Environmental Product Declaration

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

Manual valves with low lead content

from

Cimberio S.p.A.

EPD of multiple products, based on the average results of families. Series covered by this EPD: Ball valves and Check valves with lead content <0,1% (for the full list see Annex B)

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
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An EPD may be updated or depublished if conditions change. Images in the cover page are representative for all products. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

GENERAL INFORMATION

Programme Information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
PCR 2019:14 Construction products, version 2.0.1
PCR review was conducted by: Claudia Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat https://www.environdec.com/contact-us.
Life Cycle Assessment (LCA)
LCA accountability: Bureau Veritas Nexta S.r.l. www.nexta.bureauveritas.it

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: Ing. Vito D'Incognito Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

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

INFORMATION ABOUT EPD OWNER

Owner of the EPD: Cimberio S.p.A. - VAT nr: IT 00122640030
Address: Via Torchio, 57- C.P. 106 - 28017 San Maurizio d'Opaglio (NO) - Italy
Contact: +39 0322 923001 - info@cimberio.it
Contact Person: Tiziano Guidetti, tguidetti@cimberio.it

Description of the organisation: Cimberio S.p.A. is an Italian company specializing in the design and production of valves and components for plumbing, heating, air conditioning, and industrial systems. Founded in 1957 and headquartered in San Maurizio d'Opaglio, Italy. The company offers a wide range of products, including ball valves, check valves, balancing valves, and thermostatic valves, serving both residential and commercial markets. With a strong international presence, Cimberio S.p.A. combines advanced manufacturing techniques with strict quality control to meet the highest standards of performance and reliability.

Product-related or management system-related certifications: ISO 9001, ISO 14001, ISO 45001, ISO 50001, PAS 99, SA 8000

PRODUCT INFORMATION

Product name: ball valves, check valves, with lead content < 0,10%, according to the REACH Regulation

Product identification: Metal valves only non-motorized, produced with low lead content

UN CPC code: The product group classification for the assessed product is UN CPC 415


Product description: Cimberio S.p.A. manufactures a comprehensive range of non-motorized brass valves designed for hydraulic, heating, and industrial applications. These manually operated valves are built from high-quality brass to ensure reliability, long lasting and resistance to corrosion. Among the key products are ball valves, check valves, and balancing valves, all engineered for straightforward and safe manual operation. Cimberio's brass valves stand out for their precise construction and compliance with performance standards. They are widely used in both residential and industrial systems—for potable water distribution as well as thermal fluid control—and are valued for their versatility and ease of installation.

Name and location of production site(s): Cimberio S.p.A. Via Torchio, 57- C.P. 106 - 28017, San Maurizio d'Opaglio (NO) and Pogno (NO), Via Verdi 13, 28096 – Italy. The two sites operate as a single continuous flow.

References to any relevant websites for more information or explanatory materials:
https://www.cimberio.com/

CONTENT DECLARATION

The declared unit is defined as 1 kg of average valves with low lead content. The results presented in this EPD represent the average environmental impacts of the family of general valves with low lead content. Each valve was individually modelled, and the final results were obtained by averaging the impacts of all valves included in the study. For the modelling of each valve, Bill of Materials (BoM) data were used as the primary source for raw materials, raw material transport, and part of the outsourced processing. This approach ensured that inputs and outputs were attributed according to the specific material composition of each product, allowing for a precise and transparent allocation of environmental loads throughout the life cycle.
To assess the robustness and representativeness of the averaged values, a sensitivity analysis was performed by identifying, for the main impact categories, the minimum and maximum results obtained among all valves and calculating the percentage difference between them.
Overall, the sensitivity analysis confirms that the average model provides a balanced and realistic representation of the valve product family, effectively capturing the variability in material composition and manufacturing configurations while maintaining methodological consistency across all assessed life cycle stages.

For other life cycle aspects—such as energy consumption, product and transport packaging, waste management, transport of the finished product, and the remaining share of outsourced processing—a physical repartition strategy was applied. These inputs were distributed based on measurable parameters, specifically the mass of total production (manual and motorized valves, in kg), ensuring methodological consistency across all modules (A1–A5, C1–C4, and D). After calculating the environmental impact of each valve, the results were normalized to 1 kg of valve, ensuring comparability among different models. The average impact was then calculated by aggregating the results of all valves included in the study.
For each material, the total quantity used in all valves was calculated and expressed as a proportion of the overall weight of the sampled valves. In this approach, each BoM contributes to the average according to both the valve's total weight and the relative amount of each material it contains. This method ensures that the resulting composition represents a "average valve", reflecting the diversity of material mixes and the varying masses of the valve types considered, see annex A.

The declared post consumer material, weights and biogenic materials have shown below per declared unit, computed as arithmetical among all considered BoM:

Product components	Post Consumer material, weight %	Weights kg	Weights %	Biogenic material, weight kg C/kg declared unit
CZ-NL CW511L	0%	2,90E-01	29,02%	0
CW617N-DW	0%	3,94E-02	3,94%	0
CW511L-DW	0%	4,64E-01	46,39%	0
CW510L	0%	3,30E-02	3,30%	0
CC770S Low lead	0%	6,93E-02	6,93%	0
Plastic	0%	1,32E-02	1,32%	0
Steel	0%	9,06E-02	9,06%	0
Other materials	0%	2,68E-04	0,03%	0
TOTAL	**0%**	**1,00**	**100%**	**0**

The average content declaration was determined through a weighted average across different bills of materials (BoMs) of low lead valves. For each material, the total quantity used in all valves was calculated and expressed as a proportion of the overall weight of the sampled valves. Only those valves are now produced with low lead content. In this approach, each BoM contributes to the average according to both the valve's total weight and the relative

amount of each material it contains. This method ensures that the resulting composition represents a “average valve”, accurately reflecting the diversity of material mixes and the varying masses of the valve types considered.

The mass and the content of distribution and/or consumer packaging:

Packaging	Mass, kg	Weights %	Biogenic material, kg C/product or declared unit
Paperboard	4,64E-02	77,7%	1,80E-02
Wood	9,99E-03	16,7%	4,70E-03
Plastic	3,30E-03	5,5%	0
TOTAL	**6,00E-02**	**100%**	**2,27E-02**

Hazardous substances from the candidate list of SVHC	EC No.	CAS No.	Mass-% per product or declared unit
Lead	1907/2006	7439-92-1	< 0,10% (in brass alloys)

LCA INFORMATION

Declared unit: 1 kg of average valves with low lead content

Reference service life: 10 years

Time representativeness: 2023

Geographical scope: Global*

*for further information see Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation

Database(s) and LCA software used: Ecoinvent v. 3.11 and software used is SimaPro 10.2.0.2

Declaration of data sources, reference years, and share of primary data:

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Raw material valve	Database	Ecoinvent 3.11	2023	Secondary data	20,9%
Raw material packaging	Database	Ecoinvent 3.11	2023	Primary data	0,8%
Transport raw material	Database	Ecoinvent 3.11	2023	Primary data	0,5%
Transport packaging	Database	Ecoinvent 3.11	2023	Primary data	3,4%
Transports Subcontractors	Database	Ecoinvent 3.11	2023	Primary data	0,1%
Energy (Phv, Gas, W)	Database	Ecoinvent 3.11	2023	Primary data	1,2%
Electricity	Database	Ecoinvent 3.11	2023	Primary data	4,2%
Metal Working	Database	Ecoinvent 3.11	2023	Secondary data	>0,1%
Transport waste	Database	Ecoinvent 3.11	2023	Primary data	>0,1%
Waste treatment	Database	Ecoinvent 3.11	2023	Primary data	>0,1%
Total share of primary data					**31%**

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

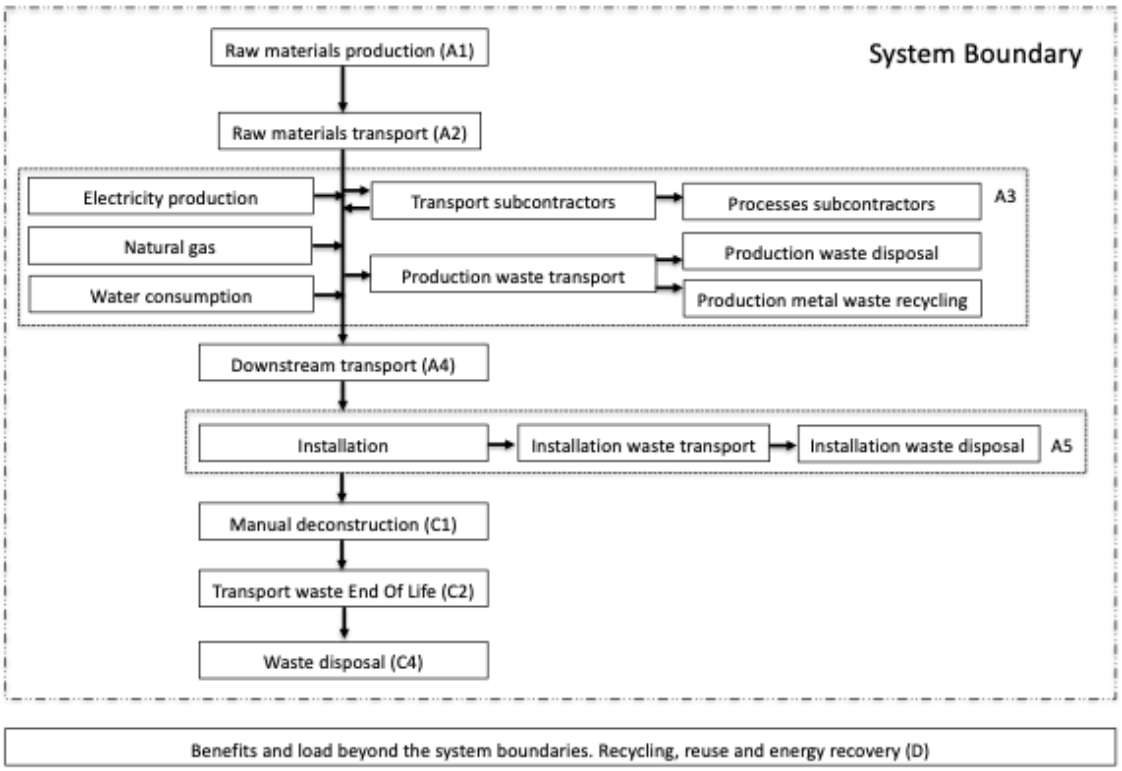
Summary of data quality:

The quality of the data used for this EPD, in terms of time, geography and technology representativeness according to EN 15804:2012+A2:2019, Annex E, E2, is considered fair. Primary data refer to 2023, with data collection carried out at the beginning of 2024. For some processes, generic and proxy data from Ecoinvent 3.11 were used to ensure methodological consistency. Proxy data refer to modified or combined datasets adjusted to better represent specific materials and manufacturing conditions.

Description of system boundaries:

The LCA study, applying a cradle-to-gate with option methodology (A1-A3, A4, A5, C1-C4 and D), type b). B modules are excluded from the analyses since no use phase maintenance, repair or replacement and energy consumption is expected during the technical lifetime.

Process flow diagram:



More information:

Product stage (A1-A3)

- A1 – Raw Material Supply: Extraction and processing of raw materials used in the production phase, including electricity and natural gas production.
- A2 – Transport of Raw Materials: Transportation of raw materials and semi-finished products from suppliers to the manufacturing site. Includes all transport-related inputs such as fuel consumption and emissions.
- A3 – Manufacturing: All processes at the production site, including water and natural gas combustion, auxiliary material consumption, packaging production, outsourced processing, emissions to air, water and soil, as well as waste generation during manufacturing. In the manufacturing processes metal scraps are produced, which are sent to recycling process.

Construction process stage (A4-A5)

- A4 – Transport: Transportation of final products from the production site to the resellers.
- A5 – Construction/installation: It includes all environmental impacts associated with the installation of the product to the construction site, site preparation, and installation activities such as energy use, auxiliary materials, and waste generation during construction.

End-of-life Stage (C1-C4)

- C1 – Deconstruction and Demolition: Activities involved in dismantling or demolition of the product at the end of its life, including energy use and emissions associated with these operations.
- C2 – Transport at End-of-Life: Transportation of the discarded product or its components to waste processing or disposal facilities.

- C3 – Waste Processing: Pre-treatment or processing of waste materials (e.g., sorting, shredding, or other treatments) prior to final disposal or recycling.
- C4 – Disposal: Final disposal of materials that are not recycled or recovered, including landfilling or incineration, with associated emissions and environmental impacts.

Resource recovery stage beyond the system boundaries (D)

- D – Benefits and Loads Beyond the System Boundary: Potential environmental benefits or burdens related to reuse, recovery, or recycling of materials and energy at the end of life, which occur outside the boundaries of the product system (e.g., substitution of primary materials or energy in other systems).

More information:

Resource repartition procedures were consistently applied across all modules (A1–A5, C1–C4, and D). The allocation of product and transport packaging, transport of the final product, waste management, energy consumption, and a portion of outsourced processing was carried out following a physical allocation strategy, based on measurable parameters such as mass. Every input was divided by total production (manual and motorized, kg). Methodologically, recycled materials within the product system are modelled using a cut-off repartition approach, whereby environmental burdens from previous life cycles are excluded. Only the impacts associated with collection, transport, and reprocessing of the recycled materials are considered, meaning that recycled inputs are treated as burden-free.

Electricity source:

The electricity residual mix of Italy, *Electricity, medium voltage {IT}| electricity, medium voltage, residual mix | Cut-off, U,* from Ecoinvent, is calculated based on the domestic residual mix. The domestic residual mix represents the sum of all domestic electricity production considering imports and exports outside the calculation area and issued and expired attributes. Since the residual mix of Italy is not present in the database, the characterization factor has been created. There is also a photovoltaic system on site.

Greenhous gas emission from the use of electricity in the manufacturing phase		
Name	**Amount**	**Unit**
Electricity imported from grid emission	0,680	$kgCO_2$-eqv/kWh
Electricity self-consumed emission	0,072	$kgCO_2$-eqv/kWh

For raw materials, transport of raw materials, and another portion of outsourced processing, the Bill of Materials (BoM) approach was adopted, ensuring that inputs and outputs were attributed according to the specific material composition of the product system. This method allows for a precise and transparent distribution of environmental loads across the product life cycle.

The BoM refers to the average quantity of each material used to produce the average kg of valves obtained in relation to production. For every material it has been possible to have just net weight. In the production phase, just metals have a significant amount of waste. So, it was possible to calculate for BoM metal raw material the raw weight by attributing an increase based on metal waste and considering the new quantity as the input.

For packaging, waste. energy, water and a part of subcontractor working it was not possible to attribute directly a material and the quantity was allocated. Following tables show the quantity of each product for declared unit.

For module A2, the impact of transport was calculated starting from the most upstream point. The distances between the site and the suppliers' locations, expressed in kilometers, were multiplied by the quantity transported, expressed in tons, to obtain a result expressed in tkm, consistent with the available characterization factors. The company, for the same product, often has different suppliers, from whom it purchases different quantities. To determine the

kilometres travelled, each distance was compared to the quantity purchased by that supplier, thus obtaining a weighted average distance.

For module A4 the downstream national transport, the distance has been calculated using the postcode of the final Italian destination. For international shipping instead, the distance has been calculated considering the city of the final destination. It has been reproportioned the weight of each transport with the sum of total production and the raw weight of packaging.

For module A5, transport and waste disposal was considered. About the transport of packaging waste, an estimated 80 km. Since the installation is manual, a zero impact was considered.

For the disposal of packaging, these have been grouped into four categories:

1. Waste paperboard;
2. Waste boxboard;
3. Waste plastic;
4. Waste wood.

Most of products have been distributed in Europe (more than 80% of total distribution), so it plausible representative the EoL in Europe.

At the end of their service life, valves are manually removed from the system and undergo a structured end-of-life process. This begins with the deconstruction phase, through the use of diesel building machine (C1: 100%), followed by the transportation of all valves to the appropriate dismantling and treatment locations (C2). All valves dismantled have been sent to the sanitary landfill (C4: 100%). Some materials, instead, are sent for incineration with energy recovery (waste from packaging sent to incineration as disposal, Module A5).

In the alternative scenario Post-dismantling, the materials are divided between waste treatment (C3) and landfill (C4). Specifically, 95% (Metals for a Climate Neutral Europe - A 2050 Blueprint - Full report, p. 32 https://eurometaux.eu/metals-blue-print-2050/) of metal products are sent to waste treatment for recycling (C3), while the remaining 5% of metal and the rest of materials are transported directly to landfill (C4).

Module C includes all processes that occur at the end of the product's useful life. It is divided into four subsections:

- C1 (Decommissioning/Demolition): covers the operations necessary for the removal or demolition of the product at the end of its useful life. In this study, the deconstruction has been assumed by diesel building machine, with the combustion of diesel which generates 1,1 kWh/tonnes of energy. After the conversion, it requires 0,00396MJ/kg of valves.
- C2 (Transportation): includes transportation of the decommissioned product to treatment, disposal or recovery facilities. In this case, a transport of 80 km was estimated.
- C4 (Disposal): represents final disposal in landfills or by incineration, including related environmental impacts for each material. In the present studies, disposal was by landfill.

In module D a substitution logic is applied ("avoided burden" approach), where benefits are calculated on the basis of the amount of recycled materials or recovered energy, assuming that they can replace virgin resources. It has been used data Eurostat to compute weight of recycled packaging.

Exclusion: The LCA study, applying a cradle-to-gate with option methodology (A1-A3, A4, A5, C1-C4 and D), type b). For this reason, as defined by the UNI EN 15804 standard point 6.3.5.3 and 6.3.5.4, maintenance, repair, replacement, refurbishment stages, operational energy and water used (which fall under module B) are not considered within the calculations. B modules are excluded from the analyses since no use phase maintenance, repair or replacement and energy consumption is expected during the technical life time. Infrastructure emissions are also excluded.

Cut-off rules: The cut-off criteria for excluding input and output streams in Life Cycle Assessment (LCA) aim to simplify the calculation process without concealing data. Any exclusion must be documented. The rules are:

- Inclusion Priority: All data available for a unit process must be included. Missing primary data can be substituted with conservative assumptions using average or generic data, which must be documented.
- Quantitative Limits: For processes lacking sufficient data, exclusions are allowed up to 1% of total primary energy consumption per process. Total omitted flows in any module (e.g., A1–A3, B1–B5, D, etc.) must not exceed 5% of total energy and mass.
- Environmental Relevance: Streams with potential environmental impact (to air, water, or soil) must be included. Conservative assumptions supported by technical judgment may be used to meet this requirement.

Activities that are not directly linked to the physical life cycle of the product have been excluded. These comprise, for instance, business travel of personnel, commuting to and from the workplace, as well as research and development activities. Also, tools for mechanical processing and maintenance, such as oils and lubricants have been excluded from the system. These processes, although relevant to the broader organizational context, do not contribute significantly to the specific environmental profile of the product and are thus considered negligible in the scope of this study.

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

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU	EU	IT	GLO	GLO	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Share of primary data	31%*					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-16%;+11% GWP-GHG					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0					-	-	-	-	-	-	-	-	-	-	-	-

* The share of primary data is linked to the modified alloy datasets in the database.

Recycled input material is the recycled copper inside each alloy (reference: *International Copper Association: Copper recycling*).
Emissions from recycled materials are less than 10% to the GWP-GHG result.

ENVIRONMENTAL PERFORMANCE

LCA results of the product - main environmental performance results

Mandatory impact category indicators according to EN 15804

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	1,06E+01	1,33E+00	1,03E-02	3,99E-04	1,89E-02	0,00E+00	4,79E-01	-4,55E-03
GWP-fossil	kg CO_2 eq.	1,05E+01	1,32E+00	6,01E-03	3,99E-04	1,89E-02	0,00E+00	1,19E-01	-6,70E-03
GWP-biogenic	kg CO_2 eq.	1,13E-01	3,76E-04	4,33E-03	8,07E-08	3,81E-06	0,00E+00	3,60E-01	2,17E-03
GWP-luluc	kg CO_2 eq.	1,57E-02	5,76E-04	1,35E-06	4,08E-08	5,89E-06	0,00E+00	1,12E-05	-1,77E-05
ODP	kg CFC 11 eq.	2,84E-05	1,94E-08	6,27E-11	5,92E-12	4,14E-10	0,00E+00	5,42E-10	-2,14E-10
AP	mol H^+ eq.	4,32E-01	1,64E-02	1,73E-05	3,56E-06	3,83E-05	0,00E+00	2,39E-04	-2,83E-05
EP-freshwater	kg P eq.	3,26E-03	1,38E-05	7,31E-08	1,39E-09	1,37E-07	0,00E+00	8,50E-06	-3,50E-07
EP-marine	kg N eq.	2,57E-02	3,46E-03	1,30E-05	1,66E-06	8,81E-06	0,00E+00	2,07E-03	-3,45E-06
EP-terrestrial	mol N eq.	3,58E-01	3,86E-02	6,77E-05	1,82E-05	9,77E-05	0,00E+00	7,33E-04	-4,13E-05
POCP	kg NMVOC eq.	9,99E-02	1,20E-02	2,60E-05	5,43E-06	6,13E-05	0,00E+00	3,20E-04	-2,33E-05
ADP-minerals&metals *	kg Sb eq.	3,07E-03	2,63E-06	1,59E-08	1,42E-10	6,44E-08	0,00E+00	3,97E-08	-5,09E-08
ADP-fossil*	MJ	1,24E+02	1,76E+01	4,81E-02	5,19E-03	2,66E-01	0,00E+00	3,64E-01	-1,72E-01
WDP*	m^3	6,01E+00	6,29E-02	3,82E-04	1,11E-05	9,44E-04	0,00E+00	-5,44E-04	-1,51E-03
Acronyms	**GWP-fossil** = Global Warming Potential fossil fuels; **GWP-biogenic** = Global Warming Potential biogenic; **GWP-luluc** = Global Warming Potential land use and land use change; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential, Accumulated Exceedance; **EP-freshwater** = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-marine** = Eutrophication potential, fraction of nutrients reaching marine end compartment; **EP-terrestrial** = Eutrophication potential, Accumulated Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADP-minerals&metals** = Abiotic depletion potential for non-fossil resources; **ADP-fossil** = Abiotic depletion for fossil resources potential; **WDP** = Water (user) deprivation potential, deprivation-weighted water consumption								

** Disclaimer:*
The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.
If the EPD covers the end-of-life stage: "The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3)" For services, "A1-A3" shall be replaced by "A1-A5

If results based on an old EF version is used to develop an EPD, the EPD shall include a statement that clarifies that an EPD based on an old EF version has been used as a data source, and that this was assessed to yield identical or conservative results compared to fully using the current EF version.
If biogenic carbon leaving the product system in module A5 (see Annex 2 of PCR) or recovered energy leaving the product system in modules A5 or C (see Annex 3 of PCR) have been balanced out already in modules A1-A3, a statement in this regard shall be included.

The variation in the products is strictly dependent on the composition of the finished material, as the type of alloy employed significantly influences the resulting impact values. Among the analyzed cases, the lowest GWP-GHG value corresponds to **DA09972128**, which is produced using **CW511L**. This particular alloy is characterized by the lowest impact resistance within the entire range of analyzed alloys. Overall, it can therefore be concluded that the level of impact is strongly and directly determined by the specific alloy selected for the manufacturing process, highlighting the critical role of material choice in defining product performance.

According to section 4.10.1 of PCR, the range of the content of the included products should be included in the content declaration.
Impact variation: the variations of the impact results have been analyzed and explained only for cases where the change exceeds 10%, as recommended in the PCR.

Impact category	Minimum variation %	Maximum variation %
Climate change	-13,30	9,60
Climate change - Fossil	-13,92	9,94
Ozone depletion	-99,53	57,91
Resource use, minerals and metals	-11,02	8,86

Differences between the declared results and the lowest and highest results (Mandatory parameters describing environmental impacts)											
Indicators	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP- total	-23%	-1%	-9%	-18%	0%	-26%	0%	0%	-	0%	0%
	16%	1%	-8%	9%	0%	-26%	0%	0%	-	0%	0%
GWP- fossil	-23%	-1%	-9%	-18%	0%	0%	0%	0%	-	0%	0%
	16%	1%	-8%	8%	0%	0%	0%	0%	-	0%	0%
GWP- biogenic	-22%	-1%	-4%	-15%	0%	0%	0%	0%	-	0%	0%
	28%	1%	-4%	15%	0%	0%	0%	0%	-	0%	0%
GWP- luluc	-6%	-1%	-1%	-5%	0%	0%	0%	0%	-	0%	0%
	8%	1%	0%	6%	0%	0%	0%	0%	-	0%	0%
ODP	-100%	-1%	-13%	-100%	0%	0%	0%	0%	-	0%	0%
	6%	1%	-2%	5%	0%	0%	0%	0%	-	0%	0%
ADP	-11%	-1%	0%	-10%	0%	0%	0%	0%	-	0%	0%
	8%	1%	0%	8%	0%	0%	0%	0%	-	0%	0%
EP- freshwater	-10%	-1%	-2%	-9%	0%	0%	0%	0%	-	0%	0%

	7%	1%	-2%	7%	0%	0%	0%	0%	-	0%	0%
EP-marine	-7%	-1%	-3%	-6%	0%	0%	0%	0%	-	0%	0%
	5%	1%	-2%	4%	0%	0%	0%	0%	-	0%	0%
EP- terrestrial	-8%	-1%	-3%	-8%	0%	0%	0%	0%	-	0%	0%
	6%	1%	-2%	5%	0%	0%	0%	0%	-	0%	0%
POCP	-7%	-1%	-4%	-7%	0%	0%	0%	0%	-	0%	0%
	5%	1%	-3%	4%	0%	0%	0%	0%	-	0%	0%
ADP - minerals & metals	-12%	-1%	0%	-11%	0%	0%	0%	0%	-	0%	0%
	10%	1%	0%	9%	0%	0%	0%	0%	-	0%	0%
ADP - fossil	-8%	-1%	-9%	-8%	0%	0%	0%	0%	-	0%	0%
	10%	1%	-9%	3%	0%	0%	0%	0%	-	0%	0%
WDP	-7%	-1%	-1%	-6%	0%	0%	0%	0%	-	0%	0%
	6%	1%	-1%	5%	0%	0%	0%	0%	-	0%	0%

Additional mandatory and voluntary impact category indicators

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP- GHG[1]	kg CO_2 eq	1,06E+01	1,33E+00	7,63E-03	3,99E-04	1,89E-02	0,00E+00	4,79E-01	-6,74E-03
Acronyms	**GWP-GHG[2]**: This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.								

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 ionizing radiation from the soil, from radon and from some construction 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 experienced with the indicator.

Resource use indicators

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2,46E+01	3,82E-01	5,77E-02	8,46E-05	4,71E-03	0,00E+00	2,14E-02	-2,35E-02
PERM	MJ	7,08E-01	0,00E+00	-5,61E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,95E-02
PERT	MJ	2,53E+01	3,82E-01	1,55E-03	8,46E-05	4,71E-03	0,00E+00	2,14E-02	-4,29E-02
PENRE	MJ	1,24E+02	1,76E+01	7,26E-02	1,44E-03	2,66E-01	0,00E+00	3,64E-01	-1,42E-01
PENRM	MJ	3,48E-01	0,00E+00	-2,45E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,97E-02

PENRT	MJ	1,25E+02	1,76E+01	4,81E-02	1,44E-03	2,66E-01	0,00E+00	3,64E-01	-1,72E-01
SM	kg	2,51E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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
FW	m^3	1,67E-01	2,19E-03	3,51E-06	3,66E-07	3,23E-05	0,00E+00	-3,02E-03	-7,14E-05
Acronyms	**PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; **PERM** = Use of renewable primary energy resources used as raw materials; **PERT** = Total use of renewable primary energy resources; **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM** = Use of non-renewable primary energy resources used as raw materials; **PENRT** = Total use of non-renewable primary energy re-sources; **SM** = Use of secondary material; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Use of net fresh water								

Waste indicators

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	5,41E-03	1,03E-04	3,28E-07	3,61E-08	1,80E-06	0,00E+00	2,28E-06	-1,65E-06
Non-hazardous waste disposed	kg	1,39E+00	4,02E-01	4,93E-03	3,50E-06	1,08E-02	0,00E+00	1,00E+00	-2,29E-04
Radioactive waste disposed	kg	2,80E-04	7,69E-06	3,58E-08	5,43E-10	9,61E-08	0,00E+00	6,70E-07	-6,07E-07

Output flow indicators

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	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
Material for recycling	kg	1,66E-01	0,00E+00	4,19E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	9,87E-05	0,00E+00	1,00E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	1,33E-03	0,00E+00	2,06E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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

Once the analysis activities of the main uses had been performed, a series of possible technological and management changes for emission abatement were considered, aimed at reducing the environmental impact of the life of the studied product. It was decided to evaluate how the product is treated in its end of life.
In the current scenario, 95% percent of metals is recycled and then other 5% with the rest of the waste is sent to landfill. As defined by the refraction PCR, since the main scenario involves a mix of different types of disposal. For waste processing, every component undergoing sorting and shredding process were considered. 95% of metals are recycled.

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	1,06E+01	1,33E+00	1,03E-02	3,99E-04	1,89E-02	2,56E-01	3,01E-02	-3,44E+00
GWP-fossil	kg CO_2 eq.	1,05E+01	1,32E+00	6,01E-03	3,99E-04	1,89E-02	2,55E-01	7,48E-03	-3,40E+00
GWP-biogenic	kg CO_2 eq.	1,13E-01	3,76E-04	4,33E-03	8,07E-08	3,81E-06	1,13E-03	2,26E-02	-3,57E-02
GWP-luluc	kg CO_2 eq.	1,57E-02	5,76E-04	1,35E-06	4,08E-08	5,89E-06	1,28E-04	7,01E-07	-8,58E-03
ODP	kg CFC 11 eq.	2,84E-05	1,94E-08	6,27E-11	5,92E-12	4,14E-10	2,46E-09	3,40E-11	-2,80E-08
AP	mol H^+ eq.	4,32E-01	1,64E-02	1,73E-05	3,56E-06	3,83E-05	8,95E-04	1,50E-05	-2,71E-01
EP-freshwater	kg P eq.	3,26E-03	1,38E-05	7,31E-08	1,39E-09	1,37E-07	5,35E-06	5,34E-07	-8,16E-04
EP-marine	kg N eq.	2,57E-02	3,46E-03	1,30E-05	1,66E-06	8,81E-06	1,03E-04	1,30E-04	-1,09E-02
EP-terrestrial	mol N eq.	3,58E-01	3,86E-02	6,77E-05	1,82E-05	9,77E-05	1,23E-03	4,60E-05	-1,53E-01
POCP	kg NMVOC eq.	9,99E-02	1,20E-02	2,60E-05	5,43E-06	6,13E-05	4,07E-04	2,01E-05	-4,73E-02
ADP-minerals&metals*	kg Sb eq.	3,07E-03	2,63E-06	1,59E-08	1,42E-10	6,44E-08	6,55E-06	2,50E-09	-4,05E-03
ADP-fossil*	MJ	1,24E+02	1,76E+01	4,81E-02	5,19E-03	2,66E-01	1,62E+00	2,29E-02	-4,44E+01
WDP*	m^3	6,01E+00	6,29E-02	3,82E-04	1,11E-05	9,44E-04	1,94E-02	-3,42E-05	-4,24E+00
Acronyms	**GWP-fossil** = Global Warming Potential fossil fuels; **GWP-biogenic** = Global Warming Potential biogenic; **GWP-luluc** = Global Warming Potential land use and land use change; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential, Accumulated Exceedance; **EP-freshwater** = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-marine** = Eutrophication potential, fraction of nutrients reaching marine end compartment; **EP-terrestrial** = Eutrophication potential, Accumulated Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADP-minerals&metals** = Abiotic depletion potential for non-fossil resources; **ADP-fossil** = Abiotic depletion for fossil resources potential; **WDP** = Water (user) deprivation potential, deprivation-weighted water consumption								

** Disclaimer:*
The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.
If the EPD covers the end-of-life stage: "The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3)" For services, "A1-A3" shall be replaced by "A1-A5

If results based on an old EF version is used to develop an EPD, the EPD shall include a statement that clarifies that an EPD based on an old EF version has been used as a data source, and that this was assessed to yield identical or conservative results compared to fully using the current EF version.
If biogenic carbon leaving the product system in module A5 (see Annex 2 of PCR) or recovered energy leaving the product system in modules A5 or C (see Annex 3 of PCR) have been balanced out already in modules A1-A3, a statement in this regard shall be included.

Results per declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP- GHG[1]	kg CO_2 eq	1,06E+01	1,33E+00	7,63E-03	3,99E-04	1,89E-02	2,56E-01	3,01E-02	-3,42E+00
Acronyms	**GWP-GHG[1]**: This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.								

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

Appendix A

List of valves that represents sizes of each family :

Family	Subfamily	Item	Size	Range Size	Weight gr	
Ball valves	-	17CRNL	1/2"	1/2"-3/4"-1"-1"1/4-1"1/2-2"	185	
		11CRNL	2"	1/4"-3/8"-1/2"-3/4"-1"-1"1/4-1"1/2-2"	2060	
Industrial valves	Check valves	233EA	3/4	3/4"	200	

Appendix B

List of all valve families for which this study is valid:

EPD Family (Low Lead Content)
Ball Valves
Industrial valves: Check valves

Please for further information see: https://www.cimberio.com/

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CPC	Central product classification
SVHC	Substances of Very High Concern

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VERSION HISTORY

New EPD

EPD
INTERNATIONAL EPD SYSTEM
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