F454 Residual Current Device RCCB

PEP ecopassport®

Product Environmental Profile

Registration number:	**ABBG-00721-V01.01-EN**	Drafting rules:	**PCR-ed4-EN-2021 09 06**
Contact information:	**EPD_ELSB@abb.com**	Supplemented by:	**PSR-0005-ed3.1-EN-2023 12 08**
Verifier accreditation number:	**VH51**	Information and reference documents:	**www.pep-ecopassport.org**
Date of issue:	**04-25**	Validity period:	**5 years**

Independent verification of the declaration and data in compliance with ISO 14025: 2006

Internal: ☐ **External:** ☒

The PCR review was conducted by a panel of experts chaired by Julie Orgelet (Ddemain)

PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500 :2022
The components of the present PEP may not be compared with components from any other program.

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

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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.
The contect of this PEP cannot be compared with the content based on another program/database.
Scan QR code for more information

General information

Reference product	Reference product is F454 A-63/0.03, ABB code 2CSF204108U1630: Rated voltage [V – AC]: 230-400 Rated current [A]: 63 Rated conditional short-circuit current (Icn): 10 kA with SCPD - fuse gG 100 A or high performance MCB S800 100 A Rated residual breaking capacity (IΔm): 1 kA Rated breaking capacity (Im): 1 kA Type of differential protection: A Sensitivity [mA]: 30 Number of poles [P]: 4 (3P+N)
Description of the product	The ABB F454 products are Residual Current Circuit Breakers RCCBs. The Residual Current Circuit breakers RCCBs are the safest devices to detect and trip against electrical leakage currents, thus ensuring protection against electric shock caused by indirect contacts.
Functional unit	The functional unit is designed to protect people and premises at risk of fire or explosion against insulation defects in a circuit with rated voltage 400 V, rated current 63A, with 4 poles, sensitivity 30mA , and the differential protection type A, and if applicable the specific specifications, in the Industrial application area, according to the appropriate use scenario, and during the 20-year reference service life of the product
Other products covered	The ABB F454 family technical characteristics: Rated voltage [V – AC]: 230-400 Rated current [A]: 25/40/63 Rated breaking capacity [A]: 4000 Type of differential protection: A/APR/A-LF/A-K Sensitivity [mA]: 10/30/100/300 Number of poles [P]: 2/4
Manufacturing address	ABB S.p.A. – ELSB Viale dell'Industria, 18 20009 Vittuone (MI) - Italy www.new.abb.com

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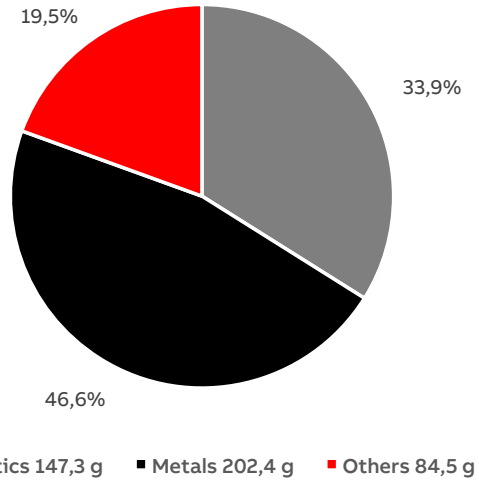
Constituent Materials



Total weight of reference product and packaging	**434,5**	**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	20,5	**Steel**	27,09	**Cardboard/Paper**	16,6
GF	11,4	**Cu**	11,78	**PBT**	1,2
PPS	1,1	**Brass**	5,50	**Magnesium oxide**	0,7
PC	0,9	**FeNi - FeNb**	1,84	**Miscellaneous**	0,5
POM	0,1	**Al, Ag, tin, Miscellaneous**	0,37	**Wood + PE + Silicon**	0,4

Total weight of the product 362,6g plus packaging 71,9 g

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Additional Information

Manufacturing	The manufacturing stage includes the production and transportation to the manufacturer's last logistic platform of 2CSF204108U1630 and its packaging, located in Schaffhausen (CH).
Distribution	We considered the transport from ABB Santa Palomba factory to ABB Factory in Schaffhausen (CH) (941 km) for laser marking, final packaging and final distribution to customers. We considered a maximum road distance of 400 km for distribution on the Swiss market. Product is sold almost exclusively in Switzerland. Negligible residual quantities may be sold in Europe.
Installation	The installation phase only implies manual activities and no energy is consumed. This phase also includes the disposal of the packaging of the product. Statistical average data from Eurostat databases were considered for the disposal of the product and its packaging.
Use	During the use phase, the 2CSF204108U1630 dissipates some electricity due to power losses. The average power loss of the switch has been calculated by ABB following the assumption indicated in the PSR-0005-ed3.1-EN-2023 12 08 : - Nominal current load rate as 50% (Industrial scenario); - RSL of 20 years; - Functioning time of 30% of the RSL (α). No maintenance is planned for the product.
End of life	The default end-of-life scenario provided by the IEC/TR 62635 document has been adopted, considering the product transport by lorry over 1000 km.
Benefits and loads beyond the system boundaries	The potential benefits derive from the impacts prevented by recycling and waste to energy recovery of the packaging in the installation phase

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Environmental Impacts

Reference lifetime	20 years
Product category	Residual Current Device RCCB
Installation elements	No installation materials are required in the life cycle of the product.
Use scenario	The calculation of the use stage electricity consumption from the average power considers the following assumptions: nominal current load rate as 50% (Industrial)
Geographical representativeness	For the use and end-of-life stages of the product, the geographical boundaries of Europe have been considered
Technological representativeness	Technological representativeness refers to the specific production process for primary data.
Software and database used	SimaPro 9.5.0.0 & Ecoinvent 3.9
Energy model used	
Manufacturing	ABB GO energy mix 2022. The energy-related processes used for the remaining inputs are those included in the ecoinvent v3.9.1 and Industry 2.0 datasets.
Installation	No energy consumption occurs during the installation stage
Use	Electricity, low voltage {CH}| market for electricity, low voltage | 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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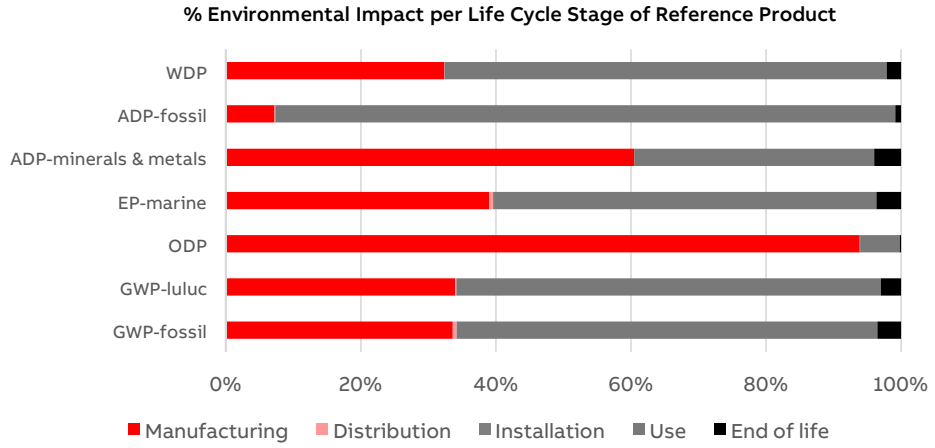
Common base of mandatory indicators



Environmental impact indicators

Indicator		Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
GWP	Total	kg CO2 eq.	1,45E+01	3,64E+00	6,51E-02	1,17E-01	1,03E+01	4,33E-01	-9,71E-01
	Fossil	kg CO2 eq.	1,10E+01	3,68E+00	6,50E-02	5,72E-03	6,82E+00	3,87E-01	-1,05E+00
	Biogenic	kg CO2 eq.	3,53E+00	-5,09E-02	5,03E-05	1,11E-01	3,42E+00	4,57E-02	7,82E-02
	Luluc	kg CO2 eq.	1,57E-02	5,35E-03	3,08E-05	2,26E-06	9,89E-03	4,74E-04	-1,39E-03
ODP		kg CFC-11 eq.	4,58E-06	4,30E-06	1,43E-09	1,25E-10	2,70E-07	9,07E-09	-7,55E-09
AP		H+ eq.	1,71E-01	8,45E-02	2,70E-04	2,85E-05	7,90E-02	7,38E-03	-3,27E-02
EP	Freshwater	kg P eq.	1,34E-02	6,70E-03	4,65E-06	6,40E-07	6,23E-03	4,10E-04	-2,64E-03
	Marine	kg N eq.	1,74E-02	6,80E-03	1,02E-04	2,39E-05	9,88E-03	6,38E-04	-2,18E-03
	Terrestrial	mol N eq.	2,05E-01	8,44E-02	1,09E-03	1,15E-04	1,13E-01	6,70E-03	-2,79E-02
POPCD		kg NMVOC eq.	5,83E-02	2,47E-02	4,10E-04	4,46E-05	3,09E-02	2,23E-03	-8,51E-03
ADP	Minerals & metals	kg SB eq.	2,03E-03	1,23E-03	1,76E-07	2,19E-08	7,21E-04	8,10E-05	-3,83E-04
	Fossil	MJ	6,52E+02	4,69E+01	9,56E-01	6,71E-02	5,98E+02	5,72E+00	-1,17E+01
WDP		m³ eq. depr.	7,39E+00	2,39E+00	4,56E-03	4,35E-04	4,83E+00	1,58E-01	-5,43E-01

Resource use indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
PERE	MJ	5,79E+02	8,69E+00	1,40E-02	2,34E-03	5,70E+02	7,81E-01	-2,20E+00
PERM	MJ	1,22E+00	1,22E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	5,80E+02	9,90E+00	1,40E-02	2,34E-03	5,70E+02	7,81E-01	-2,20E+00
PENRE	MJ	6,48E+02	4,32E+01	9,56E-01	6,71E-02	5,98E+02	5,72E+00	-1,17E+01
PENRM	MJ	3,71E+00	3,71E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	6,52E+02	4,69E+01	9,56E-01	6,71E-02	5,98E+02	5,72E+00	-1,17E+01

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Common base of mandatory indicators

Use of secondary materials, water, and energy resources

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
SM	kg	0,00E+00	0,00E+00	0,00E+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
FW	m^3	1,98E+00	6,26E-02	1,50E-04	2,13E-05	1,91E+00	5,18E-03	-1,33E-02

Waste category indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
HWD	kg	1,74E-03	9,67E-04	5,94E-06	4,11E-07	7,39E-04	2,59E-05	3,08E-05
N-HWD	kg	4,77E+00	9,14E-01	8,39E-02	9,30E-03	3,54E+00	2,18E-01	-2,19E-01
RWD	kg	7,92E-03	8,56E-05	2,92E-07	5,51E-08	7,82E-03	1,92E-05	-2,54E-06

Output flow indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
CfRu	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MfR	kg	5,38E-01	1,50E-01	0,00E+00	5,81E-02	0,00E+00	3,29E-01	0,00E+00
MfER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	5,41E-02	0,00E+00	0,00E+00	3,48E-02	0,00E+00	1,93E-02	0,00E+00

Other indicators

Indicator		Unit	Total
Biogenic Carbon	Product	kg of C	6,34E-04
	Packaging	kg of C	3,76E-02

Optional indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
Tot PE	MJ	1,23E+03	5,68E+01	9,70E-01	6,94E-02	1,17E+03	6,50E+00	-1,39E+01
Efp	Dise inc	9,31E-07	3,52E-07	6,72E-09	5,40E-10	5,40E-07	3,24E-08	-1,12E-07
IrHH	kBq U-235 eq	3,54E+01	3,34E-01	1,21E-03	2,21E-04	3,50E+01	7,46E-02	-9,67E-03
ETX FW	CTUe	2,27E+02	1,14E+02	4,60E-01	7,64E-02	1,06E+02	6,62E+00	-3,73E+01
HTX CE	CTUh	3,70E-08	1,79E-08	2,83E-11	5,97E-12	1,44E-08	4,73E-09	-3,56E-09
HTX N-CE	CTUh	1,86E-06	9,76E-07	6,87E-10	7,78E-11	7,61E-07	1,20E-07	-3,78E-07
IrLS	Pt	1,12E+02	4,31E+01	9,72E-01	3,15E-02	6,35E+01	4,07E+00	-1,38E+01

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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 multiplying the values of the Reference product by the following coefficients:

For the manufacturing stage, distribution stage and end-of-life stage: $y = a_n x_1 + b_n$ where x_1 is the weight of the product;

For use stage: $y = a_n x2 + b_n$ where x_2 is the average Power loss of the product.

Table below reports the linear coefficients an & bn for each life cycle stage. The calculation of the coefficient for the Installation Stage was not performed because the selected parameters do not affect the values for this stage.

* if the coefficient is !1, the impacts of the phase of the life cycle are assimilated to the Reference product, meaning that the impacts are unchanged in comparison to the Reference product

Impact Category	Manufacturing		Distribution		Installation		Use		End of Life	
	a1	b1	a2	b2	a3	b3	a4	b4	a5	b5
GWP-total	9,89E-03	7,65E-02	1,51E-04	1,08E-02	0,00E+00	1,17E-01	3,06E+00	2,00E-04	1,20E-03	2,75E-10
GWP-fossil	9,76E-03	1,68E-01	1,51E-04	1,08E-02	0,00E+00	5,72E-03	2,04E+00	1,33E-04	1,08E-03	2,46E-10
GWP-biogenic	1,15E-04	-9,23E-02	1,17E-07	8,33E-06	0,00E+00	1,11E-01	1,02E+00	6,67E-05	1,27E-04	2,90E-11
GWP-luluc	1,28E-05	7,44E-04	7,13E-08	5,10E-06	0,00E+00	2,26E-06	2,95E-03	1,93E-07	1,32E-06	3,01E-13
ODP	1,19E-08	4,73E-09	3,32E-12	2,37E-10	0,00E+00	1,25E-10	8,05E-08	5,25E-12	2,52E-11	5,75E-18
AP	2,29E-04	1,96E-03	6,26E-07	4,47E-05	0,00E+00	2,85E-05	2,36E-02	1,54E-06	2,05E-05	4,68E-12
EP-freshwater	1,82E-05	1,36E-04	1,08E-08	7,71E-07	0,00E+00	6,40E-07	1,86E-03	1,22E-07	1,14E-06	2,60E-13
EP-marine	1,77E-05	4,19E-04	2,37E-07	1,69E-05	0,00E+00	2,39E-05	2,95E-03	1,93E-07	1,77E-06	4,05E-13
EP-terrestrial	2,26E-04	3,17E-03	2,53E-06	1,81E-04	0,00E+00	1,15E-04	3,37E-02	2,20E-06	1,86E-05	4,25E-12
POCP	6,54E-05	1,19E-03	9,50E-07	6,79E-05	0,00E+00	4,46E-05	9,21E-03	6,02E-07	6,21E-06	1,42E-12
ADPE	3,38E-06	1,63E-05	4,09E-10	2,92E-08	0,00E+00	2,19E-08	2,15E-04	1,41E-08	2,25E-07	5,14E-14
ADPF	1,24E-01	2,42E+00	2,22E-03	1,58E-01	0,00E+00	6,71E-02	1,79E+02	1,17E-02	1,59E-02	3,63E-09
WDP	4,72E-03	6,93E-01	1,06E-05	7,55E-04	0,00E+00	4,35E-04	1,44E+00	9,42E-05	4,40E-04	1,00E-10
CRU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	2,90E-04	4,59E-02	0,00E+00	0,00E+00	0,00E+00	5,81E-02	0,00E+00	0,00E+00	9,15E-04	2,09E-10
MER	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,48E-02	0,00E+00	0,00E+00	5,36E-05	1,23E-11
PM	9,36E-10	1,53E-08	1,56E-11	1,11E-09	0,00E+00	5,40E-10	1,61E-07	1,05E-11	8,99E-11	2,05E-17
IRP	8,76E-04	1,93E-02	2,80E-06	2,00E-04	0,00E+00	2,21E-04	1,05E+01	6,82E-04	2,07E-04	4,73E-11
PENRE	1,13E-01	2,33E+00	2,22E-03	1,58E-01	0,00E+00	6,71E-02	1,79E+02	1,17E-02	1,59E-02	3,63E-09
PENRM	1,01E-02	6,58E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	1,24E-01	2,40E+00	2,22E-03	1,58E-01	0,00E+00	6,71E-02	1,79E+02	1,17E-02	1,59E-02	3,63E-09
PERE	1,59E-02	2,98E+00	3,25E-05	2,32E-03	0,00E+00	2,34E-03	1,70E+02	1,11E-02	2,17E-03	4,95E-10
PERM	5,65E-05	1,20E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	1,59E-02	4,18E+00	3,25E-05	2,32E-03	0,00E+00	2,34E-03	1,70E+02	1,11E-02	2,17E-03	4,95E-10
PE	1,39E-01	6,58E+00	2,25E-03	1,61E-01	0,00E+00	6,94E-02	3,49E+02	2,28E-02	1,80E-02	4,12E-09
SM	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	1,29E-04	1,60E-02	3,48E-07	2,49E-05	0,00E+00	2,13E-05	5,71E-01	3,73E-05	1,44E-05	3,29E-12
HWD	2,62E-06	2,46E-05	1,38E-08	9,84E-07	0,00E+00	4,11E-07	2,21E-04	1,44E-08	7,18E-08	1,64E-14
NHWD	2,38E-03	5,90E-02	1,94E-04	1,39E-02	0,00E+00	9,30E-03	1,06E+00	6,91E-05	6,06E-04	1,38E-10
RWD	2,24E-07	4,91E-06	6,76E-10	4,83E-08	0,00E+00	5,51E-08	2,33E-03	1,52E-07	5,32E-08	1,22E-14
ETP-fw	3,11E-01	1,83E+00	1,07E-03	7,61E-02	0,00E+00	7,64E-02	3,17E+01	2,07E-03	1,84E-02	4,20E-09
HTP-c	4,81E-11	5,93E-10	6,56E-14	4,69E-12	0,00E+00	5,97E-12	4,28E-09	2,80E-13	1,31E-11	3,00E-18
HTP-nc	2,65E-09	2,11E-08	1,59E-12	1,14E-10	0,00E+00	7,78E-11	2,27E-07	1,48E-11	3,34E-10	7,63E-17
SQP	8,70E-02	1,18E+01	2,25E-03	1,61E-01	0,00E+00	3,15E-02	1,89E+01	1,24E-03	1,13E-02	2,58E-09
BCProd	1,76E-06	4,02E-13	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
BCPack	0,00E+00	3,76E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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Extrapolation Factors

Product Code	Product Name	Weight [g]	Average power loss [W]
2CSF402110R0250	F452 25 A10	194,50	0,35
2CSF402110R1250	F452 25 A30	197,10	0,35
2CSF402110R1400	F452 40 A30	196,00	0,85
2CSF402110R2400	F452 40 A100	196,70	0,85
2CSF402410R1400	F452 40 APR30	196,70	0,85
2CSF204108U1250	F454A-25/0.03	362,40	0,57
2CSF204108U1400	F454A-40/0.03	359,20	1,55
2CSF204108U1630	F454A-63/0.03	359,90	3,35
2CSF204108U2400	F454A-40/0.1	342,20	1,55
2CSF204108U2630	F454A-63/0.1	341,30	3,35
2CSF204108U3400	F454A-40/0.3	341,90	1,55
2CSF204108U3630	F454A-63/0.3	341,10	3,35
2CSF204195U1630	F454A-LF 63/0.03	364,50	3,35
2CSF204195U3630	F454A-LF 63/0.3	365,10	3,35
2CSF204208U2630	F454A-S 63/0.1	345,70	3,35
2CSF204208U3630	F454A-S 63/0.3	347,80	3,35
2CSF204408U1400	F454A-K 40/0.03	367,90	1,55
2CSF204408U1630	F454A-K 63/0.03	365,40	3,35
2CSF204408U2400	F454A-K 40/0.1	350,00	1,55

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Glossary

Environmental impact Indicators	
GWP-total	Global Warming Potential total (Climate change)
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 - fraction of nutrients reachin marine end compartment
EP-terrestrial	Eutrophication potential - Accumulated Exceedance
POPCD	Formation potential of tropospheric ozone
ADP-m&m	Abiotic Depletion for non-fossil resources potential
ADP-fossil	Abiotic Depletion for fossil resources potential, WDP
WDP	Water deprivation potential

Resource indicators	
PENRE	Use of non-renewable primary energy excluding renewable primary energy resources used as raw
PENRM	Use of non-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
PERE	Use of renewable primary energy excluding non-renewable primary energy resources used as raw material.
PERM	Use of renewable primary energy resources used as raw material
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)

Secondary materials, water and energy resources		Waste category indicators	
SM	Use of secondary materials	HWD	Hazardous waste disposed
RSF	Use of renewable secondary fuels	N-HWD	Non-hazardous waste disposed
NRSF	Use of non-renewable secondary fuels	RWD	Radioactive waste disposed
FW	Net use of fresh water		

Output flow indicators		Optional indicators	
CfRu	Components for re-use	Tot PE	Total use of primary energy during the life cycle
MfR	Materials for recycling		
MfER	Materials for energy recovery	Efp	Emissions of Fine particles
EE	Exported Energy	IrHH	Ionizing radiation, human health
		ETX FW	Ecotoxicity, freshwater
		HTX CE	Human toxicity, carcinogenic effects
		HTX N-CE	Human toxicity, non-carcinogenic effects
		IrLS	Impact related to Land use / soil quality

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