

DSX203NC DIFFERENTIAL CIRCUIT BREAKER

PEP ecopassport®
Product Environmental Profile



Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations"

ORGANIZATION		CONTACT INFORMATION			
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ABB Purpose & Embedding Sustainability

ABB is committed to continually promoting and embedding sustainability across its operations and value chain, aspiring to become a role model for others to follow. With its ABB Purpose, ABB is focusing on reducing harmful emissions, preserving natural resources and championing ethical and humane behavior.



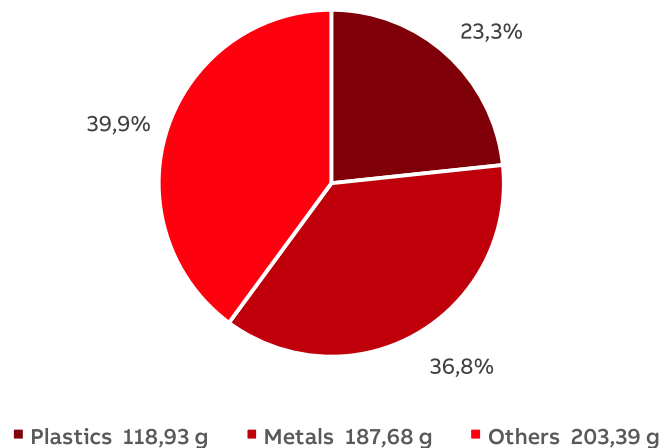
General Information

Reference product	DSX203NC B16 A30 - 2CSR256192R1165
Description of the product	The DSX203NC is a 3P+N residual current circuit breakers with overcurrent protection (RCBO); it has been designed for the protection against short-circuit currents, overload, earth fault currents, indirect contacts, additional protection against direct contacts.
Functional unit	The functional unit is designed to protect for 20 years the installation against overloads and short-circuits and people and premises at risk of fire or explosion against insulation defects in circuit with assigned voltage 230 V and rated current 16 A. This protection is ensured in accordance with the following parameters: - Number of poles 3P+N - Rated breaking capacity I_{cn} 6kA - Tripping curve Cd type B - Sensitivity 30 mA - Type of differential protection A
Other products covered	DSX203NC homogeneous family: Beaking capacity up to 6kA 3+N Poles in 4 modules with 230V rated voltage B & C char from 6 up to 20 A Sensitivity of 30mA type A

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Constituent Materials



Total weight of Reference product

510

g

Plastics as % of weight		Metals as % of weight		Others as % of weight	
Name and CAS number	Weight%	Name and CAS number	Weight%	Name and CAS number	Weight%
PA	17,9	STEEL	23,5	WOOD	24,8
PPS	4,0	COPPER	8,8	GF	7,8
PC	1,2	BRASS	1,9	CARDBOARD	6,5
PTFE	0,2	ALUMINIUM	0,8	PAPER	0,3
PE	0,1	OTHER METALS	1,7	OTHERS	0,5

Total weight of the reference product is 349,8 and its packaging is 160,2g

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Additional Environmental Information

Manufacturing	Includes the environmental impacts associated with extraction and processing of the raw materials used to produce and assembly the product and its packaging, distribution to the manufacturer's last logistic platform.
Distribution	Includes the transportation in its packaging from the manufacturer's last logistic platform to the distributor.
Installation	Installation stage includes the installation of the products made manually and waste treatment of discarded materials.
Use	Energy consumption is calculated by following the PSR. The energy models used in this phase are the specific energy mixes based on ABB distribution. No maintenance is necessary.
End of life	Includes its removal, dismantling and transportation of the dismantled product to the treatment site and the treatment process. A value of 1000 km transport by lorry is used for the transportation.
Benefits and loads beyond the system boundaries	N/A

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Environmental Impacts

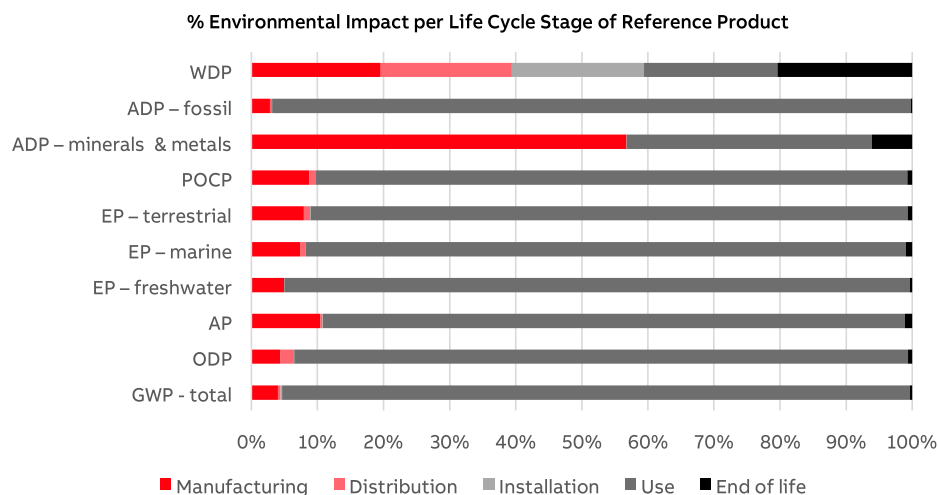
Reference lifetime	20 years
Product category	Differential Circuit Breaker
Installation elements	Installation carried out manually. End of life of packaging.
Use scenario	Load time: 50% of rated current in continuous operation (In). Use time rate: 30% of reference lifetime (RLT).
Geographical representativeness	Europe
Technological representativeness	Materials and processes data are specific for the production of DSX203NC B16 A30 - 2CSR256192R1165 and its family
Software and database used	Simapro 9.4.0.2 and Ecoinvent v3.8

Energy model used

Manufacturing	Electricity, medium voltage {IT} market for Cut-off, System_GO energy mix_ei 3.8 System
Installation	Manually done. Europe
Use	Electricity, low voltage {RER} market group for Cut-off, S
End of life	The energy-related processes used for the inputs of the end-of-life stage are those included in the ecoinvent datasets selected for the analysis

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Common base of mandatory indicators



Environmental impact indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
GWP-total	kg CO₂ eq.	2,12E+01	8,54E-01	9,06E-02	4,53E-02	2,02E+01	7,50E-02	NA
GWP-fossil	kg CO₂ eq.	2,05E+01	8,52E-01	9,05E-02	5,26E-03	1,95E+01	7,20E-02	NA
GWP-biogenic	kg CO₂ eq.	6,73E-01	1,48E-03	8,43E-05	4,00E-02	6,28E-01	2,94E-03	NA
GWP-luluc	kg CO₂ eq.	4,69E-02	7,99E-04	3,52E-05	1,77E-06	4,60E-02	7,06E-05	NA
GWP-fossil = Global Warming Potential fossil fuels GWP-biogenic = Global Warming Potential biogenic GWP-luluc = Global Warming Potential land use and land use change								
ODP	kg CFC-11 eq.	1,06E-06	4,66E-08	9,05E-02	5,26E-03	1,95E+01	7,20E-02	NA
ODP = Depletion potential of the stratospheric ozone layer								
AP	H+ eq.	1,26E-01	1,31E-02	4,59E-04	2,22E-05	1,11E-01	1,43E-03	NA
AP = Acidification potential, Accumulated Exceedance								
EP-freshwater	kg P eq.	2,07E-02	1,02E-03	5,84E-06	3,93E-07	1,96E-02	7,62E-05	NA
EP-marine	kg N eq.	2,04E-02	1,50E-03	1,58E-04	1,05E-05	1,85E-02	2,00E-04	NA
EP-terrestrial	mol N eq.	1,80E-01	1,43E-02	1,73E-03	8,36E-05	1,63E-01	1,27E-03	NA
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment EP-terrestrial = Eutrophication potential, Accumulated Exceedance								
POCP	kg NMVOC eq.	5,01E-02	4,39E-03	4,97E-04	2,48E-05	4,48E-02	3,76E-04	NA
POCP = Formation potential of tropospheric ozone								
ADP-minerals & metals	kg Sb eq.	4,94E-04	2,80E-04	2,96E-07	1,63E-08	1,83E-04	3,02E-05	NA
ADP-fossil	MJ	4,29E+02	1,21E+01	1,39E+00	5,93E-02	4,15E+02	8,84E-01	NA
ADP-minerals & metals = Abiotic depletion potential for non-fossil resources ADP-fossil = Abiotic depletion for fossil resources potential								
WDP	m³ eq. depr.	4,95E+02	9,70E+01	9,80E+01	9,90E+01	1,00E+02	1,01E+02	NA
WDP = Water Deprivation potential								

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Common base of mandatory indicators

Inventory flows indicator – Resource use indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
PERE	MJ	8,88E+01	3,19E+00	1,92E-02	1,04E-03	8,55E+01	1,14E-01	NA
PERM	MJ	4,27E-01	4,27E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NA
PERT	MJ	8,92E+01	3,61E+00	1,92E-02	1,04E-03	8,55E+01	1,14E-01	NA
PENRE	MJ	4,28E+02	1,04E+01	1,39E+00	5,93E-02	4,15E+02	8,84E-01	NA
PENRM	MJ	1,72E+00	1,72E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NA
PENRT	MJ	4,29E+02	1,21E+01	1,39E+00	5,93E-02	4,15E+02	8,84E-01	NA
PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials								
PERM = Use of renewable primary energy resources used as raw materials								
PERT = Total Use of renewable primary energy resources								
PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials								
PENRM = Use of non-renewable primary energy resources used as raw materials								
PENRT = Total Use of non-renewable primary energy resources								

Inventory flows indicator – Indicators describing the use of secondary materials, water, and energy resources

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
SM	kg	2,86E-06	2,86E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NA
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NA
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NA
FW	m³	5,74E+00	9,40E-01	4,31E-03	2,67E-04	4,76E+00	3,22E-02	NA
SM = Use of secondary material								
RSF = Use of renewable secondary fuels								
NRSF = Use of non-renewable secondary fuels								
FW = Use of net fresh water								

Inventory flows indicator – Waste category indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
Hazardous waste disposed	kg	4,82E-04	1,60E-04	3,57E-06	1,54E-07	3,16E-04	2,18E-06	NA
Non- hazardous waste disposed	kg	1,82E+00	1,97E-01	8,34E-02	6,77E-03	1,45E+00	8,73E-02	NA
Radioactive waste disposed	kg	3,09E-03	2,68E-05	9,39E-06	3,82E-07	3,05E-03	5,16E-06	NA

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Common base of mandatory indicators

Inventory flows indicator – Output flow indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NA
Materials for recycling	kg	1,22E-01	5,54E-02	0,00E+00	1,15E-02	0,00E+00	5,46E-02	NA
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NA
Exported energy	MJ	1,01E-01	4,97E-02	0,00E+00	2,36E-02	0,00E+00	2,72E-02	0,00E+00

Inventory flow indicator – other indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
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	NA
Biogenic carbon content of the associated packaging	kg of C	7,19E-02	7,19E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	NA

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Optional indicators

Environmental indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
Total use of primary energy during the life cycle	MJ	5,18E+02	5,18E+02	1,57E+01	1,41E+00	6,03E-02	9,98E-01	NA
Emissions of fine particles	incidence of diseases	4,30E-07	4,30E-07	6,09E-08	8,63E-09	3,78E-10	6,45E-09	NA
Ionizing radiation, human health	kBq U235 eq.	1,15E+01	1,15E+01	7,00E-02	7,11E-03	3,02E-04	1,19E-02	NA
Ecotoxicity (fresh water)	CTUe	3,70E+02	3,70E+02	9,82E+01	1,08E+00	6,23E-02	7,54E+00	NA
Human toxicity, car-cinogenic effects	CTUh	1,35E-08	1,35E-08	3,91E-09	3,40E-11	3,24E-12	1,43E-09	NA
Human toxicity, non-carcinogenic effects	incidence of diseases	4,24E-07	4,24E-07	1,41E-07	1,15E-09	5,94E-11	2,38E-08	NA
Impact related to land use/soil quality		8,53E+01	8,53E+01	8,41E+00	1,08E+00	4,00E-02	7,92E-01	NA

Other indicators

Indicator	Unit	Total	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
No Other indicators used								

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Extrapolation Factors

For other products than the Reference product covered by this PEP, the environmental impacts for each phase of the lifecycle are obtained by a linear correlation with respect to weight for the production, distribution, and end-of-life phase and with respect to average power loss for the use phase. Each environmental indicator value shall be calculated using the following formulas:

For the **manufacturing stage, distribution stage and end-of-life stage**:

$$y = a_n x_1 + b_n$$

where **y** is the considered impact at a specific stage and **x₁** is the **weight of the product**.

For the **use stage**:

$$y = a_n x_2 + b_n$$

Where **y** is the considered impact at a specific stage and **x₂** is the average **power loss** of the product.

The next tables report the linear coefficients **a_n** & **b_n** for each life cycle stage.

Note: The calculation of the coefficient **a₃** & **b₃** for the Installation Stage was not performed because the selected parameters do not affect the values for this stage.

IMPACT CATEGORY	MANUFACTURING		DISTRIBUTION		INST.		USE		END OF LIFE	
	a ₁	b ₁	a ₂	b ₂	a ₃	b ₃	a ₄	b ₄	a ₅	b ₅
Climate change	7.44E-03	7.48E-02	6.83E-04	1.22E-01	1.00E+00	0.0E+00	2.12E+01	1.49E-01	6.79E-04	5.99E-03
Climate change - Fossil	7.36E-03	2.35E-01	6.82E-04	1.22E-01	1.00E+00	0.0E+00	2.04E+01	1.44E-01	6.54E-04	5.77E-03
Climate change - Biogenic	6.97E-05	-1.61E-01	6.35E-07	1.14E-04	1.00E+00	0.0E+00	6.59E-01	4.65E-03	2.40E-05	2.11E-04
Climate change - Land use and LU change	7.35E-06	5.10E-04	2.66E-07	4.75E-05	1.00E+00	0.0E+00	4.83E-02	3.41E-04	6.42E-07	5.67E-06
Ozone depletion	7.75E-09	8.96E-08	1.60E-10	2.86E-08	1.00E+00	0.0E+00	1.03E-06	7.27E-09	6.08E-11	5.37E-10
Acidification	1.32E-04	1.87E-03	3.46E-06	6.19E-04	1.00E+00	0.0E+00	1.16E-01	8.21E-04	1.40E-05	1.24E-04
Eutrophication, freshwater	1.01E-05	1.31E-04	4.40E-08	7.87E-06	1.00E+00	0.0E+00	2.06E-02	1.45E-04	7.40E-07	6.53E-06
Eutrophication, marine	1.27E-05	4.20E-04	1.19E-06	2.13E-04	1.00E+00	0.0E+00	1.94E-02	1.37E-04	1.88E-06	1.66E-05
Eutrophication, terrestrial	1.29E-04	3.48E-03	1.30E-05	2.33E-03	1.00E+00	0.0E+00	1.71E-01	1.21E-03	1.20E-05	1.06E-04
Photochemical ozone formation	3.82E-05	1.17E-03	3.75E-06	6.70E-04	1.00E+00	0.0E+00	4.70E-02	3.31E-04	3.55E-06	3.14E-05
Resource use, minerals and metals	2.83E-06	2.63E-05	2.23E-09	3.98E-07	1.00E+00	0.0E+00	1.92E-04	1.36E-06	3.03E-07	2.67E-06
Resource use, fossils	9.69E-02	3.68E+00	1.05E-02	1.87E+00	1.00E+00	0.0E+00	4.36E+02	3.07E+00	7.98E-03	7.04E-02
Water use (AWARE)	5.52E-03	4.46E-01	3.25E-05	5.81E-03	1.00E+00	0.0E+00	5.00E+00	3.53E-02	3.03E-04	2.67E-03
Total use of primary energy during the life cycle	1.07E-01	8.99E+00	1.06E-02	1.90E+00	1.00E+00	0.0E+00	5.25E+02	3.70E+00	9.04E-03	7.98E-02
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	1.02E-02	3.06E+00	1.45E-04	2.59E-02	1.00E+00	0.0E+00	8.97E+01	6.33E-01	1.06E-03	9.36E-03
Use of renewable primary energy resources used as raw materials	0.0E+00	2.26E+00	0.0E+00	0.0E+00	1.00E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total use renew. primary energy res.	1.02E-02	5.31E+00	1.45E-04	2.59E-02	1.00E+00	0.0E+00	8.97E+01	6.33E-01	1.06E-03	9.36E-03
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	9.69E-02	-1.43E+00	1.05E-02	1.87E+00	1.00E+00	0.0E+00	4.35E+02	3.07E+00	7.98E-03	7.04E-02
Use of non-renewable primary energy resources used as raw materials	0.0E+00	5.11E+00	0.0E+00	0.0E+00	1.00E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total use non-renew. primary energy res.	9.69E-02	3.68E+00	1.05E-02	1.87E+00	1.00E+00	0.0E+00	4.35E+02	3.07E+00	7.98E-03	7.04E-02
Use of secondary material	1.48E-08	1.30E-07	0.0E+00	0.0E+00	1.00E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Use of renewable secondary fuels	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.00E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Use of non-renewable secondary fuels	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.00E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Net use of fresh water	1.42E-04	1.09E-02	1.18E-06	2.12E-04	1.00E+00	0.0E+00	3.79E-01	2.67E-03	9.33E-06	8.23E-05
Hazardous waste disposed	1.79E-06	2.20E-05	2.69E-08	4.81E-06	1.00E+00	0.0E+00	3.31E-04	2.34E-06	5.32E-08	4.69E-07
Non-hazardous waste disposed	1.64E-03	7.81E-02	6.28E-04	1.13E-01	1.00E+00	0.0E+00	1.52E+00	1.07E-02	7.92E-04	6.99E-03
Radioactive waste disposed	2.18E-07	9.50E-06	7.07E-08	1.27E-05	1.00E+00	0.0E+00	3.20E-03	2.26E-05	4.60E-08	4.06E-07

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	a ₁	b ₁	a ₂	b ₂	a ₃	b ₃	a ₄	b ₄	a ₅	b ₅
Particulate matter	5.70E-10	1.61E-08	6.50E-11	1.16E-08	1.00E+00	0.0E+00	3.71E-07	2.62E-09	5.87E-11	5.18E-10
Ionising radiation	5.89E-04	1.85E-02	5.36E-05	9.59E-03	1.00E+00	0.0E+00	1.19E+01	8.41E-02	1.05E-04	9.31E-04
Ecotoxicity, freshwater	9.83E-01	1.12E+01	8.17E-03	1.46E+00	1.00E+00	0.0E+00	2.76E+02	1.94E+00	7.55E-02	6.66E-01
Human toxicity, cancer	3.63E-11	6.19E-10	2.57E-13	4.59E-11	1.00E+00	0.0E+00	8.48E-09	5.98E-11	1.20E-11	1.06E-10
Human toxicity, non-cancer	1.46E-09	1.51E-08	8.63E-12	1.54E-09	1.00E+00	0.0E+00	2.71E-07	1.91E-09	2.38E-10	2.10E-09
Land use	5.01E-02	1.81E+01	8.16E-03	1.46E+00	1.00E+00	0.0E+00	7.87E+01	5.55E-01	7.52E-03	6.64E-02
Component for reuse	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.00E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Materials for recycling	9.66E-05	5.55E-02	9.66E-05	5.55E-02	1.00E+00	0.0E+00	0.0E+00	0.0E+00	4.70E-04	4.14E-03
Materials for energy recovery	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.00E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Exported energy	0.0E+00	4.97E-02	0.0E+00	4.97E-02	1.00E+00	0.0E+00	0.0E+00	0.0E+00	2.55E-04	2.25E-03

For the weight and average power loss data of the variants, please refer to table below.

ABB Code	Name	Tp = Type of differential protection	U = Rated voltage (V)	In = Rated current in continuous operation (A)	Rated breaking capacity [A]	Np = Number of protected poles	S = Sensitivity [mA]	Cd = Tripping curve	Weight of the product [g]	Average power loss [W] @50%In
2CSR256192R1065	DSX203NC B6 A30	A	230	6	6k	3P+N	30	B	361.46	1.59
2CSR256192R1105	DSX203NC B10 A30	A	230	10	6k	3P+N	30	B	364.34	1.48
2CSR256192R1135	DSX203NC B13 A30	A	230	13	6k	3P+N	30	B	364.34	1.48
2CSR256192R1165	DSX203NC B16 A30	A	230	16	6k	3P+N	30	B	360.40	2.52
2CSR256192R1205	DSX203NC B20 A30	A	230	20	6k	3P+N	30	B	363.90	2.45
2CSR256192R1064	DSX203NC C6 A30	A	230	6	6k	3P+N	30	C	361.46	1.59
2CSR256192R1104	DSX203NC C10 A30	A	230	10	6k	3P+N	30	C	364.34	1.48
2CSR256192R1134	DSX203NC C13 A30	A	230	13	6k	3P+N	30	C	364.34	1.48
2CSR256192R1164	DSX203NC C16 A30	A	230	16	6k	3P+N	30	C	360.40	2.52
2CSR256192R1204	DSX203NC C20 A30	A	230	20	6k	3P+N	30	C	363.90	2.45

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Environmental Impact Indicator Glossary

Impact indicators

Indicator	Description	Distribution
Global warming potential (GWP) - total	Indicator of potential global warming caused by emissions to air contributing to the greenhouse effect. The total global warming potential (GWP-total) is the sum of three sub-categories of climate change. GWP-total = GWP-fossil + GWP-biogenic + GWP- land use and land use change	kg CO ₂ eq.
Ozone depletion (ODP)	Emissions to air that contribute to the destruction of the stratospheric ozone layer	kg CFC-11 eq.
Acidification of soil and water (A)	Acidification of soils and water caused by the release of certain gases to the atmosphere, such as nitrogen oxides and sulphur oxides	H ⁺ eq.
Eutrophication (E)	Indicator of the contribution to eutrophication of water by the enrichment of the aquatic ecosystem with nutritional elements, e.g. industrial or domestic effluents, agriculture, etc. This indicator is divided to three: freshwater, marine and terrestrial.	kg P eq., kg N eq., mole N eq.
Photochemical ozone creation (POCP)	Indicator of emissions of gases that affect the creation of photochemical ozone in the lower atmosphere (smog) because of the rays of the sun.	kg NMVOC eq.
Depletion of abiotic resources – elements (ADPe)	Indicator of the depletion of natural non-fossil resources	kg Sb eq.
Depletion of abiotic resources – fossil fuels (ADPf)	The use of non-renewable fossil resources in an unsustainable way (e.g. from material to waste)	MJ (lower heating value)
Water Deprivation potential (WDP)	Deprivation-weighted water consumption. Assesses the potential of water deprivation, to either humans or ecosystems, building on the assumption that the less water remaining available per area, the more likely another user will be deprived.	m ³ eq. depr.

Resource use indicators

Indicator	Description	Distribution
Total use of primary energy	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) + Total use of renewable primary energy re-sources (primary energy and primary energy resources used as raw materials)	MJ (lower heating value)

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Internal: ☐ External: ☒	
Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations"	
PEP are compliant with XP C08-100-1 :2016 or EN 50693:2019 The elements of the present PEP cannot be compared with elements from any other program.	
Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations"	

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