

EPD

# Environmental Product Declaration

Circuit Breaker VD4-UniCab ISD 24.06-08.12-16-20 P300



Direct replacement solution for ABB SACE RM and SFA circuit breakers with lateral operating mechanism installed in UniCab ISD switchgear

Production site: ABB Dalmine



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-7177-6574-EN	ISSUE DATE 2024-07-30			
VALID TO 2029-07-30	STATUS Approved	SECURITY LEVEL Public		
OWNING ORGANIZATION ABB Switzerland Ltd, Group Technology Management	ABB DOCUMENT ID 1VCD900066R0001	REV. S2802	LANG. EN	PAGE 1/18

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<b>Organization No.</b>	CHE-101.538.426		
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<b>Program operator</b>	The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway phone: +47 23 08 80 00, email: post@epd-norge.no		
<b>Declared product</b>	VD4-UniCab ISD 24.06-08.12-16-20 P300		
<b>Product description</b>	VD4-UniCab ISD breakers are used in electrical distribution for control and protection of cables, transformer and distribution substations, motors and transformers. The Scope of the Medium voltage circuit breakers is to interrupt an electric current with a mechanical actuator.		
<b>Functional unit</b>	To manage and protect the electrical continuity of the circuit to which it is applied, at a use rate of 30% of service life and load factor of 50% of the rated current. during a service life of 20 years in Europe.		
<b>Reference flow</b>	A single VD4-UniCab ISD circuit breaker, including related accessories and packaging.		
<b>Independent verification</b>	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: 		
<b>Approved by</b>	Håkon Hauan, CEO EPD-Norge  Signature: 		
<b>Reference PCR</b>	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. EPDItaly012 – Electronic and Electrical Products and Systems – Switches, Rev. 0, 2020/03/16.		
<b>Program instructions</b>	The Norwegian EPD Foundation/EPD-Norge, General Programme Instructions 2019, Version 3.0, 2019/04/24.		
<b>LCA study</b>	This EPD is based on the LCA study described in the LCA report 1VCD900065R0001		
<b>EPD type</b>	Specific product		
<b>EPD scope</b>	Cradle-to-grave		
<b>Product RSL</b>	20 years		
<b>Geographical representativeness</b>	Manufacturing (suppliers): Global	Manufacturing (ABB): Italy	Downstream: Europe
<b>Reference year</b>	2023		
<b>LCA software</b>	SimaPro 9.5 (2023)		
<b>LCI database</b>	Ecoinvent v3.9.1 (2022)		
<b>Comparability</b>	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.		
<b>Liability</b>	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.		

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# 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](https://global.abb/group/en/sustainability) or scan the QR code.



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## General Information

This Environmental Product Declaration is a “specific product EPD”, and the declared product is the VD4-UniCab ISD 24.06-08.12-16-20 P300, including related accessories and packaging.

VD4-UniCab ISD breakers are used in electrical distribution for control and protection of cables, transformer and distribution substations, motors and transformers. The Scope of the Medium voltage circuit breakers is to interrupt an electric current with a mechanical actuator.

General technical information of the product is presented below.

Description		Config. 1 (Ref. product)	Config. 2	Config. 3	Config. 4
Config.	Circuit Breaker	VD4-UniCab ISD	VD4-UniCab ISD-h	VD4-UniCab ISD	VD4-UniCab ISD-h
Size	Weight [kg]	158.86	160.92	158.77	160.83
Ratings	Rated voltage [kV]	24	24	24	24
	Rated current [A]	630	630	800	800
	Rated short circuit breaking current [kA]	12-16-20	12-16-20	12-16-20	12-16-20

VD4-UniCab ISD is the base circuit breaker, VD4-UniCab ISD-h presents an additional protection compared to the base circuit breaker.

The product is manufactured by ABB Dalmine located in Italy. 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
- ISO 50001:2018 – Energy management systems

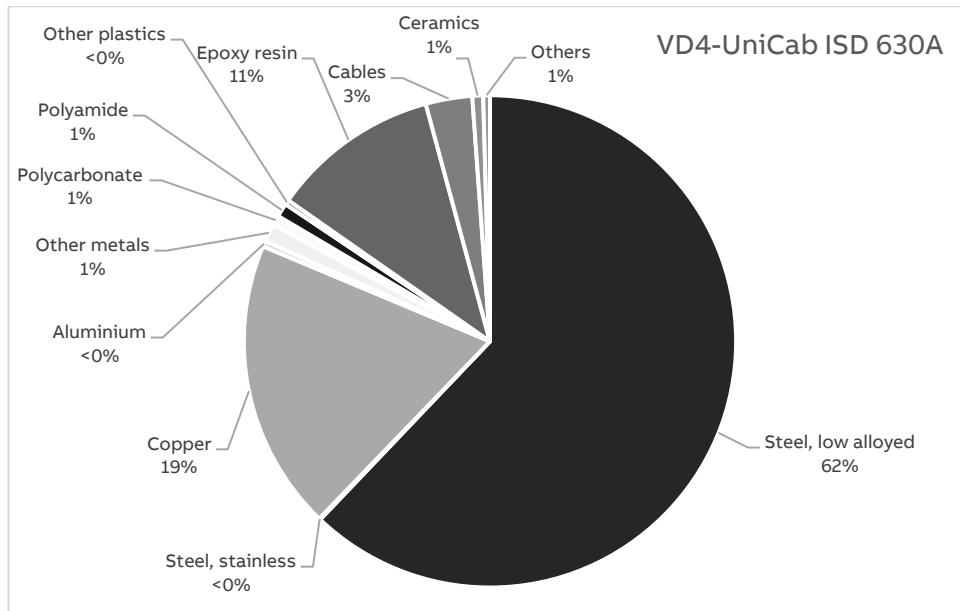
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# Constituent Materials

The constituent materials of VD4-UniCab ISD 630A are presented below.

Type	Material	Weight [kg]	Weight %
<b>Metals</b>	Steel, low-alloyed	79.84	62.06
	Steel, stainless	0.126	0.09
	Copper	24.56	19.09
	Aluminum	0.465	0.36
	Other metals	1.55	1.20
<b>Plastics</b>	Polycarbonate	0.817	0.63
	Polyamide	1.17	0.90
	Other plastics	0.41	0.31
<b>Others</b>	Epoxy resin	14.24	11.07
	Cables	3.93	3.05
	Ceramics	0.92	0.71
	Others	0.568	0.44
<b>Total</b>		<b>128.63</b>	<b>100</b>



The constituent materials of the packaging are presented below.

Material	Weight [kg]	Weight %
Cardboard	0.45	1.49%
Plastics	0.62	2.05%
Wood	29.00	95.93%
Steel	0.16	0.53%
<b>Total</b>	<b>30.23</b>	<b>100</b>



# LCA Background Information

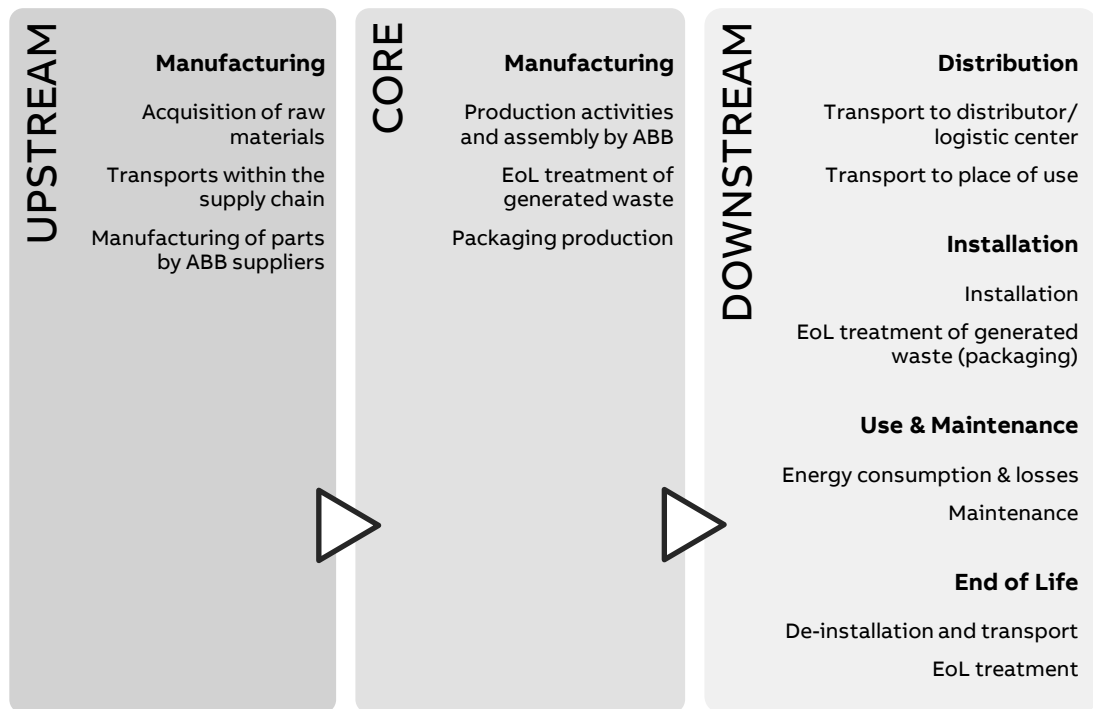
## Functional Unit

The functional unit of this study is to manage and protect the electrical continuity of the circuit to which it is applied, at a use rate of 30% of service life and load factor of 50% of the rated current. during a service life of 20 years in Europe. The reference flow is a single VD4-UniCab ISD device, 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. For transparency reasons, the manufacturing stage is further divided into an upstream and core stage.



## Data quality

Both primary and secondary data are used. The main sources for primary data are the bill of materials (BOM), CAD-files, 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 database Industry Data 2.0 is also used for material

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Electrogalvanized steel and polyoxymethylene which is not available byecoinvent. 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 EPDIItaly007 “Electronic and electrical products and systems, the cut-off criteria can be set to a maximum of 5% of the overall environmental impacts. According to PCR EPDIItaly012, in this LCA, grease has been excluded as its weight is negligible. In addition, production, use and disposal of the packaging of components and semi-finished intermediates have been excluded for the same reason as stated before.

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# 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 ABB manufacturing site through Cancellation Statement.

## 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 EPDItaly012, as the actual distance is unknown.

	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, 2020)	100 km by lorry (assumption)	Europe

## Use

The use stage considers the reference power consumption over the reference service life as defined in the functional unit. This is calculated using the following formula, according to PCR EPDItaly012:

$$E_{use}[kWh] = \frac{P_{use} * 8760 * RSL * \alpha}{1000} = \frac{8.25 \text{ W} * 8760 \text{ hours} * 20 \text{ years} * 30 \%}{1000} = 433.38 \text{ kWh}$$

Where:

- $E_{use}$  = Total energy use over the reference service life

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- $P_{use}$  = Reference power consumption in watts
- $RSL$  = Reference Service Life in years
- $\alpha$  = Use time rate
- 8760 is the number of hours in a year.
- 1000 is the conversion factor from W to kW

The LCA is based on the product with Rated current 630A, and a sensitivity analysis have been carried out for the product with 800A and -h versions to evaluate its impact in the Use stage.

Because the product is sold globally and is not limited to any specific country, the latest energy mix of the European Union is adopted as suggested by the standard EN 50693.

	Dataset	Amount	Unit
<b>Energy</b>	European energy mix; <i>Electricity, medium voltage {RER} market group for   Cut-off, S</i>	0.362	kg CO <sub>2</sub> -eq./kWh

As far as maintenance is concerned, it is assumed that there are no scheduled interventions during the product's service life, according to PCR EPDIItaly012.

## 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
<b>Product End-of-Life</b>	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.

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# 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.

## VD4-UniCab ISD 630 A.

Impact category	Unit	Total	Cradle-to-grave					
			UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
<b>GWP – total</b>	kg CO <sub>2</sub> eq.	9.69E+02	7.94E+02	-2.33E+01	9.61E+00	1.49E+01	1.57E+02	1.71E+01
<b>GWP – fossil</b>	kg CO <sub>2</sub> eq.	9.66E+02	7.77E+02	1.35E+01	9.60E+00	1.48E+00	1.51E+02	1.33E+01
<b>GWP – biogenic</b>	kg CO <sub>2</sub> eq.	1.90E+00	1.60E+01	-3.69E+01	8.74E-03	1.34E+01	5.56E+00	3.83E+00
<b>GWP – luluc</b>	kg CO <sub>2</sub> eq.	1.49E+00	1.04E+00	5.00E-02	4.69E-03	4.81E-04	3.77E-01	1.69E-02
<b>ODP</b>	kg CFC-11 eq.	2.40E-05	2.06E-05	3.85E-07	2.10E-07	1.94E-08	2.71E-06	1.46E-07
<b>AP</b>	mol H+ eq.	2.24E+01	2.14E+01	5.98E-02	3.97E-02	5.14E-03	7.57E-01	6.24E-02
<b>EP – freshwater</b>	kg P eq.	1.91E+00	1.76E+00	3.82E-03	6.76E-04	1.39E-04	1.38E-01	4.24E-03
<b>EP – marine</b>	kg N eq.	1.72E+00	1.52E+00	1.87E-02	1.52E-02	6.51E-03	1.35E-01	2.39E-02
<b>EP – terrestrial</b>	mol N eq.	2.11E+01	1.94E+01	1.85E-01	1.62E-01	2.22E-02	1.19E+00	1.66E-01
<b>POCP</b>	kg NMVOC eq.	6.44E+00	5.86E+00	7.86E-02	5.82E-02	7.35E-03	3.82E-01	5.19E-02
<b>ADP – minerals and metals</b>	kg Sb eq.	2.78E-01	2.77E-01	7.90E-05	3.10E-05	2.73E-06	3.00E-04	1.10E-04
<b>ADP – fossil</b>	MJ, net calorific value	1.43E+04	1.02E+04	2.30E+02	1.37E+02	1.32E+01	3.47E+03	1.52E+02
<b>WDP</b>	m <sup>3</sup> eq.	3.74E+02	3.31E+02	4.87E+00	5.56E-01	9.82E-02	3.55E+01	1.81E+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.

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ENVIRONMENTAL PRODUCT DECLARATION

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	1.42E+04	1.02E+04	2.30E+02	1.37E+02	1.32E+01	3.47E+03	1.52E+02
PERE	MJ, low cal. value	2.87E+03	1.50E+03	6.88E+02	2.13E+00	2.60E-01	6.66E+02	1.49E+01
PENRM	MJ, low cal. value	9.72E+01	9.72E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ, low cal. value	4.95E+01	4.95E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ, low cal. value	1.42E+04	1.02E+04	2.30E+02	1.37E+02	1.32E+01	3.47E+03	1.52E+02
PERT	MJ, low cal. value	2.92E+03	1.54E+03	6.88E+02	2.13E+00	2.60E-01	6.66E+02	1.49E+01
FW	m <sup>3</sup>	1.23E+01	9.34E+00	1.48E-01	1.95E-02	3.57E-03	2.71E+00	6.99E-02
MS	kg	3.46E+01	3.24E+01	2.19E+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	1.31E-01	1.24E-01	1.01E-03	8.72E-04	7.56E-05	4.40E-03	5.72E-04
NHWD	kg	3.06E+02	2.40E+02	4.09E+00	6.69E+00	1.22E+01	9.52E+00	3.44E+01
RWD	kg	4.35E-02	1.76E-02	2.53E-04	4.45E-05	4.91E-06	2.53E-02	2.98E-04
MER	kg	1.20E+01	2.02E+00	4.30E-01	0.00E+00	8.66E+00	0.00E+00	8.54E-01
MFR	kg	1.35E+02	2.30E+01	4.51E+00	0.00E+00	9.97E+00	0.00E+00	9.78E+01
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	5.09E+01	9.36E+00	2.04E+00	0.00E+00	3.57E+01	0.00E+00	3.84E+00
EEE	MJ	2.78E+01	4.73E+00	1.13E+00	0.00E+00	1.98E+01	0.00E+00	2.13E+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.

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# Sensitivity analysis

This chapter presents the results of sensitivity analyses, to have a complete understanding of the impacts of a different use phase and of different product configurations.

## VD4-UniCab ISD 800A.

Impact category	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing	Distribution	Installation	Use and maintenance	End-of-life	
<b>GWP – total</b>	kg CO <sub>2</sub> eq.	1.06E+03	7.94E+02	-2.33E+01	9.61E+00	1.49E+01	2.53E+02	1.71E+01
<b>GWP – fossil</b>	kg CO <sub>2</sub> eq.	1.06E+03	7.77E+02	1.35E+01	9.59E+00	1.48E+00	2.43E+02	1.33E+01
<b>GWP – biogenic</b>	kg CO <sub>2</sub> eq.	5.29E+00	1.60E+01	-3.69E+01	8.74E-03	1.34E+01	8.97E+00	3.82E+00
<b>GWP – luluc</b>	kg CO <sub>2</sub> eq.	1.72E+00	1.04E+00	5.00E-02	4.69E-03	4.81E-04	6.08E-01	1.69E-02
<b>ODP</b>	kg CFC-11 eq.	2.57E-05	2.06E-05	3.85E-07	2.10E-07	1.94E-08	4.37E-06	1.46E-07
<b>AP</b>	mol H <sup>+</sup> eq.	2.28E+01	2.14E+01	5.98E-02	3.97E-02	5.14E-03	1.22E+00	6.23E-02
<b>EP – freshwater</b>	kg P eq.	1.99E+00	1.76E+00	3.82E-03	6.76E-04	1.39E-04	2.22E-01	4.24E-03
<b>EP – marine</b>	kg N eq.	1.80E+00	1.52E+00	1.87E-02	1.52E-02	6.51E-03	2.17E-01	2.39E-02
<b>EP – terrestrial</b>	mol N eq.	2.19E+01	1.94E+01	1.85E-01	1.62E-01	2.22E-02	1.91E+00	1.66E-01
<b>POCP</b>	kg NMVOC eq.	6.67E+00	5.86E+00	7.86E-02	5.82E-02	7.35E-03	6.17E-01	5.18E-02
<b>ADP – minerals and metals</b>	kg Sb eq.	2.78E-01	2.77E-01	7.90E-05	3.10E-05	2.73E-06	4.84E-04	1.09E-04
<b>ADP – fossil</b>	MJ, net calorific value	1.64E+04	1.02E+04	2.30E+02	1.37E+02	1.32E+01	5.60E+03	1.52E+02
<b>WDP</b>	m <sup>3</sup> eq.	3.96E+02	3.31E+02	4.87E+00	5.56E-01	9.82E-02	5.72E+01	1.81E+00

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**VD4-UniCab ISD-h 630A.**

Impact category	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
<b>GWP – total</b>	kg CO <sub>2</sub> eq.	9.76E+02	8.01E+02	-2.33E+01	9.73E+00	1.49E+01	1.57E+02	1.75E+01
<b>GWP – fossil</b>	kg CO <sub>2</sub> eq.	9.73E+02	7.84E+02	1.35E+01	9.72E+00	1.48E+00	1.51E+02	1.36E+01
<b>GWP – biogenic</b>	kg CO <sub>2</sub> eq.	1.98E+00	1.60E+01	-3.69E+01	8.85E-03	1.34E+01	5.56E+00	3.89E+00
<b>GWP – luluc</b>	kg CO <sub>2</sub> eq.	1.50E+00	1.05E+00	5.00E-02	4.75E-03	4.81E-04	3.77E-01	1.72E-02
<b>ODP</b>	kg CFC-11 eq.	2.42E-05	2.07E-05	3.85E-07	2.13E-07	1.94E-08	2.71E-06	1.49E-07
<b>AP</b>	mol H+ eq.	2.25E+01	2.15E+01	5.98E-02	4.02E-02	5.14E-03	7.57E-01	6.35E-02
<b>EP – freshwater</b>	kg P eq.	1.91E+00	1.76E+00	3.82E-03	6.84E-04	1.39E-04	1.38E-01	4.32E-03
<b>EP – marine</b>	kg N eq.	1.73E+00	1.53E+00	1.87E-02	1.53E-02	6.51E-03	1.35E-01	2.46E-02
<b>EP – terrestrial</b>	mol N eq.	2.15E+01	1.98E+01	1.85E-01	1.64E-01	2.22E-02	1.19E+00	1.69E-01
<b>POCP</b>	kg NMVOC eq.	6.47E+00	5.89E+00	7.86E-02	5.89E-02	7.35E-03	3.82E-01	5.28E-02
<b>ADP – minerals and metals</b>	kg Sb eq.	2.78E-01	2.77E-01	7.90E-05	3.14E-05	2.73E-06	3.00E-04	1.12E-04
<b>ADP – fossil</b>	MJ, net calorific value	1.43E+04	1.03E+04	2.30E+02	1.39E+02	1.32E+01	3.47E+03	1.55E+02
<b>WDP</b>	m <sup>3</sup> eq.	3.76E+02	3.33E+02	4.87E+00	5.63E-01	9.82E-02	3.55E+01	1.84E+00

**VD4-UniCab ISD-h 800A.**

Impact category	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
<b>GWP – total</b>	kg CO <sub>2</sub> eq.	1.07E+03	8.01E+02	-2.33E+01	9.72E+00	1.49E+01	2.53E+02	1.75E+01
<b>GWP – fossil</b>	kg CO <sub>2</sub> eq.	1.06E+03	7.83E+02	1.35E+01	9.71E+00	1.48E+00	2.43E+02	1.36E+01
<b>GWP – biogenic</b>	kg CO <sub>2</sub> eq.	5.37E+00	1.60E+01	-3.69E+01	8.84E-03	1.34E+01	8.97E+00	3.89E+00
<b>GWP – luluc</b>	kg CO <sub>2</sub> eq.	1.73E+00	1.05E+00	5.00E-02	4.75E-03	4.81E-04	6.08E-01	1.72E-02
<b>ODP</b>	kg CFC-11 eq.	2.58E-05	2.07E-05	3.85E-07	2.13E-07	1.94E-08	4.37E-06	1.49E-07
<b>AP</b>	mol H+ eq.	2.29E+01	2.15E+01	5.98E-02	4.02E-02	5.14E-03	1.22E+00	6.34E-02
<b>EP – freshwater</b>	kg P eq.	2.00E+00	1.76E+00	3.82E-03	6.84E-04	1.39E-04	2.22E-01	4.31E-03
<b>EP – marine</b>	kg N eq.	1.81E+00	1.53E+00	1.87E-02	1.53E-02	6.51E-03	2.17E-01	2.46E-02
<b>EP – terrestrial</b>	mol N eq.	2.22E+01	1.98E+01	1.85E-01	1.64E-01	2.22E-02	1.91E+00	1.69E-01
<b>POCP</b>	kg NMVOC eq.	6.70E+00	5.89E+00	7.86E-02	5.89E-02	7.35E-03	6.17E-01	5.28E-02
<b>ADP – minerals and metals</b>	kg Sb eq.	2.78E-01	2.77E-01	7.90E-05	3.14E-05	2.73E-06	4.84E-04	1.11E-04
<b>ADP – fossil</b>	MJ, net calorific value	1.65E+04	1.03E+04	2.30E+02	1.39E+02	1.32E+01	5.60E+03	1.55E+02
<b>WDP</b>	m <sup>3</sup> eq.	3.97E+02	3.33E+02	4.87E+00	5.62E-01	9.82E-02	5.72E+01	1.84E+00

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## 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 potentials of the products are presented below. The results are representative for Europe according to IEC/TR 62635.

	Recyclability potential
VD4-UniCab ISD 630 A	76 %
VD4-UniCab ISD 800A	76 %
VD4-UniCab ISD-h 630 A	76 %
VD4-UniCab ISD-h 800A	76 %

The recycled content and recyclability potential of the packaging is calculated by dividing “MS: Use of secondary materials” in the core manufacturing stage and “MFR: material for recycling” in the installation stage by the total weight of the packaging. The recycled content is based on primary data, and the recyclability potential is representative for Europe according to Eurostat (2020). The results are presented below.

	Recyclability potential
Packaging materials	33%

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

The ABB manufacturing site uses 100 % renewable energy, procured through Guarantees of Origins (GO’s) and internal photovoltaic panels for the electricity.

Energy mix	Source	Amount	Unit
ABB_electricity mix 2023, Dalmine factory (80% hydro-20%solar)_V1	Ecoinvent v3.9.1	0.024	kg CO <sub>2</sub> -eq/kWh

### Dangerous substances

The product contains no substances given by the REACH Regulation (EC 1907/2006).

### Indoor environment

The product meets the requirements for low emissions.

### Carbon footprint

Carbon footprint has not been worked out for the product.

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### Ratings comparison

Product	Ratings (Ur.Ir.Isc)	Climate change - Total	Climate change - Fossil	Climate change - Biogenic	Climate change - Land use and LU change	Ozone depletion	Acidification	Eutrophication aquatic freshwater	Eutrophication aquatic marine	Eutrophication terrestrial	Photochemical ozone formation	Dep of ab res - minerals and metals	Dep of ab res - fossils	Water use
VD4-UniCab ISD	24.06.12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
VD4-UniCab ISD	24.06.16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
VD4-UniCab ISD	24.06.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
VD4-UniCab ISD	24.08.12	1.10	1.10	2.78	1.15	1.07	1.02	1.04	1.05	1.03	1.04	1.00	1.15	1.06
VD4-UniCab ISD	24.08.16	1.10	1.10	2.78	1.15	1.07	1.02	1.04	1.05	1.03	1.04	1.00	1.15	1.06
VD4-UniCab ISD	24.08.20	1.10	1.10	2.78	1.15	1.07	1.02	1.04	1.05	1.03	1.04	1.00	1.15	1.06
VD4-UniCab ISD-h	24.06.12	1.01	1.01	1.04	1.00	1.01	1.00	1.00	1.01	1.02	1.01	1.00	1.01	1.00
VD4-UniCab ISD-h	24.06.16	1.01	1.01	1.04	1.00	1.01	1.00	1.00	1.01	1.02	1.01	1.00	1.01	1.00
VD4-UniCab ISD-h	24.06.20	1.01	1.01	1.04	1.00	1.01	1.00	1.00	1.01	1.02	1.01	1.00	1.01	1.00
VD4-UniCab ISD-h	24.08.12	1.11	1.10	2.82	1.16	1.07	1.02	1.05	1.05	1.05	1.04	1.00	1.16	1.06
VD4-UniCab ISD-h	24.08.16	1.11	1.10	2.82	1.16	1.07	1.02	1.05	1.05	1.05	1.04	1.00	1.16	1.06
VD4-UniCab ISD-h	24.08.20	1.11	1.10	2.82	1.16	1.07	1.02	1.05	1.05	1.05	1.04	1.00	1.16	1.06

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