

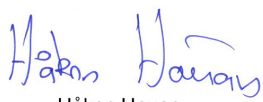
ENVIRONMENTAL PRODUCT DECLARATION

SENTRON ECPD

5TY1350-3MF[06,10,16]

Type III according to ISO 14025



Owner of the declaration: Siemens AG	Program holder and publisher: The Norwegian EPD foundation
Registration number: NEPD-11914-11861	Issue date: 29.07.2025 Valid to: 29.07.2030
IN COMPLIANCE WITH ISO 14025, EN 50693 and PCR EPD Italy007 and guided by IEC EN 63058:2021 Product specific rules for switchgear and controlgear and their assemblies for low voltage	
EPD type: Representative product w/o extrapolation rules for homogeneous product family	EPD scope: Cradle to Grave
Independent verification: Independent verification of the declaration and data, according to ISO14025:2011-10 <input checked="" type="checkbox"/> Internal <input type="checkbox"/> External according to external certified EPD management system & tool verification by Elisabet Amat, Greenize and internal verification by Lika Kvaratskhelia	Program instructions: The Norwegian EPD Foundation/EPD-Norge, General Programme Instructions 2024.09.18 version 4  Håkon Hauan Managing Director of EPD-Norway

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, as well as product specific rules (PSR) for low-voltage switchgear and control gear equipment in IEC TS 63058 ED1.0.

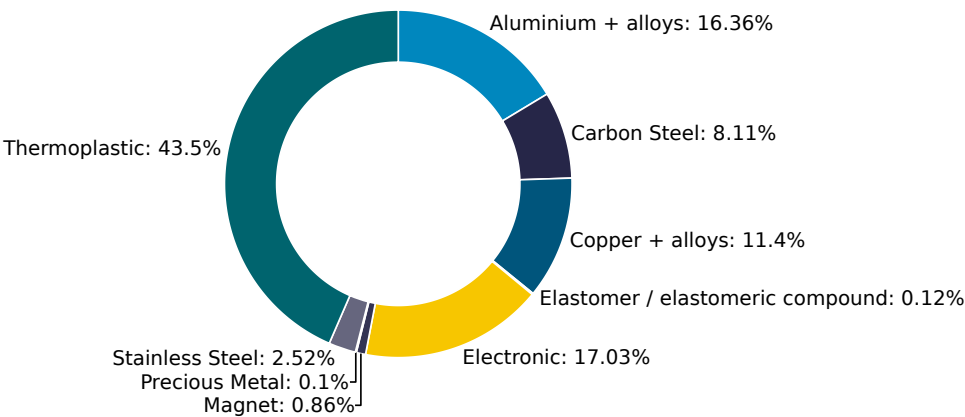
Siemens is dedicated to an environmentally conscious design of its products in line with IEC 62430 and has implemented an integrated management system according to ISO 9001, ISO 14001 and ISO 45001.

Products	All variants in the range of 5TY1350-3MF[06,10,16] consist of the same hardware and power loss characteristic, all resulting in the same impacts as the reference product
Represented by	5TY1350-3MF16
Product Description	Electronic Circuit Protection Device to operate several already known functionalities in one device (application driven) with electronic switching on base of cutting edge solid state technology.
Functional Unit	The ECPD = “Electronic Circuit Protection Device” is an circuit protection device, with integrated electronic components for arc free / wearless switching, based on cutting edge solid state technology. The combination of already known mechanical components with the intelligent protection algorithm makes it possible to combine several product functionalities in one device. The ECPD connects via Zigbee to SENTRON Gateway solutions like Power Center 1000 via wireless communication. The representative product’s (5TY1350-3MF16) use phase scenario is: 7 W full load, 50% load rate, 30% use time rate, reference lifetime: 20 years; the product is maintenance free within the reference service life.
Production Site	SIMEA Sibiu SRL, Romania

Material composition

The product weight of 0.16 kg combined with the packaging weight of 0.01 kg results in a total weight of 0.17 kg. The following chart outlines the overall material composition of the reference product, excluding packaging. Packaging consists of: Corrugated box (average composition) (EoL), Graphic paper (EoL).

Product Weight 0.16 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 EPD 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	0	0	0	0	0	0	X	0	0	X	X	X	X

Temporal and geographical scope and representativeness

Primary data of 2023; Secondary data : LCA for Experts (GaBi) 10.8, Database valid until 2025. 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

Amount of resources used and waste generated in production at Siemens is allocated based on annual production volume. For the end-of-life allocation, the "Polluter Pays" principle is adopted as required by the PCR EPDItaly007. 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, the cut-off criteria can be set to a maximum of 5 % of the overall environmental impacts. In this LCA, stickers, labels, tape, and staples used in the packaging have been excluded as their weights are negligible below 1%.

Scenarios:

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

Manufacturing	This stage covers the extraction of natural resources, production of raw materials, manufacturing, packaging, and upstream transportation.
Transportation to production site	Maritime Container ship (large ship 200000 DWT 23000 TEU) 19000 km, Road Truck-trailer (34-40 t) 1000 km, according to the default scenario of local and international transport (PCR EN 50693, 4.3.2)
Production energy model used	Romania (standard mix) with emission factor of 0.34 kgCO ₂ e/kWh
Distribution	This stage covers the product's distribution.
Distribution: Transport model use	Truck-trailer (34-40 t) 3500 km according to the default scenario of intracontinental transport (PCR EN 50693, 4.3.2)
Installation	This stage covers the End-of-Life treatment of transport packaging.
Installation: Energy model used	Not relevant
Use	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.
Use: Energy model used and use scenario	Europe (standard mix) with emission factor of 0.29 kgCO ₂ e/kWh 0.7 W full load, 50% load rate, 30% use time rate, reference service lifetime: 20 years
EoL	This stage covers the disassembly, material recycling in addition to thermal treatment of all recoverable materials and the disposal of all other materials.
EoL: Transport model use	Road Truck-trailer, 34 - 40t gross weight 1000 km
EoL: Energy model used	EMEA

Life cycle assessment - results

The following impact categories characterize the product's environmental footprint. They have been calculated with LCIA methodology 01 EN15804+A2 (EF 3.1); LCA tool: Green Digital Twin (GDT), Database: One Siemens LCA Database (based on MLC CUP 2024.1, formerly GaBi).

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	B1-B7	C1-C4	D
			Manufacturing	Distribution	Installation	Use stage	End of life	Benefits & loads
CC - total	kg CO ₂ eq	3.73E+1	1.06E+1	4.36E-2	0.00E+0	2.66E+1	1.34E-1	-1.35E+0
CC - fossil	kg CO ₂ eq	3.71E+1	1.06E+1	4.27E-2	0.00E+0	2.64E+1	1.33E-1	-1.34E+0
CC - biogenic	kg CO ₂ eq	2.35E-1	-2.17E-3	1.02E-4	0.00E+0	2.37E-1	3.57E-5	0.00E+0
CC - luluc	kg CO ₂ eq	1.53E-2	1.04E-2	7.19E-4	0.00E+0	4.01E-3	2.11E-4	-1.43E-3
ODP	kg CFC-11 eq	7.25E-10	1.27E-10	6.30E-15	0.00E+0	5.98E-10	8.41E-14	-3.23E-12
AP	Mole of H ⁺ eq	2.27E-1	1.76E-1	5.86E-5	0.00E+0	5.08E-2	2.07E-4	-8.57E-2
EP - freshwater	kg P eq	1.78E-4	6.79E-5	1.83E-7	0.00E+0	1.10E-4	4.52E-7	-2.40E-6
EP - marine	kg N eq	2.43E-2	1.15E-2	2.13E-5	0.00E+0	1.27E-2	1.00E-4	-1.79E-3
EP - terrestrial	Mole of N eq	2.58E-1	1.24E-1	2.53E-4	0.00E+0	1.33E-1	1.12E-3	-1.97E-2
POCP	kg NMVOC eq	7.36E-2	3.97E-2	5.84E-5	0.00E+0	3.36E-2	2.58E-4	-9.78E-3
ADP - M & M	kg Sb eq	7.33E-4	7.28E-4	3.72E-9	0.00E+0	4.93E-6	1.83E-9	-2.48E-4
ADP - fossil	MJ	6.95E+2	1.42E+2	5.63E-1	0.00E+0	5.52E+2	2.90E-1	-1.72E+1
WDP	m ³ world eq deprived water	1.20E+1	4.80E+0	6.62E-4	0.00E+0	7.18E+0	1.33E-2	-4.56E-1
PM	Disease incidences	2.02E-6	1.59E-6	5.86E-10	0.00E+0	4.25E-7	7.47E-10	-5.53E-7
IRP	kBq U235 eq	1.52E+1	6.91E-1	1.49E-4	0.00E+0	1.45E+1	1.80E-3	-7.10E-2
ETP - fw	CTUe	2.21E+2	6.03E+1	4.18E-1	0.00E+0	1.60E+2	1.78E-1	-5.04E+0
HTP - c	CTUh	1.96E-8	1.06E-8	8.44E-12	0.00E+0	8.98E-9	4.99E-12	-6.71E-10
HTP - nc	CTUh	2.42E-7	1.04E-7	3.79E-10	0.00E+0	1.38E-7	1.69E-10	-2.12E-8
SQP	dimensionless (pt)	3.02E+2	6.81E+1	2.77E-1	0.00E+0	2.34E+2	1.16E-1	-1.08E+0

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 freshwater 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	B1-B7	C1-C4	D
			Manufacturing	Distribution	Installation	Use stage	End of life	Benefits & loads
PERE	MJ	4.39E+2	3.93E+1	4.85E-2	0.00E+0	3.99E+2	6.74E-2	-3.23E+0
PERM	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	4.39E+2	3.93E+1	4.85E-2	0.00E+0	3.99E+2	6.74E-2	-3.23E+0
PENRE	MJ	6.95E+2	1.42E+2	5.63E-1	0.00E+0	5.52E+2	2.90E-1	-1.72E+1
PENRM	MJ	6.02E-3	1.36E+0	0.00E+0	0.00E+0	0.00E+0	-1.35E+0	0.00E+0
PENRT	MJ	6.95E+2	1.44E+2	5.63E-1	0.00E+0	5.52E+2	-1.06E+0	-1.72E+1
SM	kg	5.68E-3	5.68E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m3	4.60E-1	1.55E-1	5.41E-5	0.00E+0	3.04E-1	3.40E-4	-1.81E-2
BIOGCPRODUCT	kg of C	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
BIOGCPACKAGING	kg of C	6.42E-3	6.42E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

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

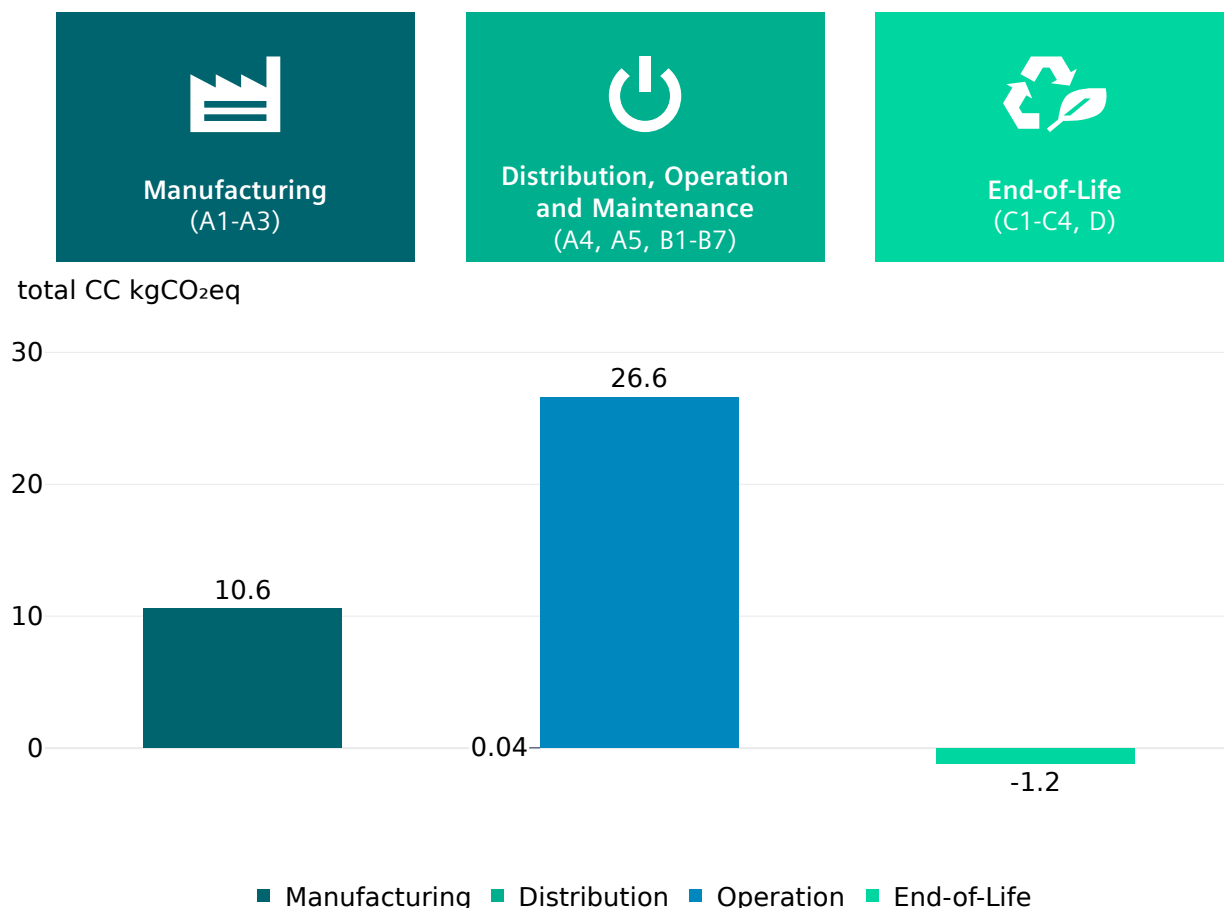
Indicators	Unit	Total - (w/o D)	A1-A3	A4	A5	B1-B7	C1-C4	D
			Manufacturing	Distribution	Installation	Use stage	End of life	Benefits & loads
HWD	kg	4.39E-6	3.59E-6	2.16E-11	0.00E+0	7.97E-7	1.14E-10	-1.71E-8
NHWD	kg	2.55E+0	2.05E+0	9.20E-5	0.00E+0	4.56E-1	4.43E-2	-7.37E-2
RWD	kg	9.39E-2	5.88E-3	1.03E-6	0.00E+0	8.81E-2	1.11E-5	-7.29E-4
MER	kg	6.11E-2	1.47E-3	0.00E+0	0.00E+0	0.00E+0	5.96E-2	0.00E+0
MFR	kg	4.83E-2	2.43E-3	0.00E+0	0.00E+0	0.00E+0	4.58E-2	0.00E+0
CRU	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
ETE	MJ	3.93E-1	1.14E-2	0.00E+0	0.00E+0	0.00E+0	3.81E-1	3.60E-2
EEE	MJ	2.20E-1	6.42E-3	0.00E+0	0.00E+0	0.00E+0	2.14E-1	2.01E-2

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 operations 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.

It leads to:

- an overall **product recyclability of up to 43%** mainly due to metal content
- an **energy recoverability of up to 47%** from plastic materials
- a **minimum disposal rate of 10%**

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.



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	Product category rules for life cycle assessments of electronic and electrical products and systems
IEC EN 63058:2021	Product specific rules for switchgear and controlgear and their assemblies for low voltage
GPI -EPDNorge	General Programme Instructions 2024.09.18 version 4



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Published by

Siemens AG
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