



SIEMENS

ENVIRONMENTAL PRODUCT DECLARATION/  
PRODUCT ENVIRONMENTAL PROFILE

# Acvatix™ - Large Stroke Valves

VVF43.., VVF53.., VVF63.., VXF43..,  
VXF53.., VXF63.., Valves

Type III according to ISO 14025



|  |  |
|--|--|
| <b>Owner of the declaration:</b> Siemens Switzerland Ltd   | <b>Program holder and publisher:</b> PEP Ecopassport |
| <b>In compliance with:</b><br>ISO 14025; EN 50693:2019; PCR-4-ed4-EN-2021 09 06                    |  |
| <b>EPD Type:</b><br>Representative product with extrapolation rules for homogeneous product family | <b>EPD scope:</b><br>Cradle to Grave                 |

# General information

This environmental product declaration (EPD) is based on the international standard ISO 14025 (“Environmental labels and declarations — Type III environmental declarations”). 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 50693:2019 as well as PCR-4-ed4-EN-2021 09 06 Product Category Rules for Electrical, Electronic and HVAC-R Products.

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.

|                            |  |
|----------------------------|--|
| <b>Products</b>            | All products which can be found in the appendix.   |
| <b>Represented by</b>      | S55208-V126 (VVF53.40-25)  |
| <b>Product Description</b> | 2- and 3- port valves with flanged connections, PN 16, 25 and 40. For use in HVAC systems as a control valve or shutoff valves in closed or open hydraulic circuits. |
| <b>Functional Unit</b>     | Production of one 2-port or 3-port with flanged connections for a reference lifetime of 20 years.  |
| <b>Production Site</b>     | Rastatt, Germany   |

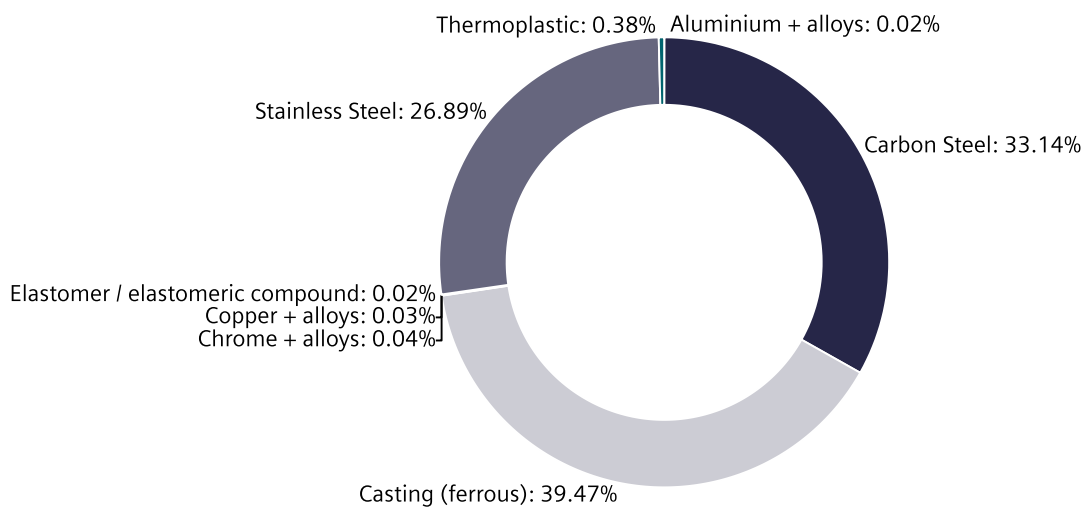
# Material composition

The product weight of 10.34 kg combined with the packaging weight of 0.99 kg results in a total weight of 11.33 kg. The following chart outlines the overall material composition of the reference product, excluding packaging.

Packaging consists of: PE film, Graphic paper, Wooden pallet (single use).

The product, including packaging, consists of 90.89% metal, 0.37% plastics, and 8.74% other materials.

Product Weight 10.34 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](#)

## System boundaries and scenarios

The PEP covers the cradle to grave of the product including the following stages.

| Manufacturing stage |           |            | Distribution | Installation | Use stage |             |        |             |               |                        |                       |                 | End-of-Life stage |                  |          |                                    | Benefits & loads beyond system boundary |
|---------------------|-----------|------------|--------------|--------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|-----------------|-------------------|------------------|----------|------------------------------------|---|
| Raw materials       | Transport | Production | Transport    | Assembly     | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-Installation | Transport         | Waste processing | Disposal | Reuse-Recovery-Recycling Potential |   |
| A1                  | A2        | A3         | A4           | A5           | B1        | B2          | B3     | B4          | B5            | B6                     | B7                    | C1              | C2                | C3               | C4       | D                                  |   |
| X                   | X         | X          | X            | X            | 0         | 0           | 0      | 0           | 0             | 0                      | 0                     | 0               | X                 | X                | X        | X                                  |   |

### Temporal and geographical scope and representativeness

Primary data of FY2024 for BOM and inbound transport and FY2024 for factory consumption and outbound transport; Secondary data: LCA tool: Green Digital Twin Version 4.0, Database: One Siemens LCA Database (based on MLC CUP 2024.1). The materials and components used in production are globally sourced and have been selected from Sphera data sets according to the global or regional representativeness.

### Data quality

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: LCA for Experts (GaBi) 10.8, Database: MLC ("Managed LCA Content" formerly known as GaBi) Professional & Extensions are used.

### Allocation

Waste treatment processes are allocated to the product system that generates the waste until the end-of waste state is reached. The environmental burdens of recycling and energy recovery processes are therefore allocated to the product system that generates the waste, while the product system that uses the exported energy and recycled materials receives it burden-free. Potential benefits and avoided loads from recovery and recycling processes are considered in separate Benefits & Loads beyond system boundary section.

**Cut-off** According to EN 50693:2019 and PCR–ed4-EN-2021 09 06, the cut-off criteria can be set to a maximum of 5% of the overall environmental impacts. In this LCA, metal manufacturing scrap EoL has been excluded as the total overall impacts are below 1%.

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## Scenarios:

The following information describes the scenarios in the different modules of the PEP.

|  |   |
|--|---|
| <b>Manufacturing</b>                           | This stage covers the extraction of natural resources, production of raw materials, manufacturing, packaging, and upstream transportation.  |
| <b>Transportation to production site</b>       | Primary data and EN 50693:2019  |
| <b>Production energy model used</b>            | A1: Global; A3: Germany (DE Electricity grid-mix standard)  |
| <b>Distribution</b>                            | This stage covers the product's distribution.   |
| <b>Distribution: Transport model use</b>       | Truck (20-26 t) 3500 km   |
| <b>Installation</b>                            | This stage covers the End-of-Life treatment of transport packaging.   |
| <b>Installation: Energy model used</b>         | Not relevant  |
| <b>Use</b>                                     | This stage covers the operational energy use. All other modules do not apply for this product. Different operating conditions can lead to deviations from the reference scenario. |
| <b>Use: Energy model used and use scenario</b> | Reference lifetime 20 years   |
| <b>EoL</b>                                     | This stage covers the disassembly, material recycling in addition to thermal treatment of all recoverable materials and the disposal of all other materials.                      |
| <b>EoL: Transport model use</b>                | Road Truck, 20 - 26t gross weight 1000.0 km   |
| <b>EoL: Energy model used</b>                  | C & D: Europe   |

# Life cycle assessment - results

The following impact categories characterize the product's environmental footprint. They have been calculated with characterization method EN15804+A2 (EF3.1); LCA tool: Green Digital Twin Version 4.0, Database: One Siemens LCA Database (based on MLC CUP 2024.1).

To ensure the high quality and completeness of the LCA results, Primary Data have been used whenever possible. 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.

## Environmental performance indicators

| Indicators       | Unit                                   | Total - (w/o D) | A1-A3         | A4           | A5           | C1-C4       | D                |
|------------------|--|-----------------|---------------|--------------|--------------|-------------|------------------|
|                  |  |                 | Manufacturing | Distribution | Installation | End of life | Benefits & loads |
| CC - total       | kg CO <sub>2</sub> eq                  | 1.11E+02        | 9.95E+01      | 3.94E+00     | 1.46E+00     | 5.99E+00    | -1.16E-05        |
| CC - fossil      | kg CO <sub>2</sub> eq                  | 1.10E+02        | 1.00E+02      | 3.87E+00     | 3.78E-02     | 5.94E+00    | -2.14E+01        |
| CC - biogenic    | kg CO <sub>2</sub> eq                  | 5.85E-01        | -8.80E-01     | 9.27E-03     | 1.42E+00     | 3.57E-02    | 1.47E-02         |
| CC - luluc       | kg CO <sub>2</sub> eq                  | 3.45E-01        | 2.57E-01      | 6.52E-02     | 2.87E-05     | 2.26E-02    | -3.66E-02        |
| ODP              | kg CFC-11 eq                           | 7.86E-09        | 7.78E-09      | 5.72E-13     | 1.82E-13     | 8.04E-11    | -8.63E-11        |
| AP               | Mole of H+ eq                          | 4.47E-01        | 4.25E-01      | 5.64E-03     | 3.56E-04     | 1.64E-02    | -8.57E-02        |
| EP - freshwater  | kg P eq                                | 3.76E-04        | 3.42E-04      | 1.66E-05     | 6.98E-07     | 1.71E-05    | -3.32E-05        |
| EP - marine      | kg N eq                                | 9.17E-02        | 8.55E-02      | 2.09E-03     | 1.32E-04     | 3.94E-03    | -1.59E-02        |
| EP - terrestrial | Mole of N eq                           | 1.06E+00        | 9.89E-01      | 2.48E-02     | 1.57E-03     | 4.37E-02    | -1.70E-01        |
| POCP             | kg NMVOC eq                            | 2.98E-01        | 2.79E-01      | 5.61E-03     | 3.83E-04     | 1.33E-02    | -5.04E-02        |
| ADP - M & M      | kg Sb eq                               | 1.12E-04        | 9.92E-05      | 3.38E-07     | 2.07E-09     | 1.20E-05    | -3.28E-04        |
| ADP - fossil     | MJ                                     | 1.30E+03        | 1.17E+03      | 5.11E+01     | 4.80E-01     | 7.68E+01    | -2.24E+02        |
| WDP              | m <sup>3</sup> world eq deprived water | 2.39E+01        | 2.34E+01      | 6.01E-02     | 1.58E-01     | 2.56E-01    | -3.50E+00        |
| PM               | Disease incidences                     | 9.28E-07        | 6.68E-07      | 5.55E-08     | 2.19E-09     | 2.02E-07    | -1.30E-06        |
| IRP              | kBq U235 eq                            | 5.25E+00        | 4.80E+00      | 1.35E-02     | 3.25E-03     | 4.35E-01    | -4.40E-01        |
| ETP - fw         | CTUe                                   | 6.14E+02        | 5.47E+02      | 3.80E+01     | 2.31E-01     | 2.89E+01    | -4.93E+01        |
| HTP - c          | CTUh                                   | 2.27E-08        | 1.64E-08      | 7.66E-10     | 1.34E-11     | 5.52E-09    | -8.41E-09        |
| HTP - nc         | CTUh                                   | 6.14E-07        | 4.43E-07      | 3.44E-08     | 5.99E-10     | 1.36E-07    | -2.93E-07        |
| SQP              | dimensionless (pt)                     | 6.51E+02        | 5.95E+02      | 2.51E+01     | 1.27E-01     | 3.03E+01    | -6.11E+01        |

**CC-total:** Climate change; **CC-fossil:** Climate change fossil; **CC-biogenic:** Climate change biogenic; **CC-LULUC:** Climate change 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 seawater end compartment; **EP-terrestrial:** Eutrophication potential, accumulated exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption; **PM:** Particulate matter emissions; **IRP:** Ionizing radiation, human health; **ETP-fw:** Ecotoxicity freshwater; **HTP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality

## Resource use indicators and biogenic carbon content

| Indicators     | Unit    | Total - (w/o D) | A1-A3         | A4           | A5           | C1-C4       | D                |
|----------------|---------|-----------------|---------------|--------------|--------------|-------------|------------------|
|                |         |                 | Manufacturing | Distribution | Installation | End of life | Benefits & loads |
| PERE           | MJ      | 4.41E+02        | 3.99E+02      | 4.40E+00     | 1.15E-01     | 3.77E+01    | -5.56E+01        |
| PERM           | MJ      | 0.00E+00        | 1.52E+01      | 0.00E+00     | -1.52E+01    | 0.00E+00    | 2.48E+00         |
| PERT           | MJ      | 4.41E+02        | 4.14E+02      | 4.40E+00     | -1.51E+01    | 3.77E+01    | -5.05E+01        |
| PENRE          | MJ      | 1.30E+03        | 1.17E+03      | 5.11E+01     | 4.80E-01     | 7.68E+01    | -2.32E+02        |
| PENRM          | MJ      | -3.50E-03       | 1.46E+00      | 0.00E+00     | -4.35E-02    | -1.42E+00   | 7.52E+00         |
| PENRT          | MJ      | 1.31E+03        | 1.18E+03      | 5.11E+01     | 4.36E-01     | 7.54E+01    | -2.32E+02        |
| SM             | kg      | 3.36E+00        | 3.36E+00      | 0.00E+00     | 0.00E+00     | 0.00E+00    | 0.00E+00         |
| RSF            | MJ      | 0.00E+00        | 0.00E+00      | 0.00E+00     | 0.00E+00     | 0.00E+00    | 0.00E+00         |
| NRSF           | MJ      | 0.00E+00        | 0.00E+00      | 0.00E+00     | 0.00E+00     | 0.00E+00    | 0.00E+00         |
| FW             | m3      | 8.73E-01        | 8.44E-01      | 4.91E-03     | 3.72E-03     | 1.99E-02    | -4.45E-01        |
| BIOGCPRODUCT   | kg of C | 0.00E+00        | 0.00E+00      | 0.00E+00     | 0.00E+00     | 0.00E+00    | 5.01E-09         |
| BIOGCPACKAGING | kg of C | 7.15E-01        | 7.15E-01      | 0.00E+00     | 0.00E+00     | 0.00E+00    | 3.89E-03         |

**PERE:** Use of renewable primary energy; **PERM:** Use of renewable primary energy resources used as raw material; **PERT:** Total use of renewable primary energy resources; **PENRE:** Use of non-renewable primary energy; **PENRM:** Use of non-renewable primary energy resources used as raw material; **PENRT:** Total use of non-renewable primary energy resources; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Use of net fresh water; **BIOGCPRODUCT:** Biogenic carbon content of the Product; **BIOGCPACKAGING:** Biogenic carbon content of the Packaging

## End-of-Life - Waste and output flows

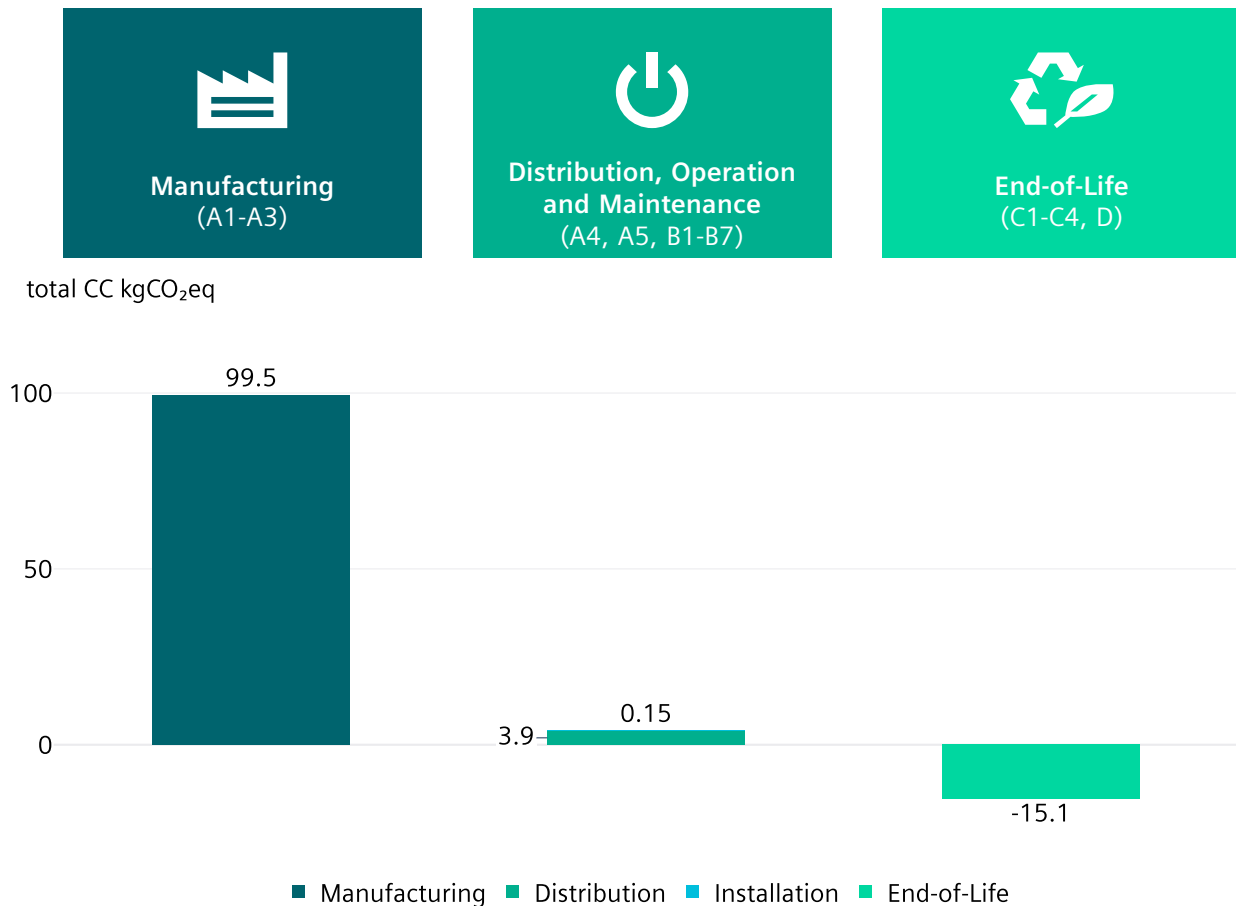
| Indicators | Unit | Total - (w/o D) | A1-A3         | A4           | A5           | C1-C4       | D                |
|------------|------|-----------------|---------------|--------------|--------------|-------------|------------------|
|            |      |                 | Manufacturing | Distribution | Installation | End of life | Benefits & loads |
| HWD        | kg   | 1.17E-06        | 1.09E-06      | 1.96E-09     | 2.35E-10     | 7.85E-08    | 5.46E-04         |
| NHWD       | kg   | 4.06E+01        | 3.83E+01      | 8.35E-03     | 1.06E-01     | 2.19E+00    | -5.63E+00        |
| RWD        | kg   | 2.42E-02        | 1.95E-02      | 9.31E-05     | 2.07E-05     | 4.55E-03    | -5.98E-03        |
| MER        | kg   | 2.36E-02        | 2.26E-03      | 0.00E+00     | 9.00E-04     | 2.04E-02    | 0.00E+00         |
| MFR        | kg   | 1.15E+01        | 3.00E+00      | 0.00E+00     | 0.00E+00     | 8.47E+00    | -1.45E+00        |
| CRU        | kg   | 0.00E+00        | 0.00E+00      | 0.00E+00     | 0.00E+00     | 0.00E+00    | -2.63E+00        |
| ETE        | MJ   | 0.00E+00        | 0.00E+00      | 0.00E+00     | 0.00E+00     | 0.00E+00    | 0.00E+00         |
| EEE        | MJ   | 0.00E+00        | 0.00E+00      | 0.00E+00     | 0.00E+00     | 0.00E+00    | 0.00E+00         |

**HWD:** Hazardous waste disposed; **NHWD:** Non-hazardous waste disposed; **RWD:** Radioactive waste disposed; **MER:** Materials for energy recovery; **MFR:** Material for recycling; **CRU:** Components for reuse; **ETE:** Exported thermal energy; **EEE:** Exported electric energy.

## Additional environmental information

### Climate change

This chart shows the overall impact of the product on climate change – total. The manufacturing phase is the lifecycle 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. The end-of-life parameters are calculated according to IEC TR 62635.



It leads to:

- an overall product recyclability of up to 84%
- an energy recoverability of up to 0%
- a minimum disposal rate of 16%

The exact final values depend on the used recycling process and add up to 100%. Calculation is done based on the applied default recovery rates according to the PCR and is consistent with the impacts displayed in the LCA.

**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 EN50693:2019. The scaling factors listed here are calculated according to this standard.

The extrapolation rules have been defined as follow:

- Manufacturing (A1-A3):  $\frac{m_{plastics,i}+m_{metals,i}+13 \cdot m_{PCBA,i}+m_{others,i}}{m_{plastics,ref}+m_{metals,ref}+13 \cdot m_{PCBA,ref}+m_{others,ref}}$
- Distribution (A4):  $\frac{m_{product,i}}{m_{product,ref}}$
- Installation (A5):  $\frac{m_{product,i}}{m_{product,ref}}$
- End of life (C1-C4):  $\frac{6 \cdot m_{plastics,i}+0.01 \cdot m_{metals,i}+1 \cdot m_{PCBA,i}+0.04 \cdot m_{others,i}}{6 \cdot m_{plastics,ref}+0.01 \cdot m_{metals,ref}+1 \cdot m_{PCBA,ref}+0.04 \cdot m_{others,ref}}$
- Benefits & Loads (D):  $\frac{1 \cdot m_{plastics,i}+4 \cdot m_{metals,i}+19 \cdot m_{PCBA,i}+2 \cdot m_{others,i}}{1 \cdot m_{plastics,ref}+4 \cdot m_{metals,ref}+19 \cdot m_{PCBA,ref}+2 \cdot m_{others,ref}}$

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:

| Article Type    | A1-A3 | A4    | A5    | C1-C4 | D     |
|-----------------|-------|-------|-------|-------|-------|
| VVF43.100-125   | 3.33  | 3.26  | 3.26  | 3.04  | 3.34  |
| VVF43.100-150K  | 3.37  | 3.29  | 3.29  | 4.39  | 3.37  |
| VVF43.100-160   | 3.33  | 3.26  | 3.26  | 3.04  | 3.34  |
| VVF43.125-200   | 4.53  | 5.18  | 5.18  | 4.02  | 4.53  |
| VVF43.125-220K  | 4.61  | 5.25  | 5.25  | 5.72  | 4.61  |
| VVF43.125-250   | 4.53  | 5.18  | 5.18  | 4.02  | 4.53  |
| VVF43.150-315   | 6.70  | 7.17  | 7.17  | 5.82  | 6.71  |
| VVF43.150-315K  | 6.79  | 7.24  | 7.24  | 7.78  | 6.79  |
| VVF43.150-400   | 6.70  | 7.17  | 7.17  | 5.82  | 6.71  |
| VVF43.200-450K  | 12.68 | 15.16 | 15.16 | 19.70 | 12.67 |
| VVF43.250-630K  | 19.16 | 21.07 | 21.07 | 27.41 | 19.15 |
| VVF43.65-50     | 2.12  | 2.12  | 2.12  | 1.98  | 2.12  |
| VVF43.65-63     | 2.12  | 2.12  | 2.12  | 1.98  | 2.12  |
| VVF43.65-63K    | 2.13  | 2.13  | 2.13  | 2.87  | 2.13  |
| VVF43.80-100    | 2.71  | 2.66  | 2.66  | 2.47  | 2.71  |
| VVF43.80-100K   | 2.73  | 2.67  | 2.67  | 3.56  | 2.72  |
| VVF43.80-80     | 2.71  | 2.66  | 2.66  | 2.47  | 2.71  |
| VVF53.100-150K  | 3.82  | 3.69  | 3.69  | 4.75  | 3.81  |
| VVF53.100-150KC | 3.82  | 3.69  | 3.69  | 4.75  | 3.81  |
| VVF53.100-160   | 3.77  | 3.65  | 3.65  | 3.39  | 3.77  |
| VVF53.100-160C  | 3.77  | 3.65  | 3.65  | 3.39  | 3.77  |

| Article Type    | A1-A3 | A4   | A5   | C1-C4 | D    |
|-----------------|-------|------|------|-------|------|
| VVF53.125-220K  | 5.32  | 5.90 | 5.90 | 6.30  | 5.32 |
| VVF53.125-220KC | 5.32  | 5.90 | 5.90 | 6.30  | 5.32 |
| VVF53.125-250   | 5.25  | 5.83 | 5.83 | 4.60  | 5.25 |
| VVF53.125-250C  | 5.25  | 5.83 | 5.83 | 4.60  | 5.25 |
| VVF53.15-0.16   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.16C  | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.2    | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.25   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.25C  | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.2C   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.32   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.32C  | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.4    | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.4C   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.5    | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.5C   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.63   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.63C  | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.8    | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-0.8C   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-1      | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-1.25   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-1.25C  | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-1.25J  | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-1.25JC | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-1.6    | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-1.6C   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-1C     | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-2      | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-2.5    | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-2.5C   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-2C     | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-3.2    | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-3.2C   | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-4      | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-4C     | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-4J     | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.15-4JC    | 0.42  | 0.39 | 0.39 | 0.51  | 0.42 |
| VVF53.150-315K  | 7.41  | 7.81 | 7.81 | 8.29  | 7.41 |
| VVF53.150-315KC | 7.41  | 7.81 | 7.81 | 8.29  | 7.41 |

| Article Type       | A1-A3       | A4          | A5          | C1-C4       | D           |
|--------------------|-------------|-------------|-------------|-------------|-------------|
| VVF53.150-400      | 7.25        | 7.66        | 7.66        | 6.26        | 7.25        |
| VVF53.150-400C     | 7.25        | 7.66        | 7.66        | 6.26        | 7.25        |
| VVF53.20-6.3       | 0.53        | 0.49        | 0.49        | 0.60        | 0.53        |
| VVF53.20-6.3C      | 0.53        | 0.49        | 0.49        | 0.60        | 0.53        |
| VVF53.200-450K     | 13.09       | 15.54       | 15.54       | 20.04       | 13.08       |
| VVF53.25-10        | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-10C       | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-10J       | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-10JC      | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-5         | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-5C        | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-6.3       | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-6.3C      | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-6.3J      | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-6.3JC     | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-8         | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.25-8C        | 0.60        | 0.56        | 0.56        | 0.67        | 0.60        |
| VVF53.250-630K     | 19.71       | 21.57       | 21.57       | 27.86       | 19.71       |
| VVF53.32-16        | 0.86        | 0.88        | 0.88        | 0.88        | 0.86        |
| VVF53.32-16C       | 0.86        | 0.88        | 0.88        | 0.88        | 0.86        |
| VVF53.40-12.5      | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| VVF53.40-12.5C     | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| VVF53.40-16        | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| VVF53.40-16C       | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| VVF53.40-16J       | 0.86        | 0.88        | 0.88        | 0.88        | 0.86        |
| VVF53.40-16JC      | 0.86        | 0.88        | 0.88        | 0.88        | 0.86        |
| VVF53.40-20        | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| VVF53.40-20C       | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| <b>VVF53.40-25</b> | <b>1.00</b> | <b>1.00</b> | <b>1.00</b> | <b>1.00</b> | <b>1.00</b> |
| VVF53.40-25C       | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| VVF53.40-25J       | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| VVF53.40-25JC      | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| VVF53.50-31.5      | 1.34        | 1.31        | 1.31        | 1.28        | 1.34        |
| VVF53.50-31.5C     | 1.34        | 1.31        | 1.31        | 1.28        | 1.34        |
| VVF53.50-31.5J     | 1.34        | 1.31        | 1.31        | 1.28        | 1.34        |
| VVF53.50-31.5JC    | 1.34        | 1.31        | 1.31        | 1.28        | 1.34        |
| VVF53.50-40        | 1.34        | 1.31        | 1.31        | 1.28        | 1.34        |
| VVF53.50-40C       | 1.34        | 1.31        | 1.31        | 1.28        | 1.34        |
| VVF53.50-40K       | 1.34        | 1.31        | 1.31        | 1.83        | 1.34        |
| VVF53.50-40KC      | 1.34        | 1.31        | 1.31        | 1.83        | 1.34        |

| Article Type   | A1-A3 | A4    | A5    | C1-C4 | D     |
|----------------|-------|-------|-------|-------|-------|
| VVF53.65-63    | 2.17  | 2.16  | 2.16  | 2.02  | 2.17  |
| VVF53.65-63C   | 2.17  | 2.16  | 2.16  | 2.02  | 2.17  |
| VVF53.65-63K   | 2.18  | 2.17  | 2.17  | 2.90  | 2.17  |
| VVF53.65-63KC  | 2.18  | 2.17  | 2.17  | 2.90  | 2.17  |
| VVF53.80-100   | 2.71  | 2.66  | 2.66  | 2.47  | 2.71  |
| VVF53.80-100C  | 2.71  | 2.66  | 2.66  | 2.47  | 2.71  |
| VVF53.80-100K  | 2.73  | 2.67  | 2.67  | 3.56  | 2.72  |
| VVF53.80-100KC | 2.73  | 2.67  | 2.67  | 3.56  | 2.72  |
| VVF63.100-125  | 4.91  | 5.52  | 5.52  | 4.32  | 4.92  |
| VVF63.100-125F | 4.91  | 5.52  | 5.52  | 4.32  | 4.92  |
| VVF63.100-150K | 4.91  | 5.52  | 5.52  | 4.32  | 4.92  |
| VVF63.125-200  | 7.21  | 7.61  | 7.61  | 6.20  | 7.22  |
| VVF63.125-200F | 7.21  | 7.61  | 7.61  | 6.20  | 7.22  |
| VVF63.125-220K | 7.21  | 7.61  | 7.61  | 6.20  | 7.22  |
| VVF63.15-0.2   | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-0.2F  | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-0.32  | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-0.32F | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-0.5   | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-0.5F  | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-0.8   | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-0.8F  | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-0.8L  | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-1.25  | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-1.25F | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-1.25L | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-2     | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-2F    | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-2L    | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-3.2   | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-3.2F  | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.15-3.2L  | 0.52  | 0.50  | 0.50  | 0.60  | 0.52  |
| VVF63.150-315  | 10.11 | 10.25 | 10.25 | 8.58  | 10.11 |
| VVF63.150-315F | 10.11 | 10.25 | 10.25 | 8.58  | 10.11 |
| VVF63.150-315K | 10.11 | 10.25 | 10.25 | 8.58  | 10.11 |
| VVF63.20-6.3   | 0.64  | 0.61  | 0.61  | 0.70  | 0.64  |
| VVF63.25-5     | 0.74  | 0.69  | 0.69  | 0.78  | 0.74  |
| VVF63.25-5F    | 0.74  | 0.69  | 0.69  | 0.78  | 0.74  |
| VVF63.25-5L    | 0.74  | 0.69  | 0.69  | 0.78  | 0.74  |
| VVF63.25-8     | 0.74  | 0.69  | 0.69  | 0.78  | 0.74  |

| Article Type   | A1-A3 | A4   | A5   | C1-C4 | D    |
|----------------|-------|------|------|-------|------|
| VVF63.25-8F    | 0.74  | 0.69 | 0.69 | 0.78  | 0.74 |
| VVF63.25-8L    | 0.74  | 0.69 | 0.69 | 0.78  | 0.74 |
| VVF63.32-16    | 1.05  | 1.05 | 1.05 | 1.04  | 1.05 |
| VVF63.40-12.5  | 1.22  | 1.20 | 1.20 | 1.18  | 1.22 |
| VVF63.40-12.5F | 1.22  | 1.20 | 1.20 | 1.18  | 1.22 |
| VVF63.40-20    | 1.22  | 1.20 | 1.20 | 1.18  | 1.22 |
| VVF63.40-20F   | 1.22  | 1.20 | 1.20 | 1.18  | 1.22 |
| VVF63.50-31.5  | 1.71  | 1.65 | 1.65 | 1.58  | 1.71 |
| VVF63.50-31.5F | 1.71  | 1.65 | 1.65 | 1.58  | 1.71 |
| VVF63.50-40K   | 1.71  | 1.65 | 1.65 | 1.58  | 1.71 |
| VVF63.65-50    | 2.87  | 2.81 | 2.81 | 2.59  | 2.87 |
| VVF63.65-50F   | 2.87  | 2.81 | 2.81 | 2.59  | 2.87 |
| VVF63.65-63K   | 2.87  | 2.81 | 2.81 | 2.59  | 2.87 |
| VVF63.80-100K  | 3.64  | 3.51 | 3.51 | 3.23  | 3.65 |
| VVF63.80-80    | 3.64  | 3.51 | 3.51 | 3.23  | 3.65 |
| VVF63.80-80F   | 3.64  | 3.51 | 3.51 | 3.23  | 3.65 |
| VXF43.100-125  | 2.65  | 2.63 | 2.63 | 2.49  | 2.65 |
| VXF43.100-160  | 2.65  | 2.63 | 2.63 | 2.49  | 2.65 |
| VXF43.125-200  | 3.59  | 4.33 | 4.33 | 3.26  | 3.59 |
| VXF43.125-250  | 3.59  | 4.33 | 4.33 | 3.26  | 3.59 |
| VXF43.150-315  | 5.43  | 6.00 | 6.00 | 4.78  | 5.43 |
| VXF43.150-400  | 5.43  | 6.00 | 6.00 | 4.78  | 5.43 |
| VXF43.65-50    | 1.63  | 1.68 | 1.68 | 1.58  | 1.63 |
| VXF43.65-63    | 1.63  | 1.68 | 1.68 | 1.58  | 1.63 |
| VXF43.80-100   | 2.04  | 2.05 | 2.05 | 1.92  | 2.04 |
| VXF43.80-80    | 2.04  | 2.05 | 2.05 | 1.92  | 2.04 |
| VXF53.100-160  | 2.78  | 2.75 | 2.75 | 2.59  | 2.78 |
| VXF53.100-160C | 2.78  | 2.75 | 2.75 | 2.59  | 2.78 |
| VXF53.125-250  | 3.80  | 4.52 | 4.52 | 3.43  | 3.80 |
| VXF53.125-250C | 3.80  | 4.52 | 4.52 | 3.43  | 3.80 |
| VXF53.15-1.6   | 0.32  | 0.31 | 0.31 | 0.43  | 0.32 |
| VXF53.15-1.6C  | 0.32  | 0.31 | 0.31 | 0.43  | 0.32 |
| VXF53.15-2.5   | 0.32  | 0.31 | 0.31 | 0.43  | 0.32 |
| VXF53.15-2.5C  | 0.32  | 0.31 | 0.31 | 0.43  | 0.32 |
| VXF53.15-4     | 0.32  | 0.31 | 0.31 | 0.43  | 0.32 |
| VXF53.15-4C    | 0.32  | 0.31 | 0.31 | 0.43  | 0.32 |
| VXF53.15-4J    | 0.32  | 0.31 | 0.31 | 0.43  | 0.32 |
| VXF53.15-4JC   | 0.32  | 0.31 | 0.31 | 0.43  | 0.32 |
| VXF53.150-400  | 5.43  | 6.01 | 6.01 | 4.78  | 5.43 |
| VXF53.150-400C | 5.43  | 6.01 | 6.01 | 4.78  | 5.43 |

| Article Type   | A1-A3 | A4   | A5   | C1-C4 | D    |
|----------------|-------|------|------|-------|------|
| VXF53.20-6.3   | 0.40  | 0.38 | 0.38 | 0.50  | 0.40 |
| VXF53.20-6.3C  | 0.40  | 0.38 | 0.38 | 0.50  | 0.40 |
| VXF53.25-10    | 0.45  | 0.43 | 0.43 | 0.55  | 0.45 |
| VXF53.25-10C   | 0.45  | 0.43 | 0.43 | 0.55  | 0.45 |
| VXF53.25-10J   | 0.45  | 0.43 | 0.43 | 0.55  | 0.45 |
| VXF53.25-10JC  | 0.45  | 0.43 | 0.43 | 0.55  | 0.45 |
| VXF53.25-6.3   | 0.45  | 0.43 | 0.43 | 0.55  | 0.45 |
| VXF53.25-6.3C  | 0.45  | 0.43 | 0.43 | 0.55  | 0.45 |
| VXF53.25-6.3J  | 0.45  | 0.43 | 0.43 | 0.55  | 0.45 |
| VXF53.25-6.3JC | 0.45  | 0.43 | 0.43 | 0.55  | 0.45 |
| VXF53.32-16    | 0.60  | 0.64 | 0.64 | 0.67  | 0.60 |
| VXF53.32-16C   | 0.60  | 0.64 | 0.64 | 0.67  | 0.60 |
| VXF53.40-16    | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.40-16C   | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.40-16J   | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.40-16JC  | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.40-25    | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.40-25C   | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.40-25J   | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.40-25JC  | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.50-40    | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.50-40C   | 0.71  | 0.74 | 0.74 | 0.76  | 0.71 |
| VXF53.50-40J   | 0.96  | 0.96 | 0.96 | 0.97  | 0.96 |
| VXF53.50-40JC  | 0.96  | 0.96 | 0.96 | 0.97  | 0.96 |
| VXF53.65-63    | 1.61  | 1.66 | 1.66 | 1.57  | 1.61 |
| VXF53.65-63C   | 1.61  | 1.66 | 1.66 | 1.57  | 1.61 |
| VXF53.80-100   | 2.03  | 2.04 | 2.04 | 1.92  | 2.03 |
| VXF53.80-100C  | 2.03  | 2.04 | 2.04 | 1.92  | 2.03 |
| VXF63.100-125  | 3.92  | 4.62 | 4.62 | 3.52  | 3.93 |
| VXF63.125-200  | 5.77  | 6.30 | 6.30 | 5.03  | 5.77 |
| VXF63.15-1.6   | 0.43  | 0.41 | 0.41 | 0.52  | 0.43 |
| VXF63.15-2.5   | 0.43  | 0.41 | 0.41 | 0.52  | 0.43 |
| VXF63.15-4     | 0.43  | 0.41 | 0.41 | 0.52  | 0.43 |
| VXF63.150-315  | 8.29  | 8.60 | 8.60 | 7.10  | 8.29 |
| VXF63.20-6.3   | 0.52  | 0.49 | 0.49 | 0.59  | 0.52 |
| VXF63.25-10    | 0.59  | 0.56 | 0.56 | 0.66  | 0.59 |
| VXF63.25-6.3   | 0.59  | 0.56 | 0.56 | 0.66  | 0.59 |
| VXF63.32-16    | 0.79  | 0.81 | 0.81 | 0.83  | 0.79 |
| VXF63.40-16    | 0.93  | 0.94 | 0.94 | 0.94  | 0.93 |
| VXF63.40-25    | 0.93  | 0.94 | 0.94 | 0.94  | 0.93 |

| Article Type  | A1-A3 | A4   | A5   | C1-C4 | D    |
|---------------|-------|------|------|-------|------|
| VXF63.50-31.5 | 1.33  | 1.31 | 1.31 | 1.28  | 1.33 |
| VXF63.65-50   | 2.32  | 2.31 | 2.31 | 2.14  | 2.32 |
| VXF63.80-80   | 2.97  | 2.90 | 2.90 | 2.69  | 2.97 |

## References

|                       |   |
|-----------------------|---|
| ISO 14025:2010        | Environmental labels and declarations - Type III environmental declarations - Principles and procedures |
| ISO 14040/44          | Lifecycle Assessment – Principles and framework   |
| EN 50693:2019         | Product category rules for life cycle assessments of electronic and electrical products and systems     |
| PCR–ed4-EN-2021 09 06 | Product Category Rules for Electrical, Electronic and HVAC-R Products                                   |



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