



Surge Protective Device with Metal Oxide Varistor

Representative product	SPBT12-280/4 (158331) PSR Product Category: Surge arresters
Description of the product	The Eaton SPD Series protects critical electrical and electronic equipment from damage by power surges. This is done by shunting high energy lightning surges (and other transient disturbances) away from the equipment being protected. It does this in nanoseconds by providing a low impedance surge path to ground while supporting power frequency voltage. The Eaton SPD Series is designed to mount on panelboards, switchgear, switchboards, busway, and motor control centers (MCCs). The representative Eaton SPD Series Surge protective device for integrated applications under the study is 158331 with Maximum continuous operating voltage 280 V.
Homogeneous Environmental Families Covered	The PEP concerns the following product offerings from the Eaton SPD series as mentioned below: Series: SPBT, SPCT, SPET, SPDT Continuous operational voltage (Uc): 280 V, 335 V, 385 V, 460 V Product Family: B, C, E, D Test Class: T1, T2, T3 Poles: 1,2,3,4
Functional unit	“Protect, against direct and indirect effects of lightning or against transient over voltages, electronic equipment connected to networks with a rated operational voltage of up to 1000V AC or 1500V DC via a surge arrester of type T 1+2, with 4 poles, according to the appropriate use scenario, and for the reference service life of the product of 20 years.”
Specifications	T = T 1+2 N_p = Four pole U_c = 280V I_{imp} = 12.5 kA U_{oc} = NA U_p = 1.5kV

	lc = 0 PSR Sub-family: Type 1+2 devices
Company information	Eaton Electro Productie s.r.l, Independentei 8, Sarbi, Romania, 437157 Email: productstewardship-es@eaton.com

Constituent Materials			
Reference product mass	6.70E-01kg (Including packaging)		
Category PEP Material	Materials	Mass (kg)	Percentage (%)
Other	Varistor	2.80E-01	41.8%
Plastic	Polyamide	1.69E-01	25.2%
Metal	Copper	6.25E-02	9.3%
Metal	Steel	6.24E-02	9.3%
Other	Label	3.23E-02	4.8%
Metal	Stainless Steel	2.86E-02	4.3%
Plastic	Polybutylene Terephthalate (PBT) 70 GF-30	1.21E-02	1.8%
Other	Wood	1.17E-02	1.7%
Other	Paper	1.00E-02	1.5%
Plastic	Polyoxymethylene (POM)	8.28E-04	0.1%
Other	Cardboard	4.63E-04	0.1%
Plastic	Low Density Polyethylene	3.94E-04	0.1%
Total		6.70E-01	100%

Substance Assessment
The representative product is compliant with the EU-RoHS Directive (2011/65/EU) with exemption and the product does contain lead as substance listed as Substance-of-Very-High-Concern (SVHC) on the Candidate List of the EU-REACH Regulation (1907/2006/EC).

Additional Environmental Information	
Manufacturing	The reference product is assembled at an Eaton plant Sarbi, Romania holding management system certifications according to ISO 14001 standards.
Distribution	Eaton is committed to minimizing weight and volume of product and packaging with focus to optimize transport efficiency.
Installation	The installation process does not require any energy consumption and there is no waste other than the obsolete product packaging generated during this step.
Use	The product does not have maintenance during operation.
End of life	The recyclability rate of the overall product is 19.36% based on the method described in IEC/TR 62635, Edition 1.0/2012-10 "Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment".

Environmental Impacts	
The calculation of the environmental impacts is the result of the Product's Life Cycle Analysis in accordance with ISO 14040/44, covering the entire lifecycle, i.e., "Cradle-to-Grave" including the following life cycle phases: production, distribution, installation, use and end of life. System modelling was carried out using the commercial LCA software EIME v6.3.0.1-4 with database version CODDE-2024-04. Indicators Set: PEF EF 3.1 (Compliance: PEP ed.4, EN15804+A2) v2.0	
Manufacturing Phase	The product is assembled as well as packed at Eaton facility in Romania. Energy model used: Romania
Distribution Phase	Distribution of the product in its packaging from Eaton's last logistics platform to the installation place in Europe is considered as per PCR rules.
Installation Phase	Product is installed in Europe. Installation of product and treatment of packaging waste are considered in this phase. There is no energy consumption for reference products. Energy model used: Europe
Use Phase	Reference lifetime: 20 Years Energy model used: Europe Usage profile: The product has significantly less leakage current which is not measurable, hence the use phase losses are considered to be Zero . Product do not require any maintenance/replacement during useful life.
End of life Phase	Product disposed with WEEE guidelines. Energy model used: Europe
Module-D	Module D is calculated according to PCR-ed4-EN-2021 09 06 based on the materials recycled and the modelled end-of-life scenario. It expresses the net benefits and loads beyond the boundaries of the system and are not to be included in the life cycle totals.

Environmental Impact Indicators: Mandatory

Mandatory environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B1-B7- Use*	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Climate change - total (GWP)	kg CO ₂ eq.	4.54E+00	3.06E+00	1.51E-01	1.03E-01	0.00E+00	1.23E+00	-3.77E-01
Climate change - fossil fuels (GWP-f)	kg CO ₂ eq.	4.50E+00	3.11E+00	1.51E-01	3.27E-02	0.00E+00	1.21E+00	-3.86E-01
Climate change - biogenic (GWP-b)	kg CO ₂ eq.	4.66E-02	-4.69E-02	6.16E-07	7.02E-02	0.00E+00	2.33E-02	9.37E-03
Climate change - land use and land use transformation (GWP-lu)	kg CO ₂ eq.	7.10E-07	3.30E-07	2.28E-07	2.06E-09	0.00E+00	1.50E-07	0.00E+00
Ozone depletion (ODP)	kg eq. CFC-11	3.90E-07	3.73E-07	1.83E-09	6.29E-10	0.00E+00	1.45E-08	-8.63E-08
Acidification (AP)	mole of H ⁺ eq.	4.36E-02	4.08E-02	2.38E-04	1.13E-04	0.00E+00	2.44E-03	-7.86E-03
Freshwater eutrophication (Ep-fw)	kg P eq.	3.95E-04	1.45E-04	5.63E-07	3.09E-07	0.00E+00	2.50E-04	-9.05E-07
Marine aquatic eutrophication (Ep-m)	kg of N eq.	3.29E-03	2.74E-03	4.31E-05	3.36E-05	0.00E+00	4.76E-04	-2.78E-04
Terrestrial eutrophication (Ep-t)	mole of N eq.	3.58E-02	2.96E-02	4.73E-04	3.50E-04	0.00E+00	5.37E-03	-3.17E-03
Photochemical ozone formation (POCP)	kg of NMVOC eq.	1.21E-02	1.04E-02	1.53E-04	7.93E-05	0.00E+00	1.42E-03	-1.43E-03
Depletion of abiotic resources - elements (ADP-e)	kg eq. Sb	3.85E-04	3.78E-04	5.37E-08	2.13E-09	0.00E+00	7.81E-06	-1.27E-04
Depletion of abiotic resources - fossil fuels (ADP-f)	MJ	1.01E+02	7.99E+01	2.67E+00	3.73E-01	0.00E+00	1.85E+01	-7.51E+00
Water scarcity (WDP)	m ³ eq. deprivation worldwide	2.37E+00	2.06E+00	5.42E-03	1.45E-03	0.00E+00	3.05E-01	-4.31E-01

*All submodules B1-B7 are zero. The product has significantly less leakage current which is not measurable, hence the B6 losses are considered to be very negligible, hence not mentioned.

Inventory Flow Indicators: Mandatory

Inventory flow indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B1-B7- Use*	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	2.62E+00	2.22E+00	8.43E-03	8.52E-02	0.00E+00	3.09E-01	-1.68E-01
Use of renewable primary energy resources used as raw materials	MJ	3.90E-01	3.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.23E-01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.01E+00	2.61E+00	8.43E-03	8.52E-02	0.00E+00	3.09E-01	-3.91E-01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	9.56E+01	7.40E+01	2.67E+00	3.73E-01	0.00E+00	1.85E+01	-7.50E+00
Use of non-renewable primary energy resources used as raw materials	MJ	5.90E+00	5.90E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.94E-03
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.01E+02	7.99E+01	2.67E+00	3.73E-01	0.00E+00	1.85E+01	-7.51E+00
Use of secondary materials	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	m ³	5.53E-02	4.80E-02	1.26E-04	4.25E-05	0.00E+00	7.13E-03	-1.00E-02
Hazardous waste disposed of	kg	1.37E+01	1.27E+01	6.30E-04	1.40E-02	0.00E+00	9.57E-01	-1.06E+01
Non-hazardous waste disposed of	kg	4.86E-01	3.71E-01	1.40E-02	1.09E-02	0.00E+00	9.01E-02	-2.08E-01
Radioactive waste disposed of	kg	1.93E-04	1.68E-04	1.11E-05	1.64E-06	0.00E+00	1.21E-05	-9.88E-05
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
Materials for recycling	kg	1.65E-01	5.14E-02	0.00E+00	3.78E-03	0.00E+00	1.10E-01	0.00E+00

Inventory flow indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B1-B7- Use*	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
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
Exported energy	MJ by energy vector	1.93E-02	4.51E-03	0.00E+00	4.32E-03	0.00E+00	1.05E-02	0.00E+00
Biogenic carbon content of the product	kg of C.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content of the associated packaging	kg of C.	2.06E-02	2.06E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*All submodules B1-B7 are zero. The product has significantly less leakage current which is not measurable, hence the B6 losses are considered to be very negligible, hence not mentioned.

Environmental Impact Indicators: Optional

Optional Environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	B1-B7- Use	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Emission of fine particles	incidence of diseases	3.05E-07	2.89E-07	2.04E-09	7.50E-10	0.00E+00	1.31E-08	-1.69E-07
Ionizing radiation, human health	kBq of U235 eq.	9.30E+02	9.30E+02	5.33E-03	7.26E-03	0.00E+00	5.82E-02	-1.03E+01
Ecotoxicity, fresh water	CTUe	4.14E+03	4.10E+03	4.39E+00	5.03E-01	0.00E+00	3.31E+01	-2.53E+00
Human toxicity, cancer effects	CTUh	5.61E-07	3.39E-07	2.95E-11	1.26E-09	0.00E+00	2.21E-07	-8.62E-07
Human toxicity, non-cancer effects	CTUh	3.03E-07	2.54E-07	5.62E-10	1.32E-10	0.00E+00	4.90E-08	-9.43E-08
Impacts related to land use/soil quality	-	1.00E+00	2.74E-01	6.44E-04	2.87E-04	0.00E+00	7.27E-01	-7.19E-05
Total use of primary energy during the life cycle	MJ	1.04E+02	8.25E+01	2.68E+00	4.59E-01	0.00E+00	1.88E+01	-7.90E+00

*All submodules B1-B7 are zero. The product has significantly less leakage current which is not measurable, hence the B6 losses are considered to be very negligible, hence not mentioned.

To evaluate the environmental impact of other product covered by this PEP, multiply the impact figures by-

Factors for Manufacturing, Distribution, Installation, Use, End-of-Life, and Module-D Phase:

Product Number	Product Number	Phases	GWP (kg CO ₂ eq.)	GWP-f (kg CO ₂ eq.)	GWP-b (kg CO ₂ eq.)	GWP-lu (kg CO ₂ eq.)	ODP (kg CFC-11 eq.)	AP (mol H+ eq.)	EP-fw (kg P eq.)	EP-m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP-e (kg Sb eq.)	ADP-f (MJ)	WDP (m3 eq.)
158331	SPBT12-280/4	Manufacturing	1.00												
		Distribution	1.00												
		Installation	1.00												
		End of life	1.00												
		Module-D	1.00												
158330	SPBT12-280/3	Manufacturing	0.75												
		Distribution	0.75												
		Installation	0.75												
		End of life	0.75												
		Module-D	0.75												
158309	SPBT12-280/2	Manufacturing	0.50												
		Distribution	0.50												
		Installation	0.50												
		End of life	0.50												
		Module-D	0.50												
158306	SPBT12-280/1	Manufacturing	0.25												
		Distribution	0.25												
		Installation	0.25												
		End of life	0.25												
		Module-D	0.25												
168698	SPET2-335/4	Manufacturing	0.94	0.94	1.00	1.09	0.84	0.82	0.99	0.73	0.73	0.78	0.89	0.95	0.88
		Distribution	0.89												
		Installation	1.00												
		End of life	0.83	0.82	0.91	0.81	0.89	0.95	0.80	0.93	0.94	0.97	0.80	1.15	0.90
		Module-D	1.10	1.10	1.14	1.00	1.04	0.88	1.07	1.05	1.05	0.99	1.06	1.13	0.92
168693	SPET2-280/4	Manufacturing	0.94	0.94	1.00	1.09	0.84	0.82	0.99	0.73	0.73	0.78	0.89	0.95	0.88
		Distribution	0.89												
		Installation	1.00												
		End of life	0.83	0.82	0.91	0.81	0.89	0.95	0.80	0.93	0.94	0.97	0.80	1.15	0.90
		Module-D	1.10	1.10	1.14	1.00	1.04	0.88	1.07	1.05	1.05	0.99	1.06	1.13	0.92
168697	SPET2-335/3	Manufacturing	0.71	0.71	0.75	0.81	0.63	0.61	0.75	0.55	0.54	0.58	0.66	0.72	0.66
		Distribution	0.66												
		Installation	0.75												
		End of life	0.62	0.62	0.68	0.61	0.67	0.71	0.60	0.70	0.71	0.73	0.60	0.86	0.68
		Module-D	0.83	0.83	0.86	1.00	0.78	0.66	0.80	0.79	0.79	0.75	0.79	0.85	0.69
168692	SPET2-280/3	Manufacturing	0.71	0.71	0.75	0.81	0.63	0.61	0.75	0.55	0.54	0.58	0.66	0.72	0.66
		Distribution	0.66												
		Installation	0.75												

Product Number	Product Number	Phases	GWP (kg CO ₂ eq.)	GWP-f (kg CO ₂ eq.)	GWP-b (kg CO ₂ eq.)	GWP-lu (kg CO ₂ eq.)	ODP (kg CFC-11 eq.)	AP (mol H+ eq.)	EP-fw (kg P eq.)	EP-m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP-e (kg Sb eq.)	ADP-f (MJ)	WDP (m3 eq.)
		End of life	0.62	0.62	0.68	0.61	0.67	0.71	0.60	0.70	0.71	0.73	0.60	0.86	0.68
		Module-D	0.83	0.83	0.86	1.00	0.78	0.66	0.80	0.79	0.79	0.75	0.79	0.85	0.69
168696	SPET2-335/2	Manufacturing	0.47	0.47	0.50	0.54	0.42	0.41	0.50	0.37	0.36	0.39	0.44	0.48	0.44
		Distribution	0.44												
		Installation	0.50												
		End of life	0.41	0.41	0.46	0.41	0.44	0.47	0.40	0.47	0.47	0.49	0.40	0.57	0.45
		Module-D	0.55	0.55	0.57	1.00	0.52	0.44	0.53	0.52	0.52	0.50	0.53	0.57	0.46
168742	SPET2-280/2	Manufacturing	0.47	0.47	0.50	0.54	0.42	0.41	0.50	0.37	0.36	0.39	0.44	0.48	0.44
		Distribution	0.44												
		Installation	0.50												
		End of life	0.41	0.41	0.46	0.41	0.44	0.47	0.40	0.47	0.47	0.49	0.40	0.57	0.45
		Module-D	0.55	0.55	0.57	1.00	0.52	0.44	0.53	0.52	0.52	0.50	0.53	0.57	0.46
168695	SPET2-335/1	Manufacturing	0.24	0.24	0.25	0.27	0.21	0.20	0.25	0.18	0.18	0.19	0.22	0.24	0.22
		Distribution	0.22												
		Installation	0.25												
		End of life	0.21	0.21	0.23	0.20	0.22	0.24	0.20	0.23	0.24	0.24	0.20	0.29	0.23
		Module-D	0.28	0.28	0.29	1.00	0.26	0.22	0.27	0.26	0.26	0.25	0.26	0.28	0.23
168741	SPET2-280/1	Manufacturing	0.24	0.24	0.25	0.27	0.21	0.20	0.25	0.18	0.18	0.19	0.22	0.24	0.22
		Distribution	0.22												
		Installation	0.25												
		End of life	0.21	0.21	0.23	0.20	0.22	0.24	0.20	0.23	0.24	0.24	0.20	0.29	0.23
		Module-D	0.28	0.28	0.29	1.00	0.26	0.22	0.27	0.26	0.26	0.25	0.26	0.28	0.23
167611	SPCT2-460/4	Manufacturing	0.87	0.87	1.01	0.93	0.64	0.67	0.98	0.67	0.66	0.69	0.67	0.89	0.72
		Distribution	0.74												
		Installation	1.00												
		End of life	0.58	0.58	0.91	0.78	0.82	0.91	0.79	0.83	0.87	0.90	0.80	1.14	0.89
		Module-D	1.10	1.10	1.14	1.00	1.04	0.88	1.07	1.05	1.05	0.99	1.06	1.13	0.92
167606	SPCT2-385/4	Manufacturing	0.87	0.87	1.01	0.93	0.64	0.67	0.98	0.67	0.66	0.69	0.67	0.89	0.72
		Distribution	0.74												
		Installation	1.00												
		End of life	0.58	0.58	0.91	0.78	0.82	0.91	0.79	0.83	0.87	0.90	0.80	1.14	0.89
		Module-D	1.10	1.10	1.14	1.00	1.04	0.88	1.07	1.05	1.05	0.99	1.06	1.13	0.92
167601	SPCT2-335/4	Manufacturing	0.87	0.87	1.01	0.93	0.64	0.67	0.98	0.67	0.66	0.69	0.67	0.89	0.72
		Distribution	0.74												
		Installation	1.00												
		End of life	0.58	0.58	0.91	0.78	0.82	0.91	0.79	0.83	0.87	0.90	0.80	1.14	0.89
		Module-D	1.10	1.10	1.14	1.00	1.04	0.88	1.07	1.05	1.05	0.99	1.06	1.13	0.92
167596	SPCT2-280/4	Manufacturing	0.87	0.87	1.01	0.93	0.64	0.67	0.98	0.67	0.66	0.69	0.67	0.89	0.72

Product Number	Product Number	Phases	GWP (kg CO ₂ eq.)	GWP-f (kg CO ₂ eq.)	GWP-b (kg CO ₂ eq.)	GWP-lu (kg CO ₂ eq.)	ODP (kg CFC-11 eq.)	AP (mol H+ eq.)	EP-fw (kg P eq.)	EP-m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP-e (kg Sb eq.)	ADP-f (MJ)	WDP (m3 eq.)
		Distribution	0.74												
		Installation	1.00												
		End of life	0.58	0.58	0.91	0.78	0.82	0.91	0.79	0.83	0.87	0.90	0.80	1.14	0.89
		Module-D	1.10	1.10	1.14	1.00	1.04	0.88	1.07	1.05	1.05	0.99	1.06	1.13	0.92
167610	SPCT2-460/3	Manufacturing	0.65	0.65	0.75	0.69	0.48	0.50	0.74	0.50	0.50	0.52	0.50	0.66	0.54
		Distribution	0.55												
		Installation	0.75												
		End of life	0.44	0.43	0.68	0.59	0.62	0.68	0.59	0.62	0.65	0.68	0.60	0.85	0.67
		Module-D	0.83	0.83	0.86	1.00	0.78	0.66	0.80	0.79	0.79	0.75	0.79	0.85	0.69
167605	SPCT2-385/3	Manufacturing	0.65	0.65	0.75	0.69	0.48	0.50	0.74	0.50	0.50	0.52	0.50	0.66	0.54
		Distribution	0.55												
		Installation	0.75												
		End of life	0.44	0.43	0.68	0.59	0.62	0.68	0.59	0.62	0.65	0.68	0.60	0.85	0.67
		Module-D	0.83	0.83	0.86	1.00	0.78	0.66	0.80	0.79	0.79	0.75	0.79	0.85	0.69
167600	SPCT2-335/3	Manufacturing	0.65	0.65	0.75	0.69	0.48	0.50	0.74	0.50	0.50	0.52	0.50	0.66	0.54
		Distribution	0.55												
		Installation	0.75												
		End of life	0.44	0.43	0.68	0.59	0.62	0.68	0.59	0.62	0.65	0.68	0.60	0.85	0.67
		Module-D	0.83	0.83	0.86	1.00	0.78	0.66	0.80	0.79	0.79	0.75	0.79	0.85	0.69
167595	SPCT2-280/3	Manufacturing	0.65	0.65	0.75	0.69	0.48	0.50	0.74	0.50	0.50	0.52	0.50	0.66	0.54
		Distribution	0.55												
		Installation	0.75												
		End of life	0.44	0.43	0.68	0.59	0.62	0.68	0.59	0.62	0.65	0.68	0.60	0.85	0.67
		Module-D	0.83	0.83	0.86	1.00	0.78	0.66	0.80	0.79	0.79	0.75	0.79	0.85	0.69
167609	SPCT2-460/2	Manufacturing	0.43	0.43	0.50	0.46	0.32	0.34	0.49	0.33	0.33	0.35	0.34	0.44	0.36
		Distribution	0.37												
		Installation	0.50												
		End of life	0.29	0.29	0.46	0.39	0.41	0.45	0.39	0.42	0.43	0.45	0.40	0.57	0.44
		Module-D	0.55	0.55	0.57	1.00	0.52	0.44	0.53	0.52	0.52	0.50	0.53	0.57	0.46
167604	SPCT2-385/2	Manufacturing	0.43	0.43	0.50	0.46	0.32	0.34	0.49	0.33	0.33	0.35	0.34	0.44	0.36
		Distribution	0.37												
		Installation	0.50												
		End of life	0.29	0.29	0.46	0.39	0.41	0.45	0.39	0.42	0.43	0.45	0.40	0.57	0.44
		Module-D	0.55	0.55	0.57	1.00	0.52	0.44	0.53	0.52	0.52	0.50	0.53	0.57	0.46
167599	SPCT2-335/2	Manufacturing	0.43	0.43	0.50	0.46	0.32	0.34	0.49	0.33	0.33	0.35	0.34	0.44	0.36
		Distribution	0.37												
		Installation	0.50												
		End of life	0.29	0.29	0.46	0.39	0.41	0.45	0.39	0.42	0.43	0.45	0.40	0.57	0.44

Product Number	Product Number	Phases	GWP (kg CO ₂ eq.)	GWP-f (kg CO ₂ eq.)	GWP-b (kg CO ₂ eq.)	GWP-lu (kg CO ₂ eq.)	ODP (kg CFC-11 eq.)	AP (mol H+ eq.)	EP-fw (kg P eq.)	EP-m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP-e (kg Sb eq.)	ADP-f (MJ)	WDP (m3 eq.)
		Module-D	0.55	0.55	0.57	1.00	0.52	0.44	0.53	0.52	0.52	0.50	0.53	0.57	0.46
167594	SPCT2-280/2	Manufacturing	0.43	0.43	0.50	0.46	0.32	0.34	0.49	0.33	0.33	0.35	0.34	0.44	0.36
		Distribution	0.37												
		Installation	0.50												
		End of life	0.29	0.29	0.46	0.39	0.41	0.45	0.39	0.42	0.43	0.45	0.40	0.57	0.44
		Module-D	0.55	0.55	0.57	1.00	0.52	0.44	0.53	0.52	0.52	0.50	0.53	0.57	0.46
167608	SPCT2-460/1	Manufacturing	0.22	0.22	0.25	0.23	0.16	0.17	0.25	0.17	0.17	0.17	0.17	0.22	0.18
		Distribution	0.18												
		Installation	0.25												
		End of life	0.15	0.14	0.23	0.20	0.21	0.23	0.20	0.21	0.22	0.23	0.20	0.28	0.22
		Module-D	0.28	0.28	0.29	1.00	0.26	0.22	0.27	0.26	0.26	0.25	0.26	0.28	0.23
167603	SPCT2-385/1	Manufacturing	0.22	0.22	0.25	0.23	0.16	0.17	0.25	0.17	0.17	0.17	0.17	0.22	0.18
		Distribution	0.18												
		Installation	0.25												
		End of life	0.15	0.14	0.23	0.20	0.21	0.23	0.20	0.21	0.22	0.23	0.20	0.28	0.22
		Module-D	0.28	0.28	0.29	1.00	0.26	0.22	0.27	0.26	0.26	0.25	0.26	0.28	0.23
167598	SPCT2-335/1	Manufacturing	0.22	0.22	0.25	0.23	0.16	0.17	0.25	0.17	0.17	0.17	0.17	0.22	0.18
		Distribution	0.18												
		Installation	0.25												
		End of life	0.15	0.14	0.23	0.20	0.21	0.23	0.20	0.21	0.22	0.23	0.20	0.28	0.22
		Module-D	0.28	0.28	0.29	1.00	0.26	0.22	0.27	0.26	0.26	0.25	0.26	0.28	0.23
167593	SPCT2-280/1	Manufacturing	0.22	0.22	0.25	0.23	0.16	0.17	0.25	0.17	0.17	0.17	0.17	0.22	0.18
		Distribution	0.18												
		Installation	0.25												
		End of life	0.15	0.14	0.23	0.20	0.21	0.23	0.20	0.21	0.22	0.23	0.20	0.28	0.22
		Module-D	0.28	0.28	0.29	1.00	0.26	0.22	0.27	0.26	0.26	0.25	0.26	0.28	0.23
170485	SPDT3-280/2	Manufacturing	0.43	0.43	0.50	0.46	0.32	0.34	0.49	0.33	0.33	0.35	0.34	0.44	0.36
		Distribution	0.37												
		Installation	0.50												
		End of life	0.29	0.29	0.46	0.39	0.41	0.45	0.39	0.42	0.43	0.45	0.40	0.57	0.44
		Module-D	0.55	0.55	0.57	1.00	0.52	0.44	0.53	0.52	0.52	0.50	0.53	0.57	0.46
167341	SPBT12-280	Manufacturing	0.12	0.12	0.56	0.20	0.18	0.15	0.09	0.11	0.11	0.12	0.19	0.10	0.16
		Distribution	0.18												
		Installation	0.41												
		End of life	0.18	0.19	0.05	0.08	0.11	0.08	0.07	0.11	0.10	0.09	0.07	0.02	0.06
		Module-D	0.01	0.04	1.45	1.00	0.03	0.06	0.20	0.09	0.07	0.06	0.03	0.03	0.06
167607	SPCT2-460	Manufacturing	0.08	0.09	0.56	0.13	0.09	0.08	0.08	0.08	0.08	0.08	0.09	0.07	0.09
		Distribution	0.11												

Product Number	Product Number	Phases	GWP (kg CO ₂ eq.)	GWP-f (kg CO ₂ eq.)	GWP-b (kg CO ₂ eq.)	GWP-lu (kg CO ₂ eq.)	ODP (kg CFC-11 eq.)	AP (mol H+ eq.)	EP-fw (kg P eq.)	EP-m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP-e (kg Sb eq.)	ADP-f (MJ)	WDP (m3 eq.)
		Installation	0.38												
		End of life	0.07	0.07	0.05	0.07	0.09	0.06	0.07	0.07	0.07	0.06	0.07	0.02	0.05
		Module-D	0.01	0.04	1.38	1.00	0.03	0.06	0.20	0.09	0.07	0.06	0.03	0.03	0.06
167602	SPCT2-385	Manufacturing	0.08	0.09	0.56	0.13	0.09	0.08	0.08	0.08	0.08	0.08	0.09	0.07	0.09
		Distribution	0.11												
		Installation	0.38	0.52	0.31	0.43	0.48	0.51	0.88	0.60	0.50	0.50	0.45	0.52	0.69
		End of life	0.07	0.07	0.05	0.07	0.09	0.06	0.07	0.07	0.07	0.06	0.07	0.02	0.05
		Module-D	0.01	0.04	1.38	1.00	0.03	0.06	0.20	0.09	0.07	0.06	0.03	0.03	0.06
167597	SPCT2-335	Manufacturing	0.08	0.09	0.56	0.13	0.09	0.08	0.08	0.08	0.08	0.08	0.09	0.07	0.09
		Distribution	0.11												
		Installation	0.38	0.52	0.31	0.43	0.48	0.51	0.88	0.60	0.50	0.50	0.45	0.52	0.69
		End of life	0.07	0.07	0.05	0.07	0.09	0.06	0.07	0.07	0.07	0.06	0.07	0.02	0.05
		Module-D	0.01	0.04	1.38	1.00	0.03	0.06	0.20	0.09	0.07	0.06	0.03	0.03	0.06
170486	SPDT3-335	Manufacturing	0.08	0.09	0.56	0.13	0.09	0.08	0.08	0.08	0.08	0.08	0.09	0.07	0.09
		Distribution	0.11												
		Installation	0.38	0.52	0.31	0.43	0.48	0.51	0.88	0.60	0.50	0.50	0.45	0.52	0.69
		End of life	0.07	0.07	0.05	0.07	0.09	0.06	0.07	0.07	0.07	0.06	0.07	0.02	0.05
		Module-D	0.01	0.04	1.38	1.00	0.03	0.06	0.20	0.09	0.07	0.06	0.03	0.03	0.06
167592	SPCT2-280	Manufacturing	0.08	0.09	0.56	0.13	0.09	0.08	0.08	0.08	0.08	0.08	0.09	0.07	0.09
		Distribution	0.11												
		Installation	0.38	0.52	0.31	0.43	0.48	0.51	0.88	0.60	0.50	0.50	0.45	0.52	0.69
		End of life	0.07	0.07	0.05	0.07	0.09	0.06	0.07	0.07	0.07	0.06	0.07	0.02	0.05
		Module-D	0.01	0.04	1.38	1.00	0.03	0.06	0.20	0.09	0.07	0.06	0.03	0.03	0.06
170484	SPDT3-280	Manufacturing	0.08	0.09	0.56	0.13	0.09	0.08	0.08	0.08	0.08	0.08	0.09	0.07	0.09
		Distribution	0.11												
		Installation	0.38	0.52	0.31	0.43	0.48	0.51	0.88	0.60	0.50	0.50	0.45	0.52	0.69
		End of life	0.07	0.07	0.05	0.07	0.09	0.06	0.07	0.07	0.07	0.06	0.07	0.02	0.05
		Module-D	0.01	0.04	1.38	1.00	0.03	0.06	0.20	0.09	0.07	0.06	0.03	0.03	0.06
168694	SPET2-335	Manufacturing	0.10	0.11	0.95	0.19	0.15	0.12	0.08	0.10	0.10	0.11	0.15	0.09	0.14
		Distribution	0.17												
		Installation	0.64	0.68	0.62	0.69	0.76	0.77	0.90	0.80	0.76	0.75	0.72	0.78	0.84
		End of life	0.13	0.14	0.05	0.08	0.10	0.07	0.07	0.09	0.09	0.08	0.07	0.02	0.06
		Module-D	0.01	0.04	1.38	1.00	0.03	0.06	0.20	0.09	0.07	0.06	0.03	0.03	0.06
168740	SPET2-280	Manufacturing	0.10	0.11	0.95	0.19	0.15	0.12	0.08	0.10	0.10	0.11	0.15	0.09	0.14
		Distribution	0.17												
		Installation	0.64	0.68	0.62	0.69	0.76	0.77	0.90	0.80	0.76	0.75	0.72	0.78	0.84
		End of life	0.13	0.14	0.05	0.08	0.10	0.07	0.07	0.09	0.09	0.08	0.07	0.02	0.06
		Module-D	0.01	0.04	1.38	1.00	0.03	0.06	0.20	0.09	0.07	0.06	0.03	0.03	0.06

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		Validity period	5 years
Independent verification of the declaration and data, in compliance with ISO 14025: 2010			
Internal		External	X
The PCR review was conducted by a panel of experts chaired by Julie ORGELET (DDemain)			
PEPs are compliant with XP C08-100-1:2016 or EN 50693:2019			
The components of the present PEP may not be compared with components from any other program.			
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