Socket Outlets

PEP ecopassport®
Product Environmental Profile

Registration number:	ABBG-00615-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:	February-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"

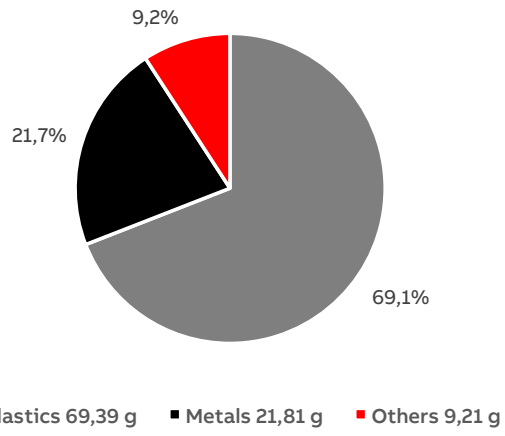
ABB Purpose & Embedding Sustainability

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	**The scope of this LCA study is the evaluation of the environmental impacts of the life cycle of Socket Outlets M1175-4-3-0 and M1363 and M1011 produced by ABB SpA. The Socket Outlets M1175-4-3-0 and M1363 and M1011 allow the connection of devices, tools or electrical and electronic non modular equipment in industrial electrical switchboards. The specific type of ABB Modular socket Outlet analyzed in this LCA project is the ABB M1175 Rated Voltage 250V AC Rated Current 16A, article code 2CSM210000R0721.**
Description of the product	**The ABB modular socket allows the connection of devices, tools or electrical and electronic non modular equipments in civil and industrial electrical switchboards.**
Functional unit	**The functional unit is designed to Connect/disconnect the plug of a load consuming In of 16A (maximum), under a voltage of 250 V, while protecting the user from direct contact with live parts and, if applicable, the specific specifications, in the Household/Commercial or Industrial application areas, according to the appropriate use scenario, and for the reference service life of the product of 20 years**
Other products covered	**ABB socket Outlet family characteristics: Rated voltage [V]: 250 - 440 Rated Current [A]: 10 - 13 -16**
Manufacturing address	**ABB S.p.A. – ELSB Viale dell'Industria, 18 20009 Vittuone (MI) - Italy www.new.abb.com**

Constituent Materials



Total weight of reference product and packaging	100,4	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	46,6	STEEL	13,6	CARDBOARD	8,1
GLASS FIBER	20,3	BRASS	8,2	MISCELLANEOUS	0,4
PC	1,2			WOOD	0,6
POM	0,9			PAPER	0,1
PE	0,1				

Weight of product 91,6 g plus packaging 8,8 g

Additional Information

Manufacturing	The manufacturing stage includes the production and transportation to the manufacturer's last logistic platform of 2CSM210000R0721 and its packaging.
Distribution	The transport from the manufacturing site to Vignate (MI) and other locations, was taken into account. For the distribution of the product from Vignate to the final customer, the intracontinental transport scenario provided by PCR-ed4-EN-2021 09 06 standard was adopted.
Installation	Product installation requires only manual activities and consumes no energy.
Use	During the use phase, the device 2CSM210000R0721 dissipate 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 @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 [19]document have been adopted, considering the product transport by lorry over 1000 km
Benefits and loads beyond the system boundaries	The potential benefits derives from the impacts prevented by recycling and waste to energy recovery of the packaging in the installation phase

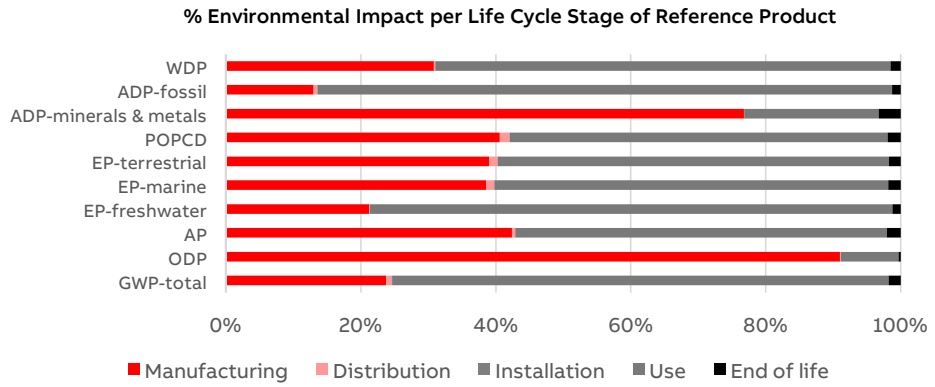
Environmental Impacts

Reference lifetime	20 years
Product category	Modular Din Rail Socket Outlet
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 consider 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 and final destination countries have been considered.
Technological representativeness	Technological representativeness refers to the specific production process for primary data.
Software and database used	SimaPro 9.5.0.1 & Ecoinvent 3.9

Energy model used

Manufacturing	Electricity, medium voltage {RO}| market for electricity, medium voltage | Cut-off, S The energy-related processes used for the remaining inputs of the manufacturing stage are those included in the ecoinvent 3.9 datasets selected for the analysis
Installation	No energy consumption occur during the installation stage
Use	Electricity, low voltage (Various regionalities according to product distribution data)
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

Common base of mandatory indicators



Environmental impact indicators

Indicator		Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
GWP	Total	kg CO2 eq.	6,86E+00	1,63E+00	5,41E-02	1,47E-02	5,04E+00	1,22E-01	-2,03E-01
	Fossil	kg CO2 eq.	6,31E+00	1,28E+00	5,41E-02	7,05E-04	4,87E+00	1,03E-01	-2,21E-01
	Biogenic	kg CO2 eq.	5,41E-01	3,47E-01	2,67E-05	1,40E-02	1,61E-01	1,92E-02	1,84E-02
	Luluc	kg CO2 eq.	1,33E-02	1,42E-03	2,68E-05	2,98E-07	1,17E-02	1,22E-04	-6,80E-05
ODP		kg CFC-11 eq.	9,44E-07	8,59E-07	9,90E-10	1,48E-11	8,09E-08	2,96E-09	3,79E-10
AP		H+ eq.	5,07E-02	2,15E-02	2,57E-04	3,45E-06	2,79E-02	1,04E-03	-3,94E-03
EP	Freshwater	kg P eq.	5,36E-03	1,14E-03	4,19E-06	7,89E-08	4,15E-03	6,60E-05	-2,74E-04
	Marine	kg N eq.	8,05E-03	3,11E-03	9,19E-05	3,20E-06	4,70E-03	1,48E-04	-3,24E-04
	Terrestrial	mol N eq.	7,56E-02	2,95E-02	9,84E-04	1,39E-05	4,38E-02	1,34E-03	-3,97E-03
POPCD		kg NMVOC eq.	2,43E-02	9,85E-03	3,52E-04	5,42E-06	1,36E-02	4,66E-04	-1,25E-03
ADP	Minerals & metals	kg SB eq.	2,81E-04	2,16E-04	1,45E-07	2,57E-09	5,60E-05	9,19E-06	-4,27E-05
	Fossil	MJ	1,21E+02	1,57E+01	7,91E-01	8,05E-03	1,03E+02	1,54E+00	-2,49E+00
WDP		m^3 eq. depr.	1,73E+00	5,35E-01	3,91E-03	5,84E-05	1,17E+00	2,59E-02	-1,01E-01

Resource use indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
PERE	MJ	2,67E+01	1,87E+00	1,05E-02	2,87E-04	2,46E+01	1,82E-01	-1,70E-01
PERM	MJ	2,19E-01	2,19E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,69E+01	2,09E+00	1,05E-02	2,87E-04	2,46E+01	1,82E-01	-1,70E-01
PENRE	MJ	1,19E+02	1,40E+01	7,91E-01	8,05E-03	1,03E+02	1,54E+00	-2,49E+00
PENRM	MJ	1,70E+00	1,70E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,21E+02	1,57E+01	7,91E-01	8,05E-03	1,03E+02	1,54E+00	-2,49E+00

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	1,04E-01	1,50E-02	1,25E-04	2,81E-06	8,75E-02	9,85E-04	-2,24E-03

Waste category indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
HWD	kg	3,03E-04	1,21E-04	4,95E-06	4,88E-08	1,72E-04	5,06E-06	-2,03E-06
N-HWD	kg	8,61E-01	2,89E-01	6,81E-02	1,48E-03	4,51E-01	5,16E-02	-1,11E-02
RWD	kg	7,49E-04	3,09E-05	1,94E-07	6,75E-09	7,13E-04	4,87E-06	1,66E-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	3,31E-01	2,40E-01	0,00E+00	6,60E-03	0,00E+00	8,42E-02	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	1,45E-02	0,00E+00	0,00E+00	5,29E-03	0,00E+00	9,20E-03	0,00E+00

Other indicators

Indicator		Unit	Total
Biogenic Carbon	Product	kg of C	4,27E-05
	Packaging	kg of C	6,87E-03

Optional indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
Tot PE	MJ	1,48E+02	1,78E+01	8,02E-01	8,34E-03	1,28E+02	1,72E+00	-2,66E+00
Efp	Dise inc	2,56E-07	1,01E-07	5,51E-09	6,48E-11	1,42E-07	7,06E-09	-1,61E-08
IrHH	kBq U-235 eq	2,95E+00	1,19E-01	8,12E-04	2,70E-05	2,81E+00	1,90E-02	6,50E-03
ETX FW	CTUe	3,91E+01	1,92E+01	4,06E-01	1,00E-02	1,84E+01	1,04E+00	-3,98E+00
HTX CE	CTUh	9,04E-09	6,28E-09	2,35E-11	7,40E-13	2,19E-09	5,49E-10	-3,51E-10
HTX N-CE	CTUh	3,43E-07	2,39E-07	5,69E-10	1,02E-11	8,98E-08	1,38E-08	-4,06E-08
IrLS	Pt	3,14E+01	9,69E+00	7,92E-01	4,04E-03	2,01E+01	8,37E-01	-1,29E+00

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: y = anx + bn

* 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	1,01E-02	7,06E-01	5,38E-04	4,78E-03	0,00E+00	1,47E-02	3,36E+01	-1,66E-05	1,33E-03	3,70E-05
GWP-fossil	1,00E-02	3,65E-01	5,37E-04	4,77E-03	0,00E+00	7,05E-04	3,25E+01	-1,60E-05	1,12E-03	3,12E-05
GWP-biogenic	7,11E-05	3,40E-01	2,65E-07	2,35E-06	0,00E+00	1,40E-02	1,07E+00	-5,27E-07	2,09E-04	5,84E-06
GWP-luluc	1,05E-05	4,59E-04	2,66E-07	2,36E-06	0,00E+00	2,98E-07	7,82E-02	-3,86E-08	1,33E-06	3,72E-08
ODP	9,30E-09	5,96E-09	9,83E-12	8,73E-11	0,00E+00	1,48E-11	5,39E-07	-2,66E-13	3,23E-11	9,00E-13
AP	1,25E-04	1,00E-02	2,55E-06	2,27E-05	0,00E+00	3,45E-06	1,86E-01	-9,18E-08	1,14E-05	3,17E-07
EP-freshwater	6,83E-06	5,18E-04	4,16E-08	3,69E-07	0,00E+00	7,89E-08	2,77E-02	-1,36E-08	7,18E-07	2,01E-08
EP-marine	1,24E-05	1,97E-03	9,12E-07	8,10E-06	0,00E+00	3,20E-06	3,13E-02	-1,54E-08	1,61E-06	4,51E-08
EP-terrestrial	1,87E-04	1,24E-02	9,77E-06	8,68E-05	0,00E+00	1,39E-05	2,92E-01	-1,44E-07	1,46E-05	4,08E-07
POCP	4,42E-05	5,79E-03	3,49E-06	3,10E-05	0,00E+00	5,42E-06	9,03E-02	-4,45E-08	5,07E-06	1,42E-07
ADPE	1,07E-06	1,18E-04	1,44E-09	1,28E-08	0,00E+00	2,57E-09	3,73E-04	-1,84E-10	1,00E-07	2,79E-09
ADPF	1,29E-01	3,95E+00	7,86E-03	6,98E-02	0,00E+00	8,05E-03	6,87E+02	-3,39E-04	1,67E-02	4,67E-04
WDP	3,85E-03	1,82E-01	3,89E-05	3,45E-04	0,00E+00	5,84E-05	7,82E+00	-3,85E-06	2,82E-04	7,86E-06
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	1,86E-04	2,23E-01	0,00E+00	0,00E+00	0,00E+00	6,60E-03	0,00E+00	0,00E+00	9,17E-04	2,56E-05
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	5,29E-03	0,00E+00	0,00E+00	1,00E-04	2,80E-06
PM	7,08E-10	3,59E-08	5,47E-11	4,86E-10	0,00E+00	6,48E-11	9,48E-07	-4,67E-13	7,69E-11	2,15E-12
IRP	6,88E-04	5,63E-02	8,07E-06	7,16E-05	0,00E+00	2,70E-05	1,87E+01	-9,22E-06	2,07E-04	5,78E-06
PENRE	1,10E-01	3,92E+00	7,86E-03	6,98E-02	0,00E+00	8,05E-03	6,87E+02	-3,39E-04	1,67E-02	4,67E-04
PENRM	1,83E-02	2,63E-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	1,29E-01	3,94E+00	7,86E-03	6,98E-02	0,00E+00	8,05E-03	6,87E+02	-3,39E-04	1,67E-02	4,67E-04
PERE	1,10E-02	8,60E-01	1,04E-04	9,24E-04	0,00E+00	2,87E-04	1,64E+02	-8,07E-05	1,98E-03	5,53E-05
PERM	0,00E+00	2,19E-01	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	1,10E-02	1,08E+00	1,04E-04	9,24E-04	0,00E+00	2,87E-04	1,64E+02	-8,07E-05	1,98E-03	5,53E-05
PE	1,40E-01	5,02E+00	7,96E-03	7,07E-02	0,00E+00	8,34E-03	8,51E+02	-4,19E-04	1,87E-02	5,22E-04
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	1,03E-04	5,51E-03	1,24E-06	1,10E-05	0,00E+00	2,81E-06	5,84E-01	-2,88E-07	1,07E-05	2,99E-07
HWD	6,08E-07	6,48E-05	4,92E-08	4,37E-07	0,00E+00	4,88E-08	1,15E-03	-5,66E-10	5,51E-08	1,54E-09
NHWD	1,93E-03	1,12E-01	6,77E-04	6,01E-03	0,00E+00	1,48E-03	3,01E+00	-1,48E-06	5,62E-04	1,57E-05
RWD	1,75E-07	1,48E-05	1,93E-09	1,71E-08	0,00E+00	6,75E-09	4,75E-03	-2,34E-09	5,31E-08	1,48E-09
ETP-fw	1,17E-01	8,45E+00	4,04E-03	3,58E-02	0,00E+00	1,00E-02	1,23E+02	-6,05E-05	1,14E-02	3,17E-04
HTP-c	2,17E-11	4,30E-09	2,34E-13	2,08E-12	0,00E+00	7,40E-13	1,46E-08	-7,18E-15	5,98E-12	1,67E-13
HTP-nc	9,88E-10	1,48E-07	5,65E-12	5,02E-11	0,00E+00	1,02E-11	5,99E-07	-2,95E-13	1,50E-10	4,18E-12
SQP	4,24E-02	5,80E+00	7,87E-03	6,98E-02	0,00E+00	4,04E-03	1,34E+02	-6,59E-05	9,12E-03	2,54E-04
BCProd	4,65E-07	1,30E-08	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	6,87E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Extrapolation Factors

Product Code	Product Name	Weight of the product [g]	Average power loss (Wloss) @50%In (Included electronic cons.) [W]
2CSM210000R0721	M1175	178,00	0,43
2CSM212000R0721	M1175-L	178,00	0,43
2CSM214000R0721	M1175-FL	178,00	0,44
2CSM211000R0721	M1175-C	178,00	0,45
2CSM110000R0711	M1174	178,00	0,46
2CSM110000R0701	M1173	189,00	0,49
2CSM112000R0701	M1173-L	189,00	0,51
2CSM210000R0701	M1170	178,00	0,43
2CSM259343R0721	M1363	178,00	0,43
2CSM258163R0721	M1363-L	178,00	0,44
2CSM220685R0721	M1011-T13	178,00	0,45
2CSM220695R0721	M1011-T23	178,00	0,46
2CSM220705R0721	M1011-T15	189,00	0,49
2CSM220715R0721	M1011-T25	189,00	0,51

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
PERE	Use of renewable primary energy excluding non-renewable primary energy resources used as raw
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
PE	Total use of primary energy during the life cycle
BCProd	Biogenic Carbon content product
BCPack	Biogenic Carbon content packaging

Secondary materials, water and energy resources	
SM	Use of secondary materials
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Net use of fresh water

Waste category indicators	
HWD	Hazardous waste disposed
N-HWD	Non-hazardous waste disposed
RWD	Radioactive waste disposed

Output flow indicators	
CfRu	Components for re-use
MfR	Materials for recycling
MfER	Materials for energy recovery
EE	Exported Energy

Optional indicators	
Tot PE	Total use of primary energy during the life cycle
Efp	Emissions of Fine particles
IrHH	Ionizing radiation, human health
ETX FW	Ecotoxicity, freshwater
HTX CE	Human toxicity, carcinogenic effects
HTX N-CE	Human toxicity, non-carcinogenic
IrLS	Impact related to Land use / soil quality

References

[1]PEP ecopassport® PROGRAM. PCR-ed4-EN-2021 09 06. Product Category Rules for Electrical. Electronic and HVAC-R Products.

[2]PEP ecopassport® PROGRAMME. PSR-0005-ed3.1-EN-2023 12 08. Specific rules for Electrical switchgear and control gear Solutions.

[3]PRé Consultants. Software SimaPro v. 9.5.0.0 (www.simapro.com).

[4]ISO 14040:2006/Amd 1:2020. Life cycle assessment. Environmental management. Principles and Framework. International Organization for Standardization. 2020.

[5]ISO 14044:2006/Amd 1:2017/Amd 2:2020. Life cycle assessment. Environmental management. Requirements and guidelines. International Organization for Standardization. 2020.

[6]ABB website. (https://global.abb/group/en/about) [accessed 12-01-2023].

[7]ABB website.(https://global.abb/group/en/sustainability/sustainability-strategy-2030) [accessed 12-01-2023].

[8]ABB website. (https://new.abb.com/low-voltage/products/system-pro-m/residual-current-devices/dda200) [accessed 15-12-2023].

[9]Ecoinvent. 2022. Swiss Centre for Life Cycle Assessment. v3.9.1 (www.ecoinvent.ch).

[10] EN 15804:2012+A2:2019: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

[11] Google Maps. (https://www.google.it/maps/preview).

[12] Sea Rates. (https://www.searates.com/).

[13] VAC – Advanced Magnetic Solutions, VITROPERM® 800 / 500 (VITROPERM 500 - 800.pdf (vacuumschmelze.com)).

[14] Wikipedia, Alnico (Alnico - Wikipedia).

[15] Kruzhanov, Vladislav & Arnhold, Volker. (2012). Energy consumption in powder metallurgical manufacturing. Powder Metallurgy. 55. 14-21. 10.1179/174329012X13318077875722 ((PDF) Energy consumption in powder metallurgical manufacturing (researchgate.net)).

[16] GO CERTIFICATES ABB SPA 2022.

[17] Eurostat. (https://ec.europa.eu/eurostat/web/products-datasets/-/ENV_WASPAC).

[18] Eurostat. (https://ec.europa.eu/eurostat/web/products-datasets/-/ENV_WASTRT).

[19] International Electrotechnical Commission. IEC/TR 62635 Ed. 1.0 en:2012. Guidelines For End-Of-Life Information Provided By Manufacturers And Recyclers And For Recyclability Rate Calculation Of Electrical And Electronic Equipment. 2012. ISBN 978-2-83220-413-9.

[20] Product Environmental Footprint (PEF), Annex_C_V2.1_May2020.

[21] Imballaggi & Riciclo. 2011. Packaging in legno dalla culla alla culla.

[22] PlasticFinder (https://www.plasticfinder.it/) [accessed 06-03-2024].

[23] Delem, L. and Wastiels, L., 2019, IOP Conf. Ser.: Earth Environ, The practical use of module D in a building case study: assumptions, limitations and methodological issues, Sci. 323 012048.

[24] EEA (European Environment Agency), Technical report No 3/2012. Annual European Union greenhouse gas inventory 1990–2010 and inventory report 2012

[25] EN 50693:2019. Product category rules for life cycle assessments of electronic and electrical products and systems

[26] Ecoinvent. 2021. Documentation for the “Allocation, cut-off, EN15804” system model 2021.10.01

[27] OECD (Organisation for Economic Co-operation and Development), 2020. Environment statistic database - Municipal waste - MetadataMUNW_2021.

[28]ITSB-00615-V01.01-EN M1175 - LCA Report to support PEP Ecopassport for M1175 Socket Outlet

