	2645 gas meter ball valve 28 0 189	gas meter ball valve	2645	28	632717	2,170.00	2.17
421081	Shut-off valve for single-pipe gas meters	2645T gas meter ball valve 28 0 189	gas meter ball valve	2645T	28	632724	2,268.00	2.268
421091	Angled shut-off valve for single-pipe gas meters with gas flow monitor	2644 gas meter corner ball valve 28 0 189	gas meter corner ball valve	2644	28	632731	930	0.93
421131	Angled shut-off valve for single-pipe gas meters	2644T gas meter corner ball valve 28 0 189	gas meter corner ball valve	2644T	28	632748	1,008.00	1.008
421231	Double-pipe gas meter	2648T mounting unit 28 0 189	mounting unit	2648T	28	632755	2,405.00	2.405
427951	Systemvalves accesories	224020 valve top - 0 1 9	valve top	224020	-	688950	55	0.055
442423	Systemvalves accesories	48759XLRepair Kit 4 5 B 9	Repair Kit	48759XL	4	867106	500	0.5
442593	Systemvalves accesories	42759XLRepair Kit 4 5 B 9	Repair Kit	42759XL	4	802592	484	0.484
443353	Systemvalves accesories	59709XLextension 4 E 1 9	extension	59709XL	4	868370	797	0.797
443701	Systemvalves accesories	2234 drain valve ¼ N 1 9	drain valve	2234	¼	457334	98	0.098
444303	Systemvalves accesories	487591 Repair Kit ½ 6 B 9	Repair Kit	487591	½	865607	0.46	0.0005
444343	Systemvalves accesories	487591 Repair Kit 1 1/2 6 B 9	Repair Kit	487591	1 ½	865805	1.06	0.0011
444413	Systemvalves accesories	487580 lever ½ S 1 9	lever	487580	½	866253	131	0.131
465901	System-Gas ball valves	2670 gas ball valve with SC 15 2G1 9	gas ball valve with SC	2670	15	492854	362	0.362
465961	System-Gas ball valves	2670 gas ball valve with SC 54 2G1 9	gas ball valve with SC	2670	54	492915	2,712.00	2.712
466651	Systemvalves accesories	22345 extension 1/4x50 NB1 9	extension	22345	¼ X 50	553654	85.9	0.0859
467791	Double-pipe gas meter	2648 mounting unit 28 0 1 9	mounting unit	2648	28	615260	2,380.00	2.38

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
475270	Systemvalves accesories	2238LF guide piece 8,2x7 5SE 9	guide piece	2238LF 246	8,2 X 7	585785	3	0.003
475821	Systemvalves accesories	22345LFextension 1/4x50 NB1 9	extension	22345LF	¼ X 50	565329	93.1	0.0931
491781	Systemvalves accesories	237598 spare part set 15/18 5 Z 9	spare part set	237598	15/18	766832	0	0
558400	Systemvalves accesories	224181 flow sensor - 0 1 9	flow sensor	224181	-	706005	145	0.145
558430	Systemvalves accesories	224184 magnet valve PWH 5 0 9	magnet valve	224184	PWH	706036	132	0.132
558440	Systemvalves accesories	224185 odour trap - S 0 9	odour trap	224185	-	706043	190	0.19
558450	Systemvalves accesories	224186 mains adapter - S 0 9	mains adapter	224186	-	707255	341	0.341
559631	Systemvalves accesories	22235 adapter nipple 1/4x3/8 NB1 9	adapter nipple	22235	¼ X 3/8	708757	32.56	0.0326
578602	Systemvalves accesories	437091 Repair Kit ½ 6 Z 9	Repair Kit	437091	½	851464	0.46	0.0005
578652	Systemvalves accesories	437091 Repair Kit 2 6 Z 9	Repair Kit	437091	2	851518	0.94	0.0009
601183	Systemvalves accesories	29719XLextension 21/2-4 0 1 9	extension	29719XL	2 ½ - 4	783123	610	0.61
604011	Systemvalves accesories	22788 drain valve ¼ 0 1 9	drain valve	22788	¼	790752	76	0.076
604991	Systemvalves accesories	22787 drain valve ¼ 0 1 9	drain valve	22787	¼	747398	36	0.036
605541	Systemvalves accesories	227591 handle DN15-20 5 499	handle	227591	DN15-20	747497	26	0.026
605841	Systemvalves accesories	227592 handle DN15-20 S 1A9	handle	227592	DN15-20	747527	38	0.038
605884	Systemvalves accesories	227593 handle DN15-20 7 H 9	handle	227593	DN15-20	747558	57.25	0.0573
605910	Systemvalves accesories	227594 thermometer Set S Z 9	thermometer	227594	SET	747589	53	0.053
605931	Systemvalves accesories	227595 plug G1/4 NB1 9	plug	227595	G1/4	747602	10	0.01
606005	Systemvalves accesories	227596 cap DN15-20 S L 9	cap	227596	DN15-20	747619	3.93	0.0039
606385	Systemvalves accesories	227597 media marking DN15-50 5 L 9	media marking	227597	DN15-50	747732	6.6	0.0066
607921	Systemvalves accesories	427598 repair set ½ S 1 9	repair set	427598	½	787738	26	0.026
607961	Systemvalves accesories	427598 repair set 11/2+2 S 1 9	repair set	427598	1 ½ + 2	787776	112	0.112
610213	Systemvalves accesories	297166 extension set ½+3/4 0 1 9	extension set	297166	½ + ¾	235004	94	0.094
610243	Systemvalves accesories	407096 extension set ½+3/4 E 1 9	extension set	407096	½ + ¾	235158	93	0.093
610553	Systemvalves accesories	297146 handle ½+3/4 5 Z 9	handle	297146	½ + ¾	235301	58	0.058
625693	Systemvalves accesories	29139 sensor - S 1 9	sensor	29139	-	234700	92	0.092
634200	Systemvalves accesories	29718 lever 1/2x3/4 7 H 9	lever	29718	½ X ¾	221700	54	0.054
636040	Systemvalves accesories	297196 extension set 1/2x3/4 0 1 9	extension set	297196	½ X ¾	234434	94	0.094
645163	Systemvalves accesories	297126 handle ½+3/4 E 1A9	handle	297126	½ + ¾	224008	53.3	0.0533
645193	Systemvalves accesories	297147 cap ½+3/4 5 I 9	cap	297147	½ + ¾	224152	4	0.004

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
645213	Systemvalves accesories	40708 handle ½+3/4 E 1 9	handle	40708	½ + ¾	224251	56	0.056
677601	Systemvalves accesories	22373XLhandle DN65-DN100 5 499	handle	22373XL	DN 65 - DN 100	654443	146	0.146
695411	Systemvalves accesories	29348ZLdrain valve ¼ 0 1 9	drain valve	29348ZL	¼	799025	76	0.076
700841	Shut-off valve for single-pipe gas meters with gas flow monitor	2645S gas meter ball valve 28-2,5 0 1 9	gas meter ball valve	2645S	28 - 2,5	618124	2,170.00	2.17
700871	Shut-off valve for single-pipe gas meters with gas flow monitor	G2345S manifold with SC 11/2x(2,5)x7 S 9	manifold with SC	G2345S	1 ½ X (2,5) X2	618155	5,400.00	5.4
700931	Shut-off valve for single-pipe gas meters with gas flow monitor	2644S gas meter corner ball valve 28x(2,5) 2 1 9	gas meter corner ball valve	2644S	28 X (2,5)	618216	950	0.95
701411	Double-pipe gas meter with gas flow monitor	G2343S mounting unit 28x(2,5) 0 1 9	mounting unit	G2343S	28 X (2,5)	618247	2,430.00	2.43
701441	Double-pipe gas meter with gas flow monitor	2648S mounting unit 28x(2,5) 2G1 9	mounting unit	2648S	28 X (2,5)	618278	2,410.00	2.41
703281	Double-pipe gas meter with gas flow monitor	G2113S mounting unit 28x(2,5m3/h) 0 1 9	mounting unit	G2113S	28 X (2,5 M3/H)	668389	2,840.00	2.84
714121	System valve with gas flow monitor	26412HTgas flow moitor with SC 1x(2,5)x282 1 9	gas flow moitor with SC	26412HT	1 X (2,5) X 28	653156	196	0.196
714161	System valve with gas flow monitor	26412HTgas flow moitor with SC 11/4x(10,02 1 9	gas flow moitor with SC	26412HT	11/4 X (10,0) X 35	653194	252	0.252
717011	Shut-off valve for single-pipe gas meters	G2111 gas meter corner ball valve 1x22 0 1 9	gas meter corner ball valve	G2111	1 X 22	528195	1,165.00	1.165
717161	Shut-off valve for single-pipe gas meters	G2112 gas meter ball valve 22 0 1 9	gas meter ball valve	G2112	22	528669	2,698.00	2.698
717261	Double-pipe gas meter	G2113 mounting unit 1x28 0 1 9	mounting unit	G2113	1 X 28	528577	2,840.00	2.84
718901	System gas fittings various	G2324 gas meter connection panel 1x22 7 H 9	gas meter connection panel	G2324	1 X 22	533601	706	0.706
719101	System gas fittings various	G2325 gas meter connection panel 1x22 7 H 9	gas meter connection panel	G2325	1 X 22	533625	1,040.00	1.04
727574	Double-pipe gas meter	G2343 mounting unit 28 7 S 9	mounting unit	G2343	28	535322	2,285.00	2.285
727584	Double-pipe gas meter	G2343T mounting unit 28 7 S 9	mounting unit	G2343T	28	535339	2,432.00	2.432
735106	Systemvalves accesories	224153 sensor - S K 9	sensor	224153	-	764593	257	0.257
735115	Systemvalves accesories	224154 sensor - S L 9	sensor	224154	-	764609	257	0.257
738910	Systemvalves accesories	224179 control - 5 0 9	control	224179	-	762735	314	0.314
739170	Systemvalves accesories	224160 sensor PWC E Z 9	sensor	224160	PWC	762230	77.5	0.0775
739180	Systemvalves accesories	224161 sensor PWH E Z 9	sensor	224161	PWH	762247	77.5	0.0775
766350	Systemvalves accesories	224198 spare part set - S Z 9	spare part set	224198	-	693985	13	0.013
768891	Systemvalves accesories	224562 sensor S 2 1 9	sensor	224562	S	734855	75.8	0.0758
769281	Systemvalves accesories	224566 sensor S(E) E 1 9	sensor	224566	S (E)	734893	41	0.041
769691	Systemvalves accesories	224314 spare part set - S Z 9	spare part set	224314	-	735227	26	0.026
769731	Systemvalves accesories	224318 odour trap - 5 8Z9	odour trap	224318	-	735265	630	0.63
769741	Systemvalves accesories	224319 sensor - 5 Z 9	sensor	224319	-	735272	23.6	0.0236
769751	Systemvalves accesories	224320 valve - 5 Z 9	valve	224320	-	735289	524	0.524

Gas valves

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
239801	Ball and shut-off valve	2969 pressure test plug 1/2 0 1 9	pressure test plug	2969	1/2	782027	243	0.243
349681	Ball and shut-off valve	2170 ball valve 16 2G1 9	ball valve	2170	16	587277	354	0.354
349711	Ball and shut-off valve	2170 ball valve 32 2G1 9	ball valve	2170	32	587307	584	0.584
382801	Ball and shut-off valve INOX	4070 ball valve with SC 1/2 E 1 9	ball valve with SC	4070	1/2	810805	324	0.324
382851	Ball and shut-off valve INOX	4070 ball valve with SC 2 E 1 9	ball valve with SC	4070	2	811055	2,450.00	2.45
413671	Ball and shut-off valve PWIS free	2275LF ball valve with SC 15 N 1 9	ball valve with SC	2275LF	15	784959	190.5	0.1905
414691	Ball and shut-off valve PWIS free	2275LF ball valve with SC 42 N 1 9	ball valve with SC	2275LF	42	785000	1,127.40	1.1274
430811	Mounting unit	223071 screw fitting 20xG1 NB1 9	screw fitting	223071	20 X G1	689766	745	0.745
440253	Megapress valve	59758 ball valve with SC 1/2 E 1 9	ball valve with SC	59758	1/2	864006	946	0.946
440303	Megapress valve	59758 ball valve with SC 2 E 1 9	ball valve with SC	59758	2	864259	3,965.00	3.965
440423	Megapress valve Inox	41758XLball valve with SC 4 E 1 9	ball valve with SC	41758XL	4	866604	18,200.00	18.2
440523	Megapress valve Inox	51758XLball valve with SC 4 E 1 9	ball valve with SC	51758XL	4	866758	18,200.00	18.2
440603	Megapress valve Inox	41758 ball valve with SC 1/2 E 1 9	ball valve with SC	41758	1/2	865003	1,230.00	1.23
440653	Megapress valve Inox	41758 ball valve with SC 2 E 1 9	ball valve with SC	41758	2	865256	4,450.00	4.45
440663	Megapress valve Inox	51758 ball valve with SC 1/2 E 1 9	ball valve with SC	51758	1/2	865300	779	0.779
440713	Megapress valve Inox	51758 ball valve with SC 2 E 1 9	ball valve with SC	51758	2	865553	3,980.00	3.98
441483	Megapress valve	59758XLball valve with SC 4 7 1 9	ball valve with SC	59758XL	4	866901	18,400.00	18.4
442133	Megapress valve	42758XLball valve with SC 4 7 1 9	ball valve with SC	42758XL	4	802561	17,420.00	17.42
442163	Megapress valve	5970XL ball valve with SC 4 7 H 9	ball valve with SC	5970XL	4	868004	16,400.00	16.4
443033	Megapress valve Inox	5170XL ball valve with SC 4 E 1 9	ball valve with SC	5170XL	4	868158	16,000.00	16
443103	Megapress valve Inox	4170XL ball valve with SC 4 E 1 9	ball valve with SC	4170XL	4	868301	17,800.00	17.8
444123	Megapress - gas ball valve	6675XL ball valve with SC 4 7 H 9	ball valve with SC	6675XL	4	868509	18,200.00	18.2
452903	Megapress valve	46754 ball valve with SC 1/2 NO1 9	ball valve with SC	46754	1/2	801571	340	0.34
452953	Megapress valve	46754 ball valve with SC 2 N 1 9	ball valve with SC	46754	2	801625	2,358.00	2.358
455333	Megapress valve	4675 ball valve with SC 1/2 NO1 9	ball valve with SC	4675	1/2	801519	398	0.398
455383	Megapress valve	4675 ball valve with SC 2 N 1 9	ball valve with SC	4675	2	801564	2,599.00	2.599
456453	Megapress valve Inox	68758 ball valve with SC 1/2 E 1 9	ball valve with SC	68758	1/2	869001	784	0.784
456503	Megapress valve Inox	68758 ball valve with SC 2 E 1 9	ball valve with SC	68758	2	869254	3,874.00	3.874

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
456543	Megapress valve Inox	68758XL ball valve with SC 4 E 1 9	ball valve with SC	68758XL	4	869407	16,800.00	16.8
467601	Mounting unit	223011 Mounting unit QN2,5x1x1 NB1 9	Mounting unit	223011	QN2,5 X 1 X 1	553609	3,080.00	3.08
467641	Mounting unit	223012 Mounting unit (Qn2,5)28x1 NB1 9	Mounting unit	223012	(QN 2,5)28 X 1	629878	3,007.00	3.007
467851	Mounting unit	223070 bow QN2,5x1x1 NB1 9	bow	223070	QN2,5 X 1 X 1	554415	1,500.10	1.5001
468501	Ball and shut-off valve INOX	2370 ball valve with SC 15 E 1 9	ball valve with SC	2370	15	554729	300	0.3
468561	Ball and shut-off valve INOX	2370 ball valve with SC 54 E 1 9	ball valve with SC	2370	54	554781	2,470.00	2.47
470101	Mounting unit	223010 Mounting unit Rp1 NB1 9	Mounting unit	223010	RP1	746216	2,940.00	2.94
491501	Ball and shut-off valve INOX	23758 ball valve with SC 15 E 1 9	ball valve with SC	23758	15	766764	558	0.558
491561	Ball and shut-off valve INOX	23758 ball valve with SC 54 E 1 9	ball valve with SC	23758	54	766825	3,725.00	3.725
559141	Ball and shut-off valve ZL	29117LFScrew-in piece 1 2A1 9	Screw-in piece	29117LF	1	721084	138.7	0.1387
559241	Ball and shut-off valve ZL	29117LFScrew-in piece 2 2A1 9	Screw-in piece	29117LF	2	721138	580.9	0.5809
600503	Megapress valve Inox	5170 ball valve with SC 1/2 E 1 9	ball valve with SC	5170	1/2	289755	351	0.351
600553	Megapress valve Inox	5170 ball valve with SC 2 E 1 9	ball valve with SC	5170	2	290003	2,520.00	2.52
601243	Megapress valve Inox	4170 ball valve with SC 1/2 E 1 9	ball valve with SC	4170	1/2	290058	345	0.345
601293	Megapress valve Inox	4170 ball valve with SC 2 E 1 9	ball valve with SC	4170	2	290300	2,510.00	2.51
601591	Ball and shut-off valve	22753 ball valve with SC 15 NB1 9	ball valve with SC	22753	15	746681	282	0.282
601651	Ball and shut-off valve	22753 ball valve with SC 54 N 1 9	ball valve with SC	22753	54	746742	1,950.00	1.95
602101	Ball and shut-off valve	22754 ball valve with SC 15x1/2 N 1 9	ball valve with SC	22754	15 X 1/2	746759	210	0.21
602161	Ball and shut-off valve	22754 ball valve with SC 54x2 N 1 9	ball valve with SC	22754	54 X 2	746810	1,888.00	1.888
602343	Ball and shut-off valve PWIS free	22752LFball valve 1/2 NB1 9	ball valve	22752LF	1/2	796150	224.7	0.2247
602393	Ball and shut-off valve PWIS free	22752LFball valve 2 N 1 9	ball valve	22752LF	2	796204	1,931.30	1.9313
602751	Ball and shut-off valve	22752 ball valve 1/2 NB1 9	ball valve	22752	1/2	746827	226	0.226
602801	Ball and shut-off valve	22752 ball valve 2 N 1 9	ball valve	22752	2	746872	1,950.00	1.95
603201	Ball and shut-off valve	22755 ball valve 1/2 NB1 9	ball valve	22755	1/2	746889	306	0.306
603251	Ball and shut-off valve	22755 ball valve with SC 2 N 1 9	ball valve with SC	22755	2	746933	2,130.00	2.13
603833	Megapress valve Inox	5174 check valve 1/2 E 1 9	check valve	5174	1/2	290508	200	0.2
603883	Megapress valve Inox	5174 check valve 2 E 1 9	check valve	5174	2	290751	1,542.00	1.542
604051	Ball and shut-off valve	22751 ball valve 3/4 NB1 9	ball valve	22751	3/4	746940	264	0.264
604101	Ball and shut-off valve	22751 ball valve 23/8 N 1 9	ball valve	22751	2 3/8	746995	2,088.00	2.088
604231	Ball and shut-off valve	22756 ball valve 3/4 NB1 9	ball valve	22756	3/4	747008	358	0.358

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
604281	Ball and shut-off valve	22756 ball valve 23/8 N 1 9	ball valve	22756	2 3/8	747053	2,270.00	2.27
604361	Ball and shut-off valve	22757 ball valve with SC 15x3/4 N 1 9	ball valve with SC	22757	15 X 3/4	747060	234	0.234
604401	Ball and shut-off valve	22781 free-flow valve 1/2 NB1 9	free-flow valve	22781	1/2	747299	440	0.44
604541	Ball and shut-off valve	2278 free-flow valve with SC 15 NB1 9	free-flow valve with SC	2278	15	747312	395	0.395
604851	Ball and shut-off valve	22785 concealed free-flow valve with SC 15NB1 9	concealed free-flow valve with SC	22785	15	747343	430	0.43
604931	Ball and shut-off valve	22786 concealed free-flow valve 1/2 NB1 9	concealed free-flow valve	22786	1/2	747374	475	0.475
606901	Ball and shut-off valve	227510 ball valve with SC 15 N 1 9	ball valve with SC	227510	15	774851	210	0.21
606961	Ball and shut-off valve	227510 ball valve with SC 54 N 1 9	ball valve with SC	227510	54	774912	1,780.00	1.78
617751	Megapress valve	42758 ball valve with SC 1/2 E 1 9	ball valve with SC	42758	1/2	787165	985	0.985
617801	Megapress valve	42758 ball valve with SC 2 E 1 9	ball valve with SC	42758	2	787219	4,230.00	4.23
620001	Ball and shut-off valve	2275 ball valve with SC 15 N 1 9	ball valve with SC	2275	15	746377	195	0.195
620061	Ball and shut-off valve	2275 ball valve with SC 54 N 1 9	ball valve with SC	2275	54	746438	1,794.00	1.794
620101	Ball and shut-off valve	2275CO ball valve with SC 15 N 1 9	ball valve with SC	2275CO	15	746445	207	0.207
620161	Ball and shut-off valve	2275CO ball valve with SC 54 N 1 9	ball valve with SC	2275CO	54	746605	1,800.00	1.8
620891	Megapress valve	43758 ball valve with SC 1/2 E 1 9	ball valve with SC	43758	1/2	787226	973	0.973
620941	Megapress valve	43758 ball valve with SC 2 E 1 9	ball valve with SC	43758	2	787677	4.22	0.0042
623441	Ball and shut-off valve	5375 ball valve with SC 16 NB1 9	ball valve with SC	5375	16	746612	215	0.215
623501	Ball and shut-off valve	5375 ball valve with SC 63 N 1 9	ball valve with SC	5375	63	746674	2,275.00	2.275
639501	Ball and shut-off valve ZL	29711ZLball valve with SC 1/2 N 1 9	ball valve with SC	29711ZL	1/2	799209	210	0.21
639551	Ball and shut-off valve ZL	29711ZLball valve with SC 2 N 1 9	ball valve with SC	29711ZL	2	799506	1,774.00	1.774
639561	Ball and shut-off valve ZL	29713ZLball valve 1/2 N 1 9	ball valve	29713ZL	1/2	799230	208	0.208
641401	Ball and shut-off valve ZL	29713ZLball valve 2 N 1 9	ball valve	29713ZL	2	799483	1,770.00	1.77
641411	Ball and shut-off valve ZL	29714ZLball valve 1/2 N 1 9	ball valve	29714ZL	1/2	799704	210	0.21
653070	PureFlow Crimp valve	V503631valve 1/2 5 399	valve	V503631	1/2	430034	44.111	0.0441
653075	PureFlow Crimp valve	V503630valve 3/8 5 399	valve	V503630	3/8	430232	40.824	0.0408
653781	PureFlow Crimp valve	V54028 valve 1/2x1/2-bulk 5 399	valve	V54028	1/2X1/2 - BULK	439334	29.016	0.029
656714	PureFlow Crimp valve	V5064ZLvalve 3/8x1/4 0 7 9	valve	V5064ZL	3/8 X 1/4	460024	142.882	0.1429
658767	PureFlow Press valve	28424ZLvalve 1/2x1/4 0 7 9	valve	28424ZL	1/2 X 1/4	935119	126.098	0.1261
658769	PureFlow Press valve	28423ZLvalve 1/2x1/4 0 7 9	valve	28423ZL	1/2 X 1/4	940311	124.511	0.1245
658772	PureFlow Press valve	28421ZLvalve 1/2x1/2 0 1 9	valve	28421ZL	1/2 X 1/2	950020	130.635	0.1306

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
658773	PureFlow Press valve	28422ZL valve 3/4x3/4 0 1 9	valve	28422ZL	3/4 X 3/4	945415	178.261	0.1783
662951	Check valve	2974ZL Check valve 1/2 NB1 9	Check valve	2974ZL	1/2	790350	81.6	0.0816
663031	Check valve	2974ZL Check valve 2 NB1 9	Check valve	2974ZL	2	790602	850	0.85
667361	Ball and shut-off valve ZL	29716ZL ball valve with SC 1/2x3/4 N 1 9	ball valve with SC	29716ZL	1/2 X 3/4	798752	249	0.249
669873	Megapress valve	4870 ball valve with SC 1/2 7 H 9	ball valve with SC	4870	1/2	289151	366	0.366
669923	Megapress valve	4870 ball valve with SC 2 7 H 9	ball valve with SC	4870	2	289403	2,653.00	2.653
669933	Megapress valve	5970 ball valve with SC 1/2 7 H 9	ball valve with SC	5970	1/2	289458	371	0.371
669983	Megapress valve	5970 ball valve with SC 2 7 H 9	ball valve with SC	5970	2	289700	2,660.00	2.66
679903	Megapress valve	48758 ball valve with SC 1/2 E 1 9	ball valve with SC	48758	1/2	285009	804	0.804
679953	Megapress valve	48758 ball valve with SC 2 E 1 9	ball valve with SC	48758	2	285054	3,976.00	3.976
695131	Slanted seat valve	22817 circulation regulation valve 15 NB1 9	circulation regulation valve	22817	15	778804	523	0.523
699304	Megapress-gas ball valve	66753 ball valve with SC 1/2 7 H 9	ball valve with SC	66753	1/2	306902	581	0.581
699354	Megapress-gas ball valve	66753 ball valve with SC 2 7 H 9	ball valve with SC	66753	2	307152	3,827.00	3.827
699604	Megapress-gas ball valve	6675 ball valve with SC 1/2 7 H 9	ball valve with SC	6675	1/2	306001	383	0.383
699654	Megapress-gas ball valve	6675 ball valve with SC 2 7 H 9	ball valve with SC	6675	2	306254	2,588.00	2.588
699864	Megapress-gas ball valve	66751 ball valve with SC 1/2 7 H 9	ball valve with SC	66751	1/2	306308	315	0.315
699914	Megapress-gas ball valve	66751 ball valve with SC 2 7 H 9	ball valve with SC	66751	2	306551	2,395.00	2.395
699944	Megapress-gas ball valve	66752 ball valve with SC 1/2 7 H 9	ball valve with SC	66752	1/2	306605	332	0.332
699994	Megapress-gas ball valve	66752 ball valve with SC 2 7 H 9	ball valve with SC	66752	2	306858	2,450.00	2.45
700601	gas valve with gas flow monitor	26472S gas flow monitor 3/4x(2,50 1 9	gas flow monitor	26472S	3/4 X (2,5)	617837	102.5	0.1025
700691	gas valve with gas flow monitor	26472S gas flow monitor 2x(10,0)0 1 9	gas flow monitor	26472S	2 X (10,0)	617929	810	0.81
700731	gas valve with gas flow monitor	26471S gas flow monitor 3/4x(2,50 1 9	gas flow monitor	26471S	3/4 X (2,5)	617974	114	0.114
700821	gas valve with gas flow monitor	26471S gas flow monitor 2x(10,0)0 1 9	gas flow monitor	26471S	2 X (10,0)	618100	814	0.814
701471	Shut-off valve for single-pipe gas meters with gas flow monitor	G21121S gas meter ball valve 1x(2,5) 0 1 9	gas meter ball valve	G21121S	1 X (2,5)	618308	2,689.70	2.6897
701501	Shut-off valve for single-pipe gas meters with gas flow monitor	G21122S gas meter ball valve 13/8x(2,0 1 9	gas meter ball valve	G21122S	1 3/8 X (2,5)	618339	2,267.00	2.267
701531	Shut-off valve for single-pipe gas meters with gas flow monitor	G23451S manifold 11/2x(2,5)-2 7 S 9	manifold	G23451S	11/2X(2,5) -2	618360	6,200.00	6.2
701591	Shut-off valve for single-pipe gas meters with gas flow monitor	G21112S gas meter corner ball valve 1x(2,5) 0 1 9	gas meter corner ball valve	G21112S	1 X (2,5)	618452	1,192.00	1.192
701621	Shut-off valve for single-pipe gas meters with gas flow monitor	G21111S gas meter corner ball valve 1x(2,5) 0 1 9	gas meter corner ball valve	G21111S	1 X (2,5)	618483	1,250.00	1.25
701651	Shut-off valve for single-pipe gas meters with gas flow monitor	G21113S gas meter corner ball valve 1x(2,5) 0 1 9	gas meter corner ball valve	G21113S	1 X (2,5)	618513	946	0.946

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
701681	Double-pipe gas meter with gas flow monitor	G23431SMounting unit 1x(2,5) 0 1 9	Mounting unit	G23431S	1 X (2,5)	618544	2,670.00	2.67
701791	Double-pipe gas meter with gas flow monitor	G21141SMounting unit 1x(2,5) 0 1 9	Mounting unit	G21141S	1 X (2,5)	618605	2,500.00	2.5
701821	Double-pipe gas meter with gas flow monitor	G2342S Mounting unit 1x1x250x(2,5) 0 1 9	Mounting unit	G2342S	1 X 1X 250X (2,5)	618636	3,100.00	3.1
701901	Double-pipe gas meter with gas flow monitor	G2342S Mounting unit. 2x1x250x(6,0) 0 1 9	Mounting unit	G2342S	2 X 1X 250X (6,0)	618711	4,345.00	4.345
701941	Double-pipe gas meter with gas flow monitor	G2110S gas meter corner ball valve 3/4x(2,5) 0 1 9	gas meter corner ball valve	G2110S	3/4 X (2,5)	618759	422	0.422
702001	Double-pipe gas meter with gas flow monitor	G2110S gas meter corner ball valve 11/4x(10,0) 0 1 9	gas meter corner ball valve	G2110S	1 1/4 X (10,0)	618810	1,076.00	1.076
702011	gas valve with gas flow monitor	2649S gas flow monitor 1x(2,5)x0 1 9	gas flow monitor	2649S	1 X (2,5) X 1 1/4	618827	250.5	0.2505
715501	gas ball valve	G2101 gas ball valve 1/2 0 1 9	gas ball valve	G2101	1/2	525934	310	0.31
715551	gas ball valve	G2101 gas ball valve 2 0 1 9	gas ball valve	G2101	2	532574	2,920.00	2.92
715601	gas ball valve	G2101T gas ball valve TAE 1/2 0 1 9	gas ball valve TAE	G2101T	1/2	526870	390	0.39
715651	gas ball valve	G2101T gas ball valveTAE 2 0 1 9	gas ball valve TAE	G2101T	2	527730	4,687.00	4.687
715801	Double-pipe gas meter	G2110 gas meter corner ball valve 3/4 0 1 9	gas meter corner ball valve	G2110	3/4	525125	415	0.415
715841	Double-pipe gas meter	G2110 gas meter corner ball valve 2 0 1 9	gas meter corner ball valve	G2110	2	531492	2,188.00	2.188
715851	Double-pipe gas meter	G2110T gas meter corner ball valve TAE 3/4 0 1 9	gas meter corner ball valve TAE	G2110T	3/4	526825	413	0.413
715871	Double-pipe gas meter	G2110T gas meter corner ball valve TAE 11/4 0 1 9	gas meter corner ball valve TAE	G2110T	1 1/4	526849	1,118.00	1.118
715901	Shut-off valve for single-pipe gas meters	G21111 gas meter corner ball valve 1 0 1 9	gas meter corner ball valve	G21111	1	525088	1,204.00	1.204
715911	Shut-off valve for single-pipe gas meters	G21111Tgas meter corner ball valve TAE 1 0 1 9	gas meter corner ball valve TAE	G21111T	1	526801	1,319.00	1.319
715931	Shut-off valve for single-pipe gas meters	G21112 gas meter corner ball valve 1 0 1 9	gas meter corner ball valve	G21112	1	526283	1,180.00	1.18
715941	Shut-off valve for single-pipe gas meters	G21112Tgas meter corner ball valve TAE 1 0 1 9	gas meter corner ball valve TAE	G21112T	1	526818	1,266.00	1.266
715961	Shut-off valve for single-pipe gas meters	G21115 gas meter corner ball valve 11/2 0 1 9	gas meter corner ball valve	G21115	1 1/2	527204	2,730.00	2.73
717091	Shut-off valve for single-pipe gas meters	G21121 gas meter ball valve 1 0 1 9	gas meter ball valve	G21121	1	527983	2,746.00	2.746
717221	Shut-off valve for single-pipe gas meters	G21121Tgas meter ball valve TAE 1 0 1 9	gas meter ball valve TAE	G21121T	1	527976	2,780.00	2.78
717251	Double-pipe gas meter	G21131 Mounting unit 1 0 1 9	Mounting unit	G21131	1	528539	3,020.00	3.02
717291	Double-pipe gas meter	G21141 Mounting unit 1 0 1 9	Mounting unit	G21141	1	528560	2,455.00	2.455
717321	Double-pipe gas meter	G21141TMounting unit TAE 1 0 1 9	Mounting unit TAE	G21141T	1	528553	2,472.00	2.472
717657	gas socket	G2016T gas socket TAE 1/2 0 7 9	gas socket TAE	G2016T	1/2	526788	348.5	0.3485
717667	gas socket	G2019LTgas socket TAE 1/2 0 7 9	gas socket TAE	G2019LT	1/2	527389	448	0.448
717682	gas socket	G20201Tconcealed gas sockedeTAE 1/0 B 9	concealed gas socked TAE	G20201T	1/2 O. S.	528829	630	0.63
717801	gas ball valve	G21071Tgas appliance ball valve TAE 1/2 0 1 9	gas appliance ball valve TAE	G21071T	1/2	526108	418	0.418
717827	gas ball valve	G21071Tgas appliance ball valve TAE 1 0 7 9	gas appliance ball valve TAE	G21071T	1	526153	898	0.898

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
717867	gas ball valve	G2109T gas appliance ball valve TAE 1/2 0 7 9	gas appliance ball valve TAE	G2109T	1/2	526177	380	0.38
718404	gas valve various	G2206T thermal shut-off system valve 1/2 7 H 9	thermal shut-off system valve	G2206T	1/2	526528	102	0.102
718861	gas valve various	G23241 gas meter connection panel 1 7 S 9	gas meter connection panel	G23241	1	531881	947.5	0.9475
718874	gas valve various	G23242 gas meter connection panel 1 7 H 9	gas meter connection panel	G23242	1	532024	938	0.938
718961	gas valve various	G23252 gas meter connection panel 1 7 S 9	gas meter connection panel	G23252	1	531324	1,432.00	1.432
719501	gas valve various	G2360 overflow cap 2 0 1 9	overflow cap	G2360	2	526481	278	0.278
719524	gas valve various	G23601 overflow cap 23/4 S 4 9	overflow cap	G23601	2 3/4	532222	518	0.518
719531	gas valve various	G23603 seal 2 S D 9	seal	G23603	2	532086	3	0.003
719551	gas valve various	G2361 closing cap 2 0 1 9	closing cap	G2361	2	526498	310.5	0.3105
719564	gas valve various	G23611 closing cap 23/4 S 4 9	closing cap	G23611	2 3/4	532239	537	0.537
721771	gas valve various	G2919 screw fitting 1x13/8 0 1 9	screw fitting	G2919	1 X 1 3/8	526412	237	0.237
721821	gas valve various	G2920 screw fitting 1x13/8 0 1 9	screw fitting	G2920	1 X 1 3/8	526474	310	0.31
721961	gas valve various	G2925 elbow 1 0 1 9	elbow	G2925	1	532420	408	0.408
722174	gas valve various	G2940 screw 1/8 7 H 9	screw	G2940	1/8	532406	12.8	0.0128
727211	Shut-off valve for single-pipe gas meters	G21113 gas meter corner ball valve 1 0 1 9	gas meter corner ball valve	G21113	1	529925	945	0.945
727221	Shut-off valve for single-pipe gas meters	G21122 gas meter ball valve 13/8 0 1 9	gas meter ball valve	G21122	1 3/8	530051	2,257.00	2.257
727231	Shut-off valve for single-pipe gas meters	G21122Tgas meter ball valve 13/8 0 1 9	gas meter ball valve	G21122T	1 3/8	530068	2,283.00	2.283
727554	Double-pipe gas meter	G23431 Mounting unit 1 7 S 9	Mounting unit	G23431	1	535308	2,683.00	2.683
727564	Double-pipe gas meter	G23431TMounting unit 1 7 S 9	Mounting unit	G23431T	1	535315	2,715.00	2.715
739150	flushing station	224110 flushing station 340x525x80 S Z 9	flushing station	224110	340 X 525 X 80	762216	6,265.00	6.265
739160	flushing station	224120 flushing station 340x525x80 S Z 9	flushing station	224120	340 X 525 X 80	762223	6,980.00	6.98
740970	PureFlow Crimp Ventil	V503631valve 1/2bulk 5 399	valve	V503631	1/2 BULK	430133	9.72	0.0097
741013	PureFlow Crimp Ventil	V54056 valve 3/4x3/4bulk 5 399	valve	V54056	3/4 X 3/4 BULK	439440	36.281	0.0363
765400	PureFlow Press Ventil	28880ZLvalve 1/2WallHydrant 0 199	valve	28880ZL	1/2 WALL HYDRANT	971209	554.289	0.5543
768331	PureFlow Press Ventil	2870ZL ball valve 1 NB1 9	ball valve	2870ZL	1	982007	229	0.229
768361	PureFlow Press Ventil	2870ZLball valve 2 NB1 9	ball valve	2870ZL	2	982038	959	0.959
769671	flushing station	224310 flushing station PWH/PWC 7 H 9	flushing station	224310	PWH/PWC	735180	7,938.00	7.938
785061	Shut-off valve for single-pipe gas meters	G21113Tgas meter corner ball valve TAE 1 0 1 9	gas meter corner ball valve TAE	G21113T	1	536428	1,108.00	1.108
871073	Megapress valve	29817 valve 1/2 0 1 9	valve	29817	1/2	873053	780	0.78
871263	Megapress valve	29817 valve 2 R 1 9	valve	29817	2	873305	4,243.00	4.243

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
871273	Megapress valve	48817 valve 1/2 0 1 9	valve	48817	1/2	873350	900	0.9
871323	Megapress valve	48817 valve 2 R 1 9	valve	48817	2	873602	4,730.00	4.73
880553	Ball and shut-off valve INOX	29753ZLball valve with SC 1/2 N 1 9	ball valve with SC	29753ZL	1/2	878454	0	0
880643	Ball and shut-off valve INOX	28821ZLball valve with SC 2 N 1 9	ball valve with SC	28821ZL	2	878805	0	0

Valves (US)

Material	System	Material short text	Designation	Model no.	Dimensions	Item no.	Mass in g	Mass in kg
636383	PureFlow Crimp valve	V5236 valve 3/4x3/4 5 399	valve	V5236	3/4 X 3/4	430409	36.32	0.03632
653070	PureFlow Crimp valve	V503631valve 1/2 5 399	valve	V503631	1/2	430034	44.111	0.044111
653075	PureFlow Crimp valve	V503630valve 3/8 5 399	valve	V503630	3/8	430232	40.824	0.040824
653781	PureFlow Crimp valve	V54028 valve 1/2x1/2-bulk 5 399	valve	V54028	1/2X1/2 - BULK	439334	29.016	0.029016
656712	PureFlow Crimp valve	V5026ZL ball valve 3/8x1/4 0 7 9	ball valve	V5026ZL	3/8 X 1/4	460017	145.149	0.145149
656714	PureFlow Crimp valve	V5064ZLvalve 3/8x1/4 0 7 9	valve	V5064ZL	3/8 X 1/4	460024	142.882	0.142882
658767	PureFlow Crimp valve	28424ZLvalve 1/2x1/4 0 7 9	valve	28424ZL	1/2 X 1/4	935119	126.098	0.126098
658769	PureFlow Crimp valve	28423ZLvalve 1/2x1/4 0 7 9	valve	28423ZL	1/2 X 1/4	940311	124.511	0.124511
658772	PureFlow Crimp valve	28421ZLvalve 1/2x1/2 0 1 9	valve	28421ZL	1/2 X 1/2	950020	130.635	0.130635
658773	PureFlow Crimp valve	28422ZLvalve 3/4x3/4 0 1 9	valve	28422ZL	3/4 X 3/4	945415	178.261	0.178261
740970	PureFlow Crimp valve	V503631valve 1/2bulk 5 399	valve	V503631	1/2 BULK	430133	9.72	0.00972
741013	PureFlow Crimp valve	V54056 valve 3/4x3/4bulk 5 399	valve	V54056	3/4 X 3/4 BULK	439440	36.281	0.036281
765400	PureFlow Crimp valve	28880ZLvalve 1/2WallHydrant 0 199	valve	28880ZL	1/2 WALL HYDRANT	971209	554.289	0.554289

Imprint



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Notes

This EPD is mainly based on the work and findings of the Institut für Fenstertechnik e.V., Rosenheim (ift Rosenheim) and specifically on the ift-Richtlinie NA-01/4 Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen. (ift-Guideline NA-01/4 - Guidance on preparing Type III Environmental Product Declarations)
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