



ENVIRONMENTAL PRODUCT DECLARATION

SIMATIC S7-1500 CPU

6ES7512-1CK01-0AB0

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.

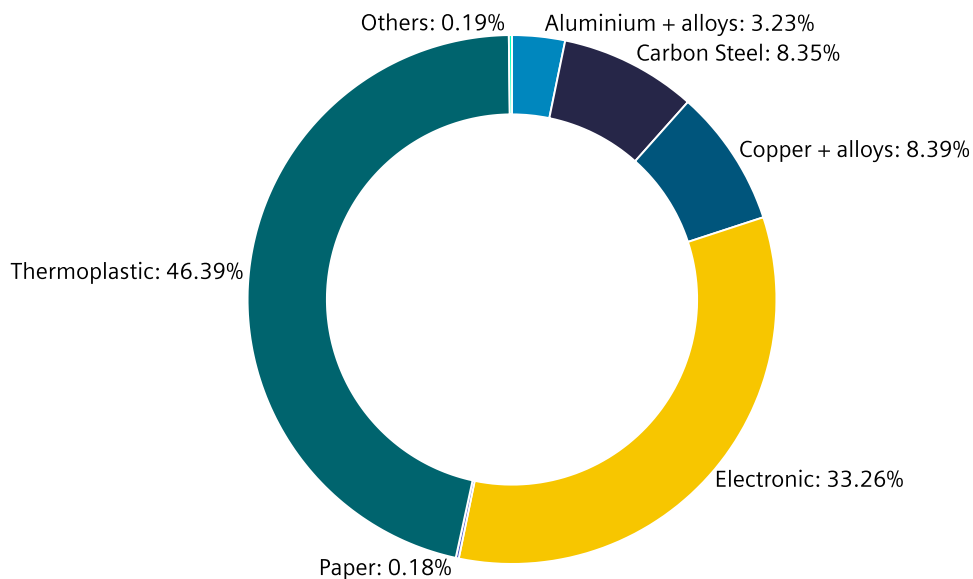
Products	Variants in the product family of SIMATIC S7-1500 Compact CPU 1512C - please refer to link
Represented by the reference product	6ES7512-1CK01-0AB0
Product Description	SIMATIC S7-1500 Compact CPU CPU 1512C-1 PN, central processing unit with working memory 250 KB for program and 1 MB for data, 32 digital inputs, 32 digital outputs, 5 analog inputs, 2 analog outputs, 6 high-speed counters, 4 high-speed outputs for PTO/PWM/frequency output, 1. interface: PROFINET IRT with 2-port switch, 48 ns bit performance, incl. front connector push-in, SIMATIC Memory Card necessary
Functional Unit	To control industrial automation applications over the 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 1.33 kg adds up with packaging weight of 0.21 kg to a total weight of 1.54 kg. Packaging consists of: PE foam, cardboard and paper.

Product Weight 1.33 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:
China (standard mix), China (hydro power)

Transportation model:
Truck-trailer, 34 – 40 t gross weight, 3500 km

Energy model used:
Europe (standard mix)

Distribution scenario:
Container Ship, Panamax 52000 DWT, 5000 TEU, 19000 km; plus
Truck-trailer, 34 - 40 t gross weight, 1000 km

Use Scenario:
70% active mode (7.6 W),
30% off,
reference lifetime 10 years

Energy model used:
Europe (standard mix)

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

Key environmental performance indicators

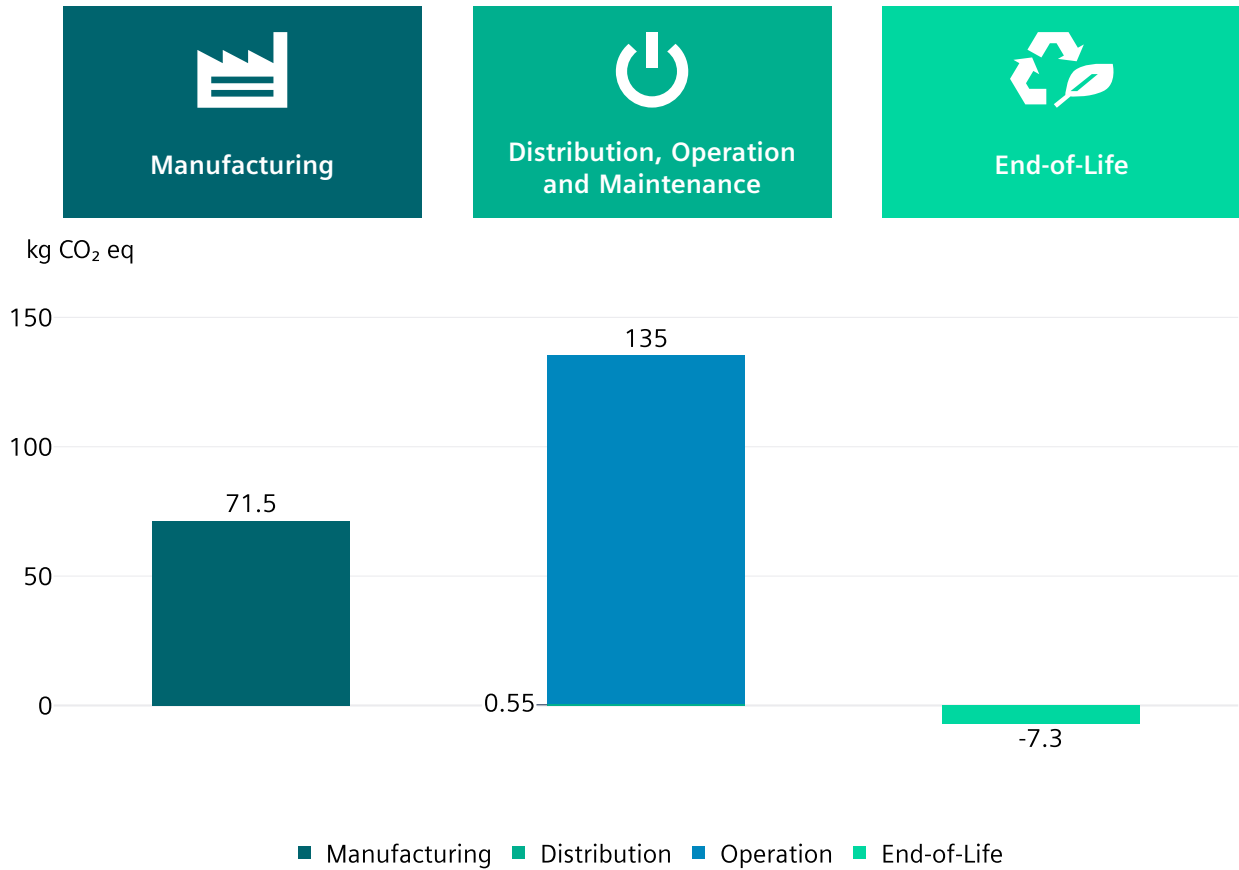
The following impact categories characterize the product's environmental footprint. They have been calculated with LCIA methodology EN15804+A2 (EF 3.1); LCA tool: Green Digital Twin Version 4.4, Database: One Siemens LCA Database (based on Sphera MLC CUP 2024.1).

Measurement setup of the energy consumption for the active mode in operation phase: Room temperature, typical power consumption at 24 V, 25% load on the S7-1500 bus (only the internal power loss in the PLC is taken into account), all PN interfaces active, 100% display backlight.

Impact Category	Unit	Total	Manufacturing	Distribution	Operation	End-of-Life
Climate change – total	kg CO ₂ eq	1.99E+2	7.15E+1	5.47E-1	1.35E+2	-7.34E+0
Climate change – fossil	kg CO ₂ eq	1.98E+2	7.13E+1	5.40E-1	1.33E+2	-7.32E+0
Climate change – biogenic	kg CO ₂ eq	1.33E+0	1.17E-1	4.28E-3	1.20E+0	3.48E-3
Climate Change, land use and land use change	kg CO ₂ eq	8.59E-2	7.90E-2	1.94E-3	2.03E-2	-1.54E-2
Ozone depletion	kg CFC-11 eq	3.53E-9	5.25E-10	4.75E-14	3.03E-9	-2.11E-11
Acidification	Mole of H+ eq	6.98E-1	8.30E-1	1.01E-2	2.57E-1	-3.99E-1
Eutrophication, freshwater	kg P eq	8.56E-4	3.15E-4	6.46E-7	5.57E-4	-1.65E-5
Eutrophication, marine	kg N eq	1.38E-1	8.53E-2	2.48E-3	6.43E-2	-1.46E-2
Eutrophication, terrestrial	Mole of N eq	1.47E+0	9.26E-1	2.73E-2	6.73E-1	-1.61E-1
Photochemical ozone formation, human health	kg NMVOC eq	3.86E-1	2.71E-1	7.07E-3	1.70E-1	-6.17E-2
Resource use, mineral and metals	kg Sb eq	7.57E-3	1.41E-2	1.67E-8	2.50E-5	-6.56E-3
Resource use, fossils	MJ	3.65E+3	9.58E+2	5.09E+0	2.80E+3	-1.10E+2
Water use	m ³ world eq	5.92E+1	2.69E+1	1.37E-2	3.64E+1	-4.09E+0
Particulate matter	Disease incidences	7.11E-6	7.49E-6	1.79E-7	2.15E-6	-2.71E-6
Ionising radiation, human health	kBq U235 eq	7.72E+1	4.13E+0	1.11E-3	7.34E+1	-2.97E-1
Ecotoxicity, freshwater – total	CTUe	1.21E+3	4.51E+2	3.76E+0	8.10E+2	-5.32E+1
Human toxicity, cancer – total	CTUh	7.18E-8	3.07E-8	7.12E-11	4.55E-8	-4.42E-9
Human toxicity, non-cancer – total	CTUh	1.22E-6	6.66E-7	2.54E-9	6.97E-7	-1.47E-7
Land Use	dimensionless (pt)	1.35E+3	1.80E+2	7.60E-1	1.18E+3	-1.29E+1

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:

- **product recyclability of up to 30%** mainly due to metal content
- **energy recoverability of up to 52%** from plastic materials
- **minimum disposal rate of 18%**

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.

Legal Disclaimer

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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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Siemens AG
Digital Industries
Factory Automation
Gleiwitzer Str. 555
90475 Nürnberg-Moorenbrunn
Germany

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