

EPD



Environmental Product Declaration

Medium-voltage switchgear UniGear ZS1 12.12.32 IF,BT 500mm(w/CT, VT, CB)

Production site: ABB Brno, Czech Republic



DOCUMENT KIND Environmental Product Declaration	IN COMPLIANCE WITH ISO 14025 and EN 50693			
PROGRAM OPERATOR The Norwegian EPD Foundation	PUBLISHER The Norwegian EPD Foundation			
REGISTRATION NUMBER OF THE PROGRAM OPERATOR NEPD-8899-7606	ISSUE DATE 31-01-2025			
VALID TO 31-01-2030	STATUS Approved		SECURITY LEVEL Public	
OWNING ORGANIZATION ABB Switzerland Ltd, Group Technology Management	ABB DOCUMENT ID 1VLG101290	REV. A	LANG. EN	PAGE 1/16

EPD Owner	ABB Switzerland Ltd, Group Technology Management				
Organization No.	CHE-101.538.426				
Manufacturer name and address	ABB, s.r.o Videnska 117, Brno 619 00, Czech Republic				
Company contact	Karol Majer- karol.majer@cz.abb.com Global Product Manager				
Program operator	The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway phone: +47 23 08 80 00, email: post@epd-norge.no				
Declared product	Medium-voltage switchgear UniGear ZS1 12.12.32 500mm, IF, BT (w/CT, VT, CB)				
Product description	Medium-voltage air-insulated switchgear UniGear ZS1 is the ABB mainline global switchgear up to 24 kV, 4000 A, 63 kA. UniGear ZS1 is used to distribute electric power in a variety of demanding applications such as on offshore platforms, in container or cruise ships, in mines as well as in utility substations, power plants or chemical plants. Panels are available as a single busbar, double busbar, back-to-back or double level solution.				
Functional unit	The functional unit of this study is power distribution switchgear with main function of protecting and metering, during a service life of 20 years in Europe with a use rate of 100% and 61% load factor of the rated current.				
Reference flow	Medium-voltage air-insulated switchgear UniGear ZS1, including related accessories and packaging.				
Independent verification	Independent verification of the declaration and data, according to ISO 14025:2010 <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL				
	Independent verifier approved by EPD-Norge: Elisabet Amat Signature: 				
Approved by	Håkon Hauan, CEO EPD-Norge Signature: 				
Reference PCR	EN 50693:2019 – Product Category Rules for Life Cycle Assessments of Electronic and Electrical Products and Systems. EPDItaly007 – Electronic and Electrical Products and Systems, Rev. 3.0, 2023/01/13. EPDItaly015 – Electronic and Electrical Products and Systems – Switchboards, Rev. 1.5, 2022/02/23.				
Program instructions	The Norwegian EPD Foundation/EPD-Norge, General Programme Instructions 2019, Version 3.0, 2019/04/24.				
LCA study	This EPD is based on the LCA study described in the LCA report 1VLG101281				
EPD type	Specific product with extrapolation rules by a specific manufacturer				
EPD scope	Cradle-to-grave				
Product RSL	20 years				
Geographical representativeness	Manufacturing (suppliers): Global	Manufacturing (ABB): Czech Republic	Downstream: Europe		
Reference year	2023				
LCA software	SimaPro 9.5 (2023)				
LCI database	Ecoinvent v3.9.1 (2022)				
Comparability	EPDs published within the same product category, though originating from different programs, may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.				
Liability	The owner of the declaration shall be liable for the underlying information and evidence. EPD-Norge shall not be liable with respect to manufacturer, life cycle assessment data, and evidence.				

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	2/16

Contents

Sustainability at ABB 4

General Information 5

Constituent Materials 6

LCA Background Information 8

Inventory Analysis 10

Environmental Indicators 12

Extrapolation rules 14

Additional Environmental Information 15

References 16

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	3/16



Sustainability at ABB

ABB is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation, and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels.

At ABB, we actively contribute to a more sustainable world, leading by example in our own operations and partnering with customers and suppliers to enable a low-carbon society, preserve resources, and promote social progress.

Learn more on our website global.abb/group/en/sustainability or scan the QR code.



STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	4/16



General Information

This Environmental Product Declaration is a “specific product with extrapolation rules EPD”, and the declared product is the Air-insulated switchgear UniGear ZS1 12.12.32 500mm IF, BT (w/CT, VT, CB-), including related accessories and packaging.

General technical information of the Air-insulated switchgear UniGear ZS1 12.12.32 500mm (w/CT, VT, CB) are presented below.

UniGear ZS1 12.12.32 500mm (w/CT, VT, CB)		
Ratings	Rated voltage [kV]	12
	Rated feeder current [A]	1250
	Rated short time withstand current [kA]	31.5
Size	Width	500mm
Components	Circuit Breaker	VD4/P p135 12kV 1250A 31.5kA
	Current Transformer	TPU 43.13 1000//1/1 A
	Voltage Transformer	TJCN 4 - 11000/√3//110/√3/110/3

The UG ZS1 12.12.32 500mm manufactured by ABB Brno located in Czech Republic. The manufacturing site is certified according to the following standards:

- ISO 9001:2015 – Quality Management Systems
- ISO 14001:2015 – Environmental Management Systems
- ISO 45001:2018 – Occupational Health and Safety Management Systems

Abbreviations

Term	Description
LCA	Life Cycle Assessment
EPD	Environmental Product Declaration
PCR	Product Category Rules
GWP	Global Warming Potential
RSL	Reference Service Life of the product
IF	Incoming feeder
BT	Bus tie
CT	Current transformer
VT	Voltage transformer
CB	Circuit breaker

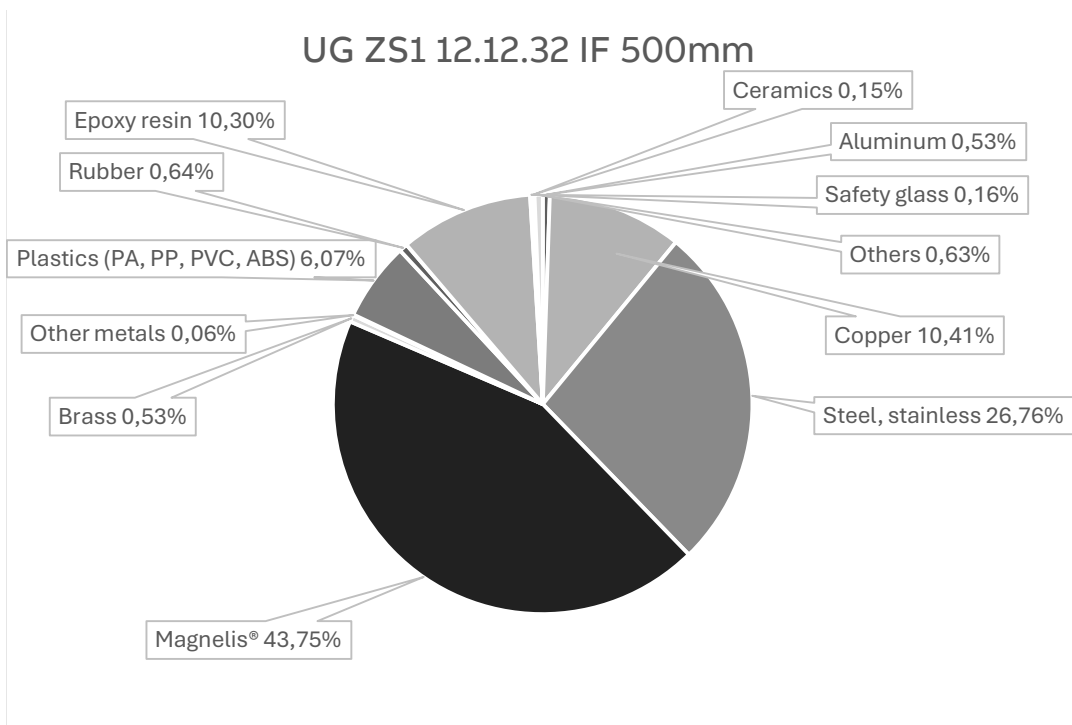
STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	5/16



Constituent Materials

The constituent materials of UG ZS1 12.12.32 500mm IF (with TPU43.13, TJCN4, VD4/P 12.12.32 p.135) is presented below. Weights of VD4/P 12.12.32 p.135, 3 pcs of TPU 43.13 and 3 pcs of TJCN4 are included to bellow table.

Type	Material	Weight [kg]	Weight %
Metals	Aluminum	3.30	0.53
	Copper	64.29	10.41
	Steel, stainless	165.16	26.76
	Steel (Magnelis®)	270.09	43.75
	Brass	3.29	0.53
	Other metals	0.38	0.06
Plastics	Plastics (PA, PP, PVC, ABS)	37.46	6.07
	Rubber	3.97	0.64
Others	Epoxy resin	63.55	10.3
	Safety glass	1.01	0.16
	Ceramics	0.9	0.15
	Others	3.89	0.63
Total		617.28	100



STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	6/16

The constituent materials of the packaging and accessories are presented below.

Description	Material	Weight [kg]	Weight %
Metals	Aluminum, steel	1.224	0.68
Plastics	PE, PES	1.75	0.98
Wooden base materials	Wood (pallet, case)	174	97.34
Others	Cardboard	1.79	1.00
Total		178.76	100

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	7/16



LCA Background Information

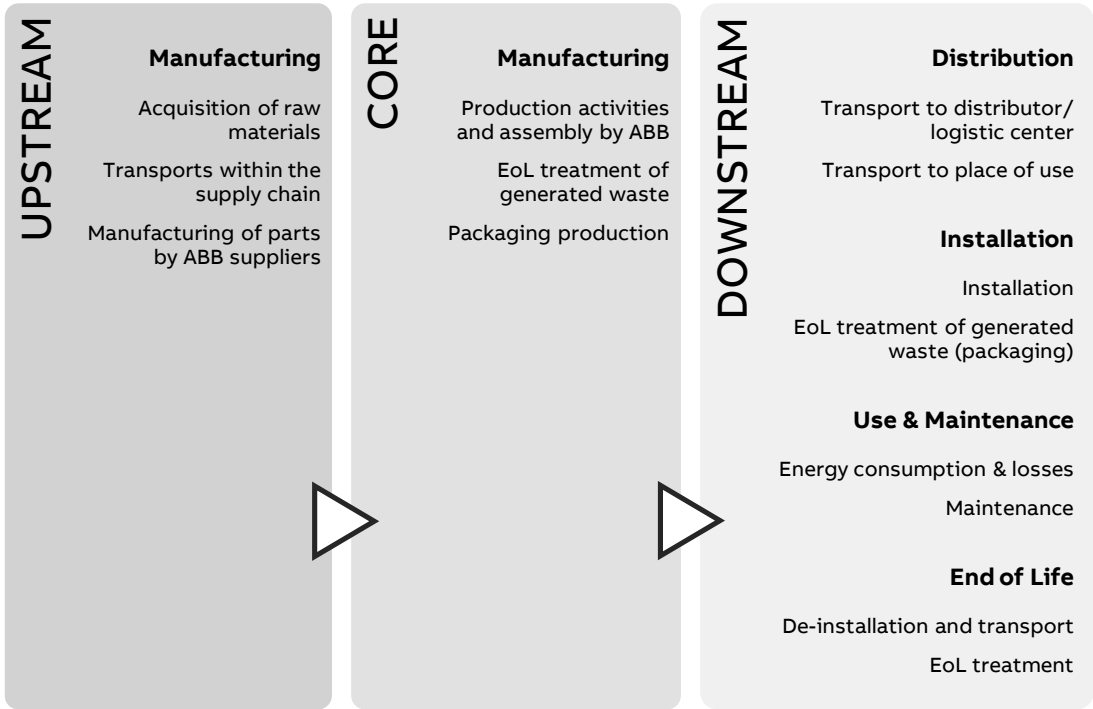
Functional Unit

The functional unit of this study is to distribute electric power at an internal resistance use rate of 100% and load rate of 61 %, during a service life of 20 years in Europe. The reference flow is a single UG ZS1 12.12.32 500mm, including related accessories and packaging.

Note, the reference service life (RSL) of 20 years is a theoretical period selected for calculation purposes only – this is not representative for the minimum, average, nor actual service life of the product.

System Boundaries

The life cycle assessment is a “cradle-to-grave” analysis, and the system boundaries are defined according to EN 50693, as required by the PCR EPDItaly007. For transparency reasons, the manufacturing stage is further divided into an upstream and core stage.



STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	8/16

Data quality

Both primary and secondary data are used. The main sources for primary data are the bill of materials, technical drawings, and site-specific foreground data provided by ABB.

For all processes for which primary data are not available, generic background data originating from the ecoinvent v3.9.1 database, with system model “allocation, cut-off by classification”, are used. The LCA software used for the calculations is SimaPro 9.5.

Allocation rules

The utility consumption and waste generation by ABB, in the core manufacturing stage, is allocated to the production of one reference product according to applicable rules. For the end-of-life allocation, the “Polluter Pays” principle is adopted according to what is defined in the CEN/TR 16970 standard. However, the potential benefits and avoided loads from recovery and recycling processes are not considered because it is not required by the PCR.

Cut-off criteria

According to PCR, the cut-off criteria can be set to a maximum of 2 % of the overall environmental impacts. In this LCA, stickers have been excluded as their weights are negligible. Process black oxide and phosphate conversion coating have also been excluded due to the model complexity and unavailability of data.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	9/16



Inventory Analysis

Manufacturing Stage (upstream)

The life cycle inventory in the upstream manufacturing stage is based on the primary data available from ABB. Datasets are applied accordingly, to the best of our knowledge, to represent each material, manufacturing process, and surface treatment.

Additionally, supply chain transports are added as far as data is available between ABB, the suppliers, and sub-suppliers. Only primary suppliers are considered. The rest of the transports are assumed to already be included in ecoinvent's "market for"-processes.

Manufacturing Stage (core)

In the core manufacturing stage, utility consumption and waste generation at the ABB manufacturing site are accounted for. The packaging materials and accessories associated with the product are also considered. Modelling decisions and assumptions that are highly relevant to the results are as following:

- 100% renewable electricity is considered, which is procured by the manufacturing site ABB Videnska through Guarantees of Origins (GO's). This dataset includes electricity inputs produced in this country and from imports and transformed to medium voltage, the transmission voltage, direct emissions to air and electricity losses during transmission. However, due to the lack of life cycle based residual mix data, other electricity mixes in the LCA are not calculated with residual mix.

Distribution

The transport distance from the ABB manufacturing site to the site of installation is assumed to be 300 km by lorry, as suggested by the PCR EPDItaly 015, as the actual distance is unknown. The environmental impacts can be multiplied accordingly if the actual distance is known.

	Dataset	Amount	Unit	Represent.
Transport	Transport, freight, lorry 16-32 metric ton, EURO4 {RER}	300	km	PCR

Installation

The installation phase only implies manual activities, and no energy is consumed. Therefore, this phase only considers the end-of-life of the packaging materials used.

	Scenario	Transport	Representation
Packaging End-of-Life	Packaging waste by waste management operations (Eurostat, 2021) *	100 km by lorry (assumption)	Europe

*Due to lack of data from Eurostat, 100% landfill is assumed for ceramics (e.g., bentonite)

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	10/16

Use

The use stage considers the reference power consumption over the reference service life of 20 years as defined in the functional unit. This is calculated using the following formula, according to PCR EPDIItaly015:

$$E_{use} [kWh] = \frac{P_{use} * 8760 * RSL * \alpha}{1000} = \frac{177.1W * 8760 \text{ hours} * 20 \text{ years} * 100 \%}{1000} = 31126.9 kWh$$

Where:

- E_{use} = Total energy use over the reference service life
- P_{use} = Reference power consumption in watts
- RSL = Reference Service Life in years
- α = Use time rate
- 8760 is the number of hours in a year
- 1000 is the conversion factor from W to kW

	Dataset	Amount	Unit	Represent.
Energy	European energy mix; <i>Electricity, medium voltage {RER}/ market group for / Cut-off, S</i>	0,361	kg CO ₂ -eq./kWh	Europe

Maintenance is not considered because the consumed energy is negligible from the environmental impacts point of view.

End of life

Decommissioning of the product only implies manual activities, and no energy is consumed. Therefore, this phase only considers the end-of-life of the product.

	Scenario	Transport	Representation
Product End-of-Life	IEC/TR 62635 (Annex D.3) *	100 km by lorry (assumption)	Europe

*A conservative approach is adopted by considering all parts as either: requiring selective treatment, difficult to process, or going through a separation process; no individual part is considered as a single recyclable material. Also, due to the transformer containing parts difficult to process through separation, these are all modelled as 100 % waste to landfill to represent the typical waste streams within Europe.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	11/16



Environmental Indicators

In accordance with the PCR EPDItaly007, the environmental impact indicators are determined by using the characterization factors and impact assessment methods specified in EN 15804:2012+A2:2019.

UG ZS1 12.12.32 500mm IF (with TPU43.13, TJCN4, VD4/P 12.12.32 p.135)

Impact category	Unit	Total	Cradle-to-gate					
			Cradle-to-gate				DOWNSTREAM	
			UPSTREAM	CORE	Distribution	Installation	Use and maintenance	End-of-life
		Manufacturing						
GWP – total	kg CO ₂ eq.	1,50E+04	3,54E+03	7,12E+01	4,47E+01	1,26E+01	1,13E+04	1,22E+02
GWP – fossil	kg CO ₂ eq.	1,47E+04	3,59E+03	2,04E+02	4,47E+01	1,46E+00	1,08E+04	5,85E+01
GWP – biogenic	kg CO ₂ eq.	2,90E+02	-5,13E+01	-1,33E+02	4,07E-02	1,12E+01	3,99E+02	6,38E+01
GWP – luluc	kg CO ₂ eq.	3,31E+01	5,34E+00	5,48E-01	2,18E-02	4,49E-04	2,71E+01	6,81E-02
ODP	kg CFC-11 eq.	3,05E-04	9,50E-05	1,40E-05	9,78E-07	1,74E-08	1,95E-04	6,76E-07
AP	mol H ⁺ eq.	1,22E+02	6,58E+01	1,13E+00	1,85E-01	4,53E-03	5,44E+01	2,63E-01
EP – freshwater	kg P eq.	1,54E+01	5,47E+00	5,49E-02	3,15E-03	1,24E-04	9,88E+00	1,80E-02
EP – marine	kg N eq.	1,61E+01	5,74E+00	4,14E-01	7,05E-02	5,74E-03	9,66E+00	2,27E-01
EP – terrestrial	mol N eq.	1,57E+02	6,57E+01	4,43E+00	7,53E-01	1,90E-02	8,52E+01	7,04E-01
POCP	kg NMVOC eq.	4,95E+01	2,02E+01	1,32E+00	2,71E-01	6,53E-03	2,75E+01	2,38E-01
ADP – minerals and metals	kg Sb eq.	7,98E-01	7,75E-01	1,04E-03	1,44E-04	2,87E-06	2,15E-02	4,39E-04
ADP – fossil	MJ, net calorific value	2,99E+05	4,48E+04	3,30E+03	6,37E+02	1,18E+01	2,49E+05	6,61E+02
WDP	m ³ eq.	4,04E+03	1,39E+03	8,66E+01	2,59E+00	8,39E-02	2,55E+03	9,54E+00

GWP-fossil: Global Warming Potential fossil; GWP-biogenic: Global Warming Potential biogenic; GWP-luluc: Global Warming Potential land use and land use change; ODP: Depletion potential of the stratospheric ozone layer; AP: Acidification potential; EP-freshwater: Eutrophication potential-freshwater compartment; EP-marine: Eutrophication potential-marine compartment; EP-terrestrial: Eutrophication potential-accumulated exceedance; POCP: Formation potential of tropospheric ozone; ADP-minerals & metals: Abiotic Depletion for non-fossil resources potential; ADP-fossil: Abiotic Depletion for fossil resources potential; WDP: Water deprivation potential.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	12/16

Resource use parameters	Unit	Total	Cradle-to-gate		Cradle-to-grave			
			UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
PENRE	MJ, low cal. value	2,97E+05	4,35E+04	3,23E+03	6,37E+02	1,18E+01	2,49E+05	6,61E+02
PERE	MJ, low cal. value	5,98E+04	6,74E+03	5,13E+03	9,89E+00	2,62E-01	4,79E+04	5,89E+01
PENRM	MJ, low cal. value	1,45E+03	1,38E+03	7,15E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERM	MJ, low cal. value	3,16E+03	7,15E+02	2,45E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ, low cal. value	2,99E+05	4,49E+04	3,30E+03	6,37E+02	1,18E+01	2,49E+05	6,61E+02
PERT	MJ, low cal. value	6,30E+04	7,46E+03	7,58E+03	9,89E+00	2,62E-01	4,79E+04	5,89E+01
FW	m ³	2,45E+02	4,70E+01	2,72E+00	9,08E-02	3,07E-03	1,95E+02	3,39E-01
MS	kg	1,43E+02	1,37E+02	5,52E+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	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

PENRE: Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material; PERE: Use of renewable primary energy excluding renewable primary energy resources used as raw material; PENRM: Use of non-renewable primary energy resources used as raw material; PERM: Use of renewable primary energy resources used as raw material; PENRT: Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); PERT: Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); FW: Net use of fresh water; MS: Use of secondary materials; RFS: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels.

System output indicators	Unit	Total	Cradle-to-gate		Cradle-to-grave			
			UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
HWD	kg	8,17E-01	4,78E-01	1,66E-02	4,06E-03	6,83E-05	3,16E-01	2,56E-03
NHWD	kg	1,83E+03	8,15E+02	1,03E+02	3,11E+01	9,80E+00	6,84E+02	1,90E+02
RWD	kg	1,95E+00	1,27E-01	5,88E-03	2,07E-04	5,11E-06	1,81E+00	1,18E-03
MER	kg	7,85E+01	7,45E+00	6,32E+01	0,00E+00	6,81E+00	0,00E+00	1,10E+00
MFR	kg	8,11E+02	2,01E+02	2,14E+02	0,00E+00	1,14E+01	0,00E+00	3,85E+02
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	3,26E+02	3,34E+01	2,56E+02	0,00E+00	2,89E+01	0,00E+00	7,86E+00
EEE	MJ	1,78E+02	1,75E+01	1,40E+02	0,00E+00	1,61E+01	0,00E+00	4,37E+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 electricity energy.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	13/16



Extrapolation rules

Due to the large variations in environmental impacts present within the series, extrapolation rules are established according to EN 50693. This LCA covers different build configurations than representative product. All the analyzed configurations have the same main functionality, product standards and manufacturing technology. The different life cycle stages can be extrapolated to other products of the same homogeneous environmental family by applying a rule of proportionality to the parameters in the following tables, divided by different life cycle stages.

Type	UG ZS1 12.12.32 BT 500 mm (with TPU43.13, TJC4, VD4/P 12.12.32 p.135)				
LCA phase	UPSTREAM	CORE	DOWNSTREAM		
	Manufacturing		Distribution	Use	End of Life
GWP – total	0,990	0,955	0,987	1,000	0,986
GWP – fossil	0,990	0,984	0,987	1,000	0,974
GWP – biogenic	1,005	1,000	0,987	1,000	0,996
GWP – luluc	0,993	0,995	0,987	1,000	0,980
ODP	0,996	0,988	0,987	1,000	0,980
AP	1,002	0,991	0,987	1,000	0,980
EP – freshwater	1,002	0,994	0,987	1,000	0,980
EP – marine	0,996	0,992	0,987	1,000	0,977
EP – terrestrial	0,997	0,991	0,987	1,000	0,980
POCP	0,996	0,991	0,987	1,000	0,981
ADP – minerals and metals	1,004	0,987	0,987	1,000	0,980
ADP – fossil	0,989	0,987	0,987	1,000	0,980
WDP	0,997	1,004	0,987	1,000	0,980

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	14/16



Additional Environmental Information

Circularity Values

The recyclability potential of the product (excluding packaging) is calculated by dividing “MFR: material for recycling” in the end-of-life stage by the total weight of the product. As a result, the recyclability potential of the product is presented below. The result is representative for Europe according to IEC/TR 62635.

Recyclability potential	
UG ZS1 12.12.32 500mm IF (with TPU43.13, TJC4, VD4/P 12.12.32 p.135)	62,39 %
UG ZS1 12.12.32 500mm BT (with TPU43.13, TJC4, VD4/P 12.12.32 p.135)	62,15 %

Greenhouse gas emissions from the use of electricity in the manufacturing phase

Production mix from import, medium voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process.

Energy mix	Source	Amount	Unit
ABB_Electricity mix CZ factory {CZ}_biomass49%_PV30%_Wind21%_2023/ S_SMP_V1	Ecoinvent v3.9.1	0,068	kg CO ₂ -eq/kWh

Dangerous substances

The product complies with REACH and RoHS directive requirements and does not contain any of the listed materials in excess of the authorized proportions. For further information about REACH and RoHS, please visit the ABB webpage:

<https://new.abb.com/contact/form>.

Indoor environment

The product meets the requirements for low emissions.

Carbon footprint

Carbon footprint has not been worked out for the product.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	15/16



References

- Janoska Neuschlova, K. (2024). Life Cycle Assessment Report:Medium-voltage switchgear UniGear ZS1 12.12.32 IF, BT, BR, IFD, M 500mm (w/CT,VT,LPITs,CB) (Report No. 1VLG101281, rev. A). ABB Switzerland Ltd, Group Technology Management
- Vybiralova, N. (2024). Environmental Product Declaration: Indoor Voltage Transformer TJC 4 11000/√3//110/√3//110/3 V (EPD No. NEPD-6838-6108-EN). The Norwegian EPD Foundation. https://www.epd-norge.no/getfile.php/1361439-1718020822/EPDer/Byggevarer/NEPD-6838-6108_Indoor-Voltage-Transformer-TJC-4-11000----3--110----3--110-3-V.pdf
- Vano, P. (2022). Environmental Product Declaration: Indoor Current Transformer TPU 43.13 1000//1/1 A (EPD No. NEPD-4042-3066-EN). The Norwegian EPD Foundation. https://www.epd-norge.no/getfile.php/1328093-1671600827/EPDer/Byggevarer/NEPD-4042-3066_Indoor-current-transformer-TPU-4313-1000--1-1-A.pdf
- Scarano, D. (2024). *Environmental Product Declaration: VD4 Vacuum Circuit Breakers p.135 and p.150 families with PT1 pole* (EPD No. NEPD-6027-5273-EN). The Norwegian EPD Foundation. https://www.epd-norge.no/getfile.php/1353724-1717583096/EPDer/Byggevarer/NEPD-6027-5273_VD4-Vacuum-Circuit-Breakers-p150-family-with-PT1-pole.pdf
- ecoinvent. ecoinvent v3.9.1 (2022). <https://ecoinvent.org/the-ecoinvent-database/data-releases/ecoinvent-3-9-1/>
- European Committee for Standardization. (2019). *Product category rules for life cycle assessments of electronic and electrical products and systems* (EN 50693:2019).
- European Committee for Standardization. (2019). *Sustainability of constructions - Environmental product declarations* (EN 15804:2012+A2:2019).
- Eurostat. (2021). *Packaging waste by waste management operations*. https://ec.europa.eu/eurostat/databrowser/view/ENV_WASPAC/default/table?lang=en
- ICMQ S.p.A. (2023). *PCR EPDItaly007 - Electronic and electrical products and systems*, rev. 3.0 (2023-01-13). EPDItaly. <https://www.epditaly.it/en/view-pcr/>
- ICMQ S.p.A. (2022). *PCR EPDItaly015 - Electronic and electrical products and systems - switchboards*, rev. 1.5 (2022-02-23). EPDItaly. <https://www.epditaly.it/en/view-pcr/>
- ICMQ S.p.A (2020b). *Regulations of the EPDItaly Programme Regulations*, rev. 5.2 (2020-02-16). EPDItaly. https://www.epditaly.it/en/wp-content/uploads/2016/12/EPDITALY-Regulament_rev-5.2_EN.pdf
- International Electrotechnical Commission. (2012). *Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment*, Edition 1.0 (2012-10-1) (IEC/TR 62635).
- International Organization for Standardisation. (2006). *Environmental management - Life cycle assessment - Principles and framework* (ISO Standard No. 14040:2006). <https://www.iso.org/standard/37456.html>
- International Organization for Standardisation. (2006). *Environmental management - Life cycle assessment - Requirements and guidelines* (ISO Standard No. 14044:2006). <https://www.iso.org/standard/38498.html>
- PRé Sustainability. (2023). SimaPro (version 9.5) [computer software]. <https://pre-sustainability.com/solutions/tools/simapro/>
- SeaRates. (2022). *Shipping Distances & Time Calculator*. <https://www.searates.com/services/distances-time>
- The Norwegian EPD Foundation/EPD-Norge. (2019). *General Programme Instructions 2019*, Version 3.0 (2019-04-24). <https://www.epd-norge.no/getfile.php/1340010-1685100696/Dokumenter/GPI%20Det%20norske%20EPD%20programmet%20approved%20240419%20-%20ver3%20updated%20250523.pdf>
- ArcelorMittal Europe. (2024). *Environmental Product Declaration: Hot dip galvanized steel with Magnelis® coating* (EPD No. EPD-IES-0014422). The International EPD® System, www.environdec.com, <https://environdec.com/library/epd14422>



The Norwegian EPD Foundation

Program Operator and publisher

The Norwegian EPD Foundation
Post Box 5250 Majorstuen,
0303 Oslo, Norway

Ph. +47 23 08 80 00

email post@epd-norge.no

web www.epd-norge.no



Owner of the declaration

ABB Switzerland Ltd, Group
Technology Management

Brown Boveri Straße 6, 5400 Baden,
Switzerland

web www.abb.com



Author

Katerina Janoska Neuschlova
ABB s.r.o.

Videnska 117, Brno, Czech Republic

Ph. +420 705 657 202

email katerina.janoska-neuschlova@cz.abb.com

web www.abb.com

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	1VLG101290	A	EN	16/16