ENVIRONMENTAL PRODUCT DECLARATION

Acvatix™ - Modulating control valves with magnetic actuators

MVF461H..

Type II according to ISO 14021 including life cycle impact assessment (LCIA)

SIEMENS

General information

This environmental product declaration (EPD) is based on the international standard ISO 14021 (“Environmental labels and declarations – Self declared environmental claims – Type II environmental labelling”). The data in this EPD has been evaluated on a full-scale life cycle assessment (LCA) study according to ISO 14040/44, taking into account the product category rules (PCR) for electronic and electrotechnical products and systems defined in EN 50693.

Siemens is dedicated to an environmentally conscious design of its products in line with IEC 62430 and has implemented an integrated management system according to ISO 9001, ISO 14001 and ISO 45001.

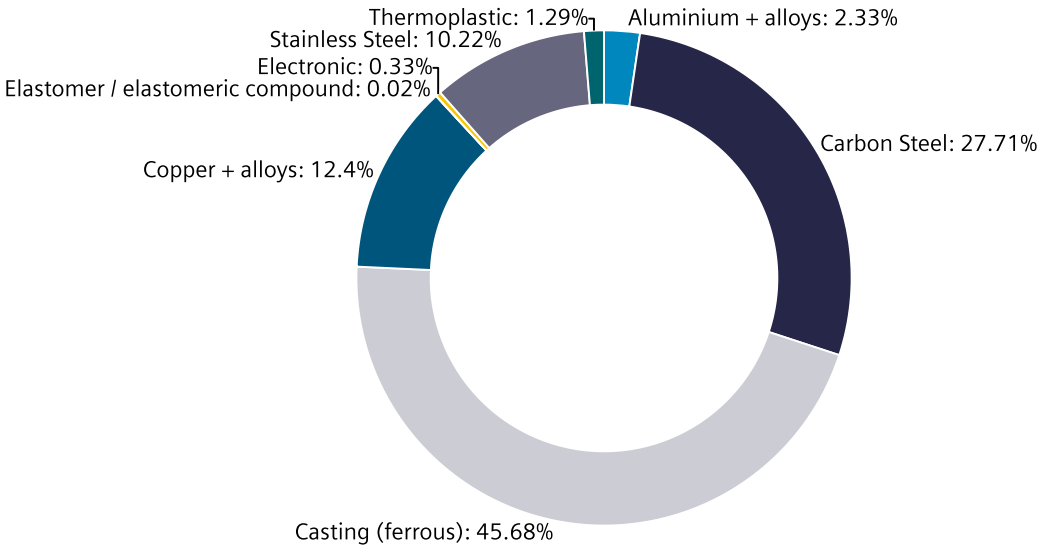
Products	**All products which can be found in the appendix.**
Represented by the reference product	BPZ:MVF461H50-30 (MVF461H50-30)
Product Description	Flanged valve with magnetic actuator for position control and position feedback, proportional control of district heating stations and heating plant using high-temperature hot water and steam. For closed circuits only.
Functional Unit	Positioning of HVAC applications with 0.62% runtime, over a reference lifetime of 10 years.[1]

[1] The lifetime value used for calculation is a reference value and does not equate with the minimum, average or real life time.

Material composition

The following chart outlines the overall material composition of the calculated reference product without packaging. Product weight of 25.47 kg adds up with packaging weight of 1.0 kg to a total weight of 26.47 kg. Packaging consists of: PE film, Corrugated box (average composition), EPS-Foam (15 kg/m3), Graphic paper.

Product Weight 25.47 kg



Substance assessment

At Siemens, we are committed to the development and production of environmentally sound and sustainably produced equipment. This includes avoiding hazardous substances in our products without compromising their benefits for our customers. Please visit the following website to learn more about how we comply with product-related environmental regulations like RoHS, REACH, WEEE and others: Product Related Environmental Protection

Life cycle stages and reference scenarios

Manufacturing

This stage covers the extraction of natural resources, production of raw materials, manufacturing, packaging, and transportation.

Distribution and Operation

This stage covers the product's distribution, installation, use, and maintenance. Different operating conditions can lead to deviations from the reference scenario.

End-of-Life

This stage covers the disassembly or shredding and material recycling of all recyclable materials, as well as energy recovery, thermal treatment and the disposal of all other materials.

Scenarios

Energy model used:
Slovenia (standard mix), Hong Kong (standard mix), China (standard mix), Germany (Thermal energy from natural gas), Italy (standard mix), France (standard mix), Germany (standard mix), Province of China Taiwan (standard mix), India (standard mix), United Kingdom (standard mix), Germany (Thermal energy from light fuel oil), Czechia (standard mix), Germany (renewable mix), Switzerland (standard mix), Germany (Thermal energy from biogas)

Transportation model:
EN 50693

Energy model used:
United States (standard mix);

Distribution scenario:
Truck (20-26 t) 1800 km, Container ship (large ship 200000 DWT 23000 TEU) 11300 km

Use Scenario:
Energy consumption in standby 0.84 W (39.75% at position 0%); 26 W (59.63% at position > 0%) and run 70 W
0.62% runtime
Reference lifetime 10 years

Energy model used:
Americas

End-of-Life methodology:
Avoided burden (net-scrap calculation)

Key environmental performance indicators

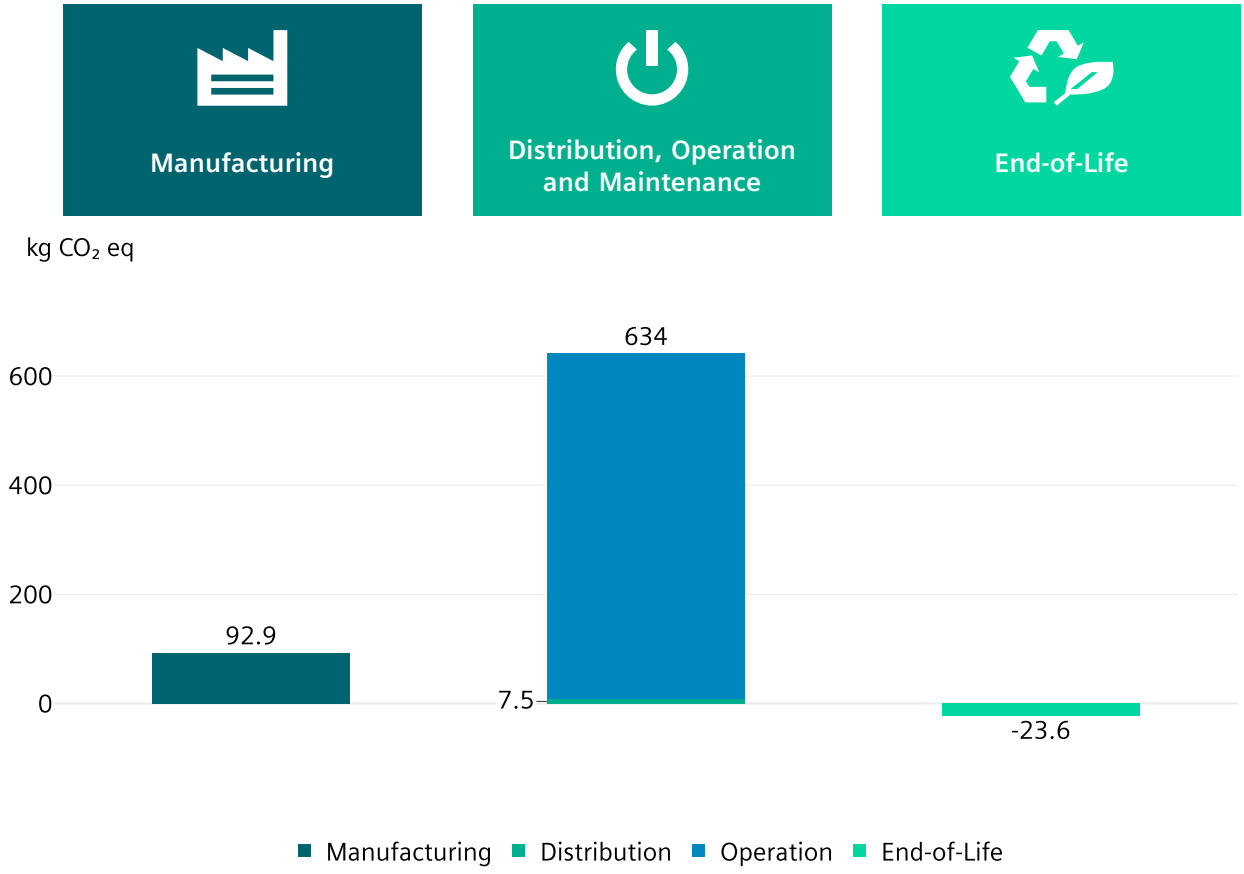
The following impact categories characterize the product's environmental footprint. They have been calculated with LCIA methodology EN15804+A2 (EF 3.1); LCA tool: Green Digital Twin Version 4.0, Database: One Siemens LCA Database (based on MLC CUP 2024.1).

Both primary and secondary data are used. To ensure the high quality and completeness of the LCA results, primary data have been used whenever possible. The main sources for primary data are the bill of materials and the bill of processes. Site specific data are provided by Siemens reporting system. Datasets for resources, such as electrical energy or natural gas, are chosen from the region where the device is produced and assembled. If primary data are not available, datasets reflecting state-of-the-art manufacturing technology are considered. Generic data originating from the LCA tool: Green Digital Twin Version 4.0, Database: One Siemens LCA Database (based on MLC CUP 2024.1).

Impact Category	Unit	Total	Manufacturing	Distribution	Operation	End of life
Climate change – total	kg CO_2 eq	7.11E+2	9.29E+1	7.53E+0	6.34E+2	-2.36E+1
Climate change – fossil	kg CO_2 eq	7.10E+2	9.20E+1	7.42E+0	6.34E+2	-2.36E+1
Climate change – biogenic	kg CO_2 eq	9.06E-1	7.52E-1	2.38E-2	1.24E-1	6.07E-3
Climate Change, land use and land use change	kg CO_2 eq	1.32E-1	1.62E-1	7.84E-2	5.93E-2	-1.68E-1
Ozone depletion	kg CFC-11 eq	2.15E-8	1.76E-8	8.65E-13	3.90E-9	-5.46E-11
Acidification	Mole of H+ eq	1.19E+0	5.18E-1	4.82E-2	8.60E-1	-2.32E-1
Eutrophication, freshwater	kg P eq	7.30E-4	4.00E-4	2.11E-5	3.82E-4	-7.38E-5
Eutrophication, marine	kg N eq	2.43E-1	6.36E-2	1.27E-2	1.94E-1	-2.75E-2
Eutrophication, terrestrial	Mole of N eq	2.77E+0	8.07E-1	1.41E-1	2.10E+0	-2.86E-1
Photochemical ozone formation, human health	kg NMVOC eq	7.45E-1	2.32E-1	3.57E-2	5.67E-1	-8.96E-2
Resource use, mineral and metals	kg Sb eq	-5.52E-3	1.60E-3	4.35E-7	6.58E-5	-7.19E-3
Resource use, fossils	MJ	1.17E+4	1.13E+3	7.65E+1	1.07E+4	-2.64E+2
Water use	m^3 world eq deprived water	1.55E+2	1.90E+1	1.97E-1	1.46E+2	-9.83E+0
Particulate matter	Disease incidences	1.09E-5	4.31E-6	8.09E-7	7.86E-6	-2.05E-6
Ionising radiation, human health	kBq U235 eq	9.72E+1	6.64E+0	2.02E-2	9.09E+1	-3.57E-1
Ecotoxicity, freshwater – total	CTUe	2.83E+3	4.83E+2	5.67E+1	2.36E+3	-6.41E+1
Human toxicity, cancer – total	CTUh	4.47E-6	4.39E-6	1.13E-9	8.75E-8	-8.95E-9
Human toxicity, non-cancer – total	CTUh	1.52E-6	5.03E-7	4.78E-8	1.44E-6	-4.70E-7
Land Use	dimensionless (pt)	1.73E+3	6.75E+2	3.03E+1	1.05E+3	-2.78E+1

Climate change

This chart shows the overall impact of the product on climate change – total. The operations phase is the life cycle phase with the biggest overall impact. Different operating conditions can lead to deviations from the reference scenario.



End-of-Life results

The end-of-life stage was modelled by shredding of the device, followed by sorting and material separation process.

It leads to:

- product recyclability of up to 90%
- energy recoverability of up to 3%
- minimum disposal rate of 7%

The exact final values depend on the used recycling process and add up to 100%.

Note: The device should not be disposed of as unsorted municipal waste. Special treatment for specific components may be mandated by law or recommended for environmental reasons. Observe all local and applicable laws.

Appendix

Scaling factors

The results of the LCA of the reference product can be extrapolated to other products of a homogeneous product family according to the standard EN50693. The scaling factors listed here are calculated according to this standard.

To extrapolate the impact from the reference product to another product from the range, multiply the following scaling factors to the impact category per life cycle stage from page 4:

Article Type	Manufacturing	Distribution	Operation	End-of-Life
M3P100FY	2.20	2.49	1.14	2.38
M3P100FYP	2.20	2.49	1.14	2.38
M3P80FY	1.68	1.90	0.78	1.83
M3P80FYP	1.68	1.90	0.78	1.83
MVF461H15-0.6	0.34	0.28	0.59	0.26
MVF461H15-1.5	0.34	0.28	0.59	0.26
MVF461H15-3	0.34	0.28	0.59	0.26
MVF461H20-5	0.37	0.30	0.59	0.29
MVF461H25-8	0.41	0.35	0.59	0.33
MVF461H32-12	0.60	0.56	0.78	0.55
MVF461H40-20	0.66	0.62	1.00	0.61
MVF461H50-30	**1.00**	**1.00**	**1.00**	**1.00**

Legal Disclaimer

This Environmental Product Declaration (EPD) is for information purposes only. It is based upon the standards mentioned above. This EPD does not warrant or guarantee the composition of a product or that the product will retain a particular composition for a particular period. Therefore, all warranties, representations, conditions, and all other terms of any kind whatsoever implied by statute or common law are – to the fullest extent permitted by applicable law – excluded.

Siemens therefore does not assume any liability for any error or for any consequence which may arise from the use of this information to the maximum extent under the law.

Please be aware that the data of this EPD cannot be compared with data calculated based upon product category rules (PCRs) other than the standards mentioned above. The values given are only valid within the context specified and cannot be used directly to draw up the environmental assessment of an installation.

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