

IBERVILLE® BOXES

PEP ecopassport®

Product Environmental Profile



Product Environmental Profile - PEP Ecopassport.
Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations"

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STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	1/21



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.



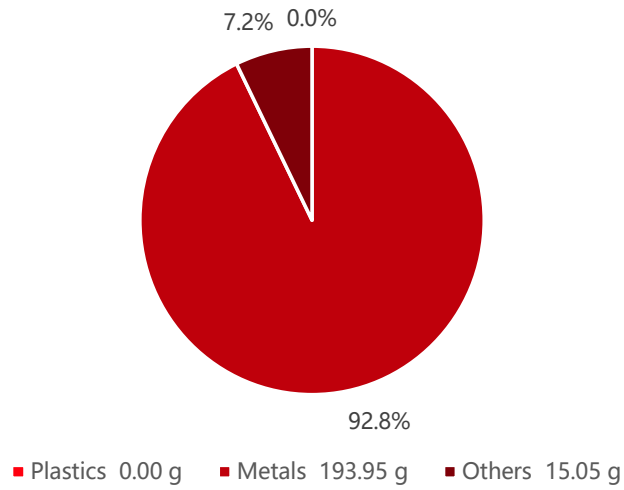
General Information

Reference product	BC54151-L Iberville steel box
Description of the product	Iberville steel boxes are manufactured from hot dipped galvanized steel sheet. The zinc coating is uniformly distributed both inside and outside the box, and not only protects the surface of the steel but also sacrifices itself through galvanic action to prevent corrosion at edges, holes and possible scratches. The use of hot dipped galvanized steel sheet ensures full zinc protection for all the boxes. Iberville boxes incorporate numerous features which result in boxes rugged enough to stand up against the severest abuse.
Functional unit	The functional unit is to connect a workstation remote from the wall to the energy and communication networks for 20 years, via following wiring accessories: <ul style="list-style-type: none"> • Electrical junction box (120-V); • Lighting fixtures (120-V); • Wiring devices (120-V). The reference product is BC54151-L Iberville steel box with a weight of 0.194 kg and its packaging of 0.0155 kg.
Other products covered	List of other products covered in this PEP is presented in the paragraph which concerned the extrapolation rules

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	2/21



Constituent Materials



Total weight of Reference product included packaging (g)

209

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%
Polyethylene	<0,1	Steel	92.8	Wood	4.0
-	-	-	-	Carton	2.7
-	-	-	-	Paper	0.5

Total weight of the reference product 0.194 kg plus packaging 0.015 kg.

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	3/21



Additional Environmental Information

Manufacturing	The manufacturing stage includes the production and transportation to the manufacturer's last logistic platform of Iberville® boxes and its packaging. The final assembly of the product is carried out at ABB's plant located in Quebec (CA)
Distribution	The transport from the ABB factory (Quebec, CA) to the storage site (Bromont, CA) was taken into account. For the distribution of the product from warehouse to the final customer, primary data about the location of the ABB clients has been considered and a weighted average has been computed relative to distances with a cut-off of about 20%.
Installation	The steel screws to install the Iberville boxes have been considered. The installation phase implies manual activities and no energy is consumed because there is no direct consumption during the installation of the product. This phase also includes the disposal of the packaging of Iberville boxes.
Use	No material and energy consumption occurs during the use stage. No maintenance happens during the use phase, the environmental impacts linked to this procedure have been considered equal to zero in the respective results section.
End of life	The default end-of-life scenario provided by the PCR document has been adopted for the Iberville® boxes (100% incineration).
Benefits and loads beyond the system boundaries	No benefits and loads beyond the system boundaries has been considered.

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	4/21



Environmental Impacts

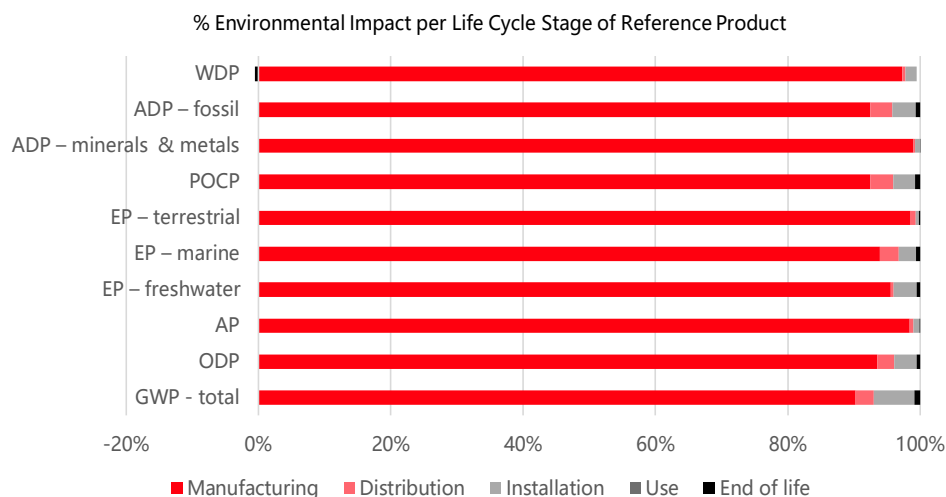
Reference lifetime	20 years
Product category	Other Cable Management Products
Installation elements	The steel screws to install the Iberville boxes have been considered. This phase also includes the disposal of the packaging of Iberville boxes
Use scenario	No material and energy consumption occur during the use stage. No maintenance phase is planned for the the Iberville® boxes.
Geographical representativeness	The suppliers are collocated all over the world, the products are fabricated and distributed in Canada.
Technological representativeness	Technological representativeness refers to the specific production process for primary data.
Software and database used	SimaPro 9.5 and ecoinvent 3.9.1

Energy model used

Manufacturing	<p>Manufacturing plant: _Electricity, medium voltage {CA-QC} market for electricity, medium voltage Cut-off, Pseudo system_Residual mix - 100% hydroelectric (modified process from ecoinvent)</p> <p>Warehouse: Electricity, medium voltage {CA-QC} market for electricity, medium voltage Cut-off, S</p> <p>The energy-related processes used for the remaining inputs of the manufacturing stage are those included in the ecoinvent v3.9.1 datasets selected for the analysis</p>
Installation	No energy consumption occur during the installation stage.
Use	No energy consumption occur during the use stage.
End of life	The energy-related processes used for the inputs of the end-of-life stage are those included in ecoinvent 3.9.1

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	5/21

Common base of mandatory indicators



Environmental impact indicators

Indicator	Unit	Total (no Benefits)	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
GWP-total	kg CO ₂ eq.	1.07E+00	9.70E-01	2.99E-02	6.63E-02	0.00E+00	8.89E-03	0.00E+00
GWP-fossil	kg CO ₂ eq.	1.06E+00	9.83E-01	2.99E-02	4.15E-02	0.00E+00	6.21E-03	0.00E+00
GWP-biogenic	kg CO ₂ eq.	9.17E-03	-1.83E-02	1.10E-05	2.48E-02	0.00E+00	2.68E-03	0.00E+00
GWP-luluc	kg CO ₂ eq.	5.56E-03	5.48E-03	1.49E-05	6.11E-05	0.00E+00	5.68E-06	0.00E+00
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.	1.93E-08	1.80E-08	4.93E-10	6.55E-10	0.00E+00	1.08E-10	0.00E+00
ODP = Depletion potential of the stratospheric ozone layer								
AP	H ⁺ eq.	2.31E-02	2.27E-02	1.31E-04	2.04E-04	0.00E+00	2.95E-05	0.00E+00
AP = Acidification potential, Accumulated Exceedance								
EP-freshwater	kg P eq.	5.08E-04	4.85E-04	2.44E-06	1.73E-05	0.00E+00	3.00E-06	0.00E+00
EP-marine	kg N eq.	1.66E-03	1.56E-03	4.81E-05	4.33E-05	0.00E+00	1.07E-05	0.00E+00
EP-terrestrial	mol N eq.	7.33E-02	7.23E-02	5.14E-04	4.31E-04	0.00E+00	1.13E-04	0.00E+00
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.	5.33E-03	4.93E-03	1.85E-04	1.76E-04	0.00E+00	4.01E-05	0.00E+00
POCP = Formation potential of tropospheric ozone								
ADP-minerals & metals	kg Sb eq.	4.64E-05	4.59E-05	8.14E-08	3.52E-07	0.00E+00	1.85E-08	0.00E+00
ADP-fossil	MJ	1.32E+01	1.22E+01	4.38E-01	4.63E-01	0.00E+00	9.32E-02	0.00E+00
ADP-minerals & metals = Abiotic depletion potential for non-fossil resources ADP-fossil = Abiotic depletion for fossil resources potential								
WDP	m ³ eq. depr.	4.26E-01	4.19E-01	2.23E-03	7.35E-03	0.00E+00	-2.31E-03*	0.00E+00
WDP = Water Deprivation potential * The result of the WDP for the end-of-life phase derived from the ecoinvent datasets and should be interpreted with caution.								

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	6/21

Common base of mandatory indicators

Inventory flows indicator – Resource use indicators

Indicator	Unit	Total (no Benefits)	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
PERE	MJ	2.75E+00	2.69E+00	5.55E-03	5.03E-02	0.00E+00	1.48E-03	0.00E+00
PERM	MJ	3.56E-01	3.52E-01	0.00E+00	3.83E-03	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.10E+00	3.04E+00	5.55E-03	5.42E-02	0.00E+00	1.48E-03	0.00E+00
PENRE	MJ	1.31E+01	1.21E+01	4.38E-01	4.62E-01	0.00E+00	9.32E-02	0.00E+00
PENRM	MJ	6.73E-02	6.55E-02	0.00E+00	1.82E-03	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.32E+01	1.22E+01	4.38E-01	4.63E-01	0.00E+00	9.32E-02	0.00E+00

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 (no Benefits)	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
SM	kg	1.88E-01	1.88E-01	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	m³	2.12E-02	2.09E-02	7.00E-05	3.12E-04	0.00E+00	-4.86E-05*	0.00E+00

SM = Use of secondary material

RSF = Use of renewable secondary fuels

NRSF = Use of non-renewable secondary fuels

FW = Use of net fresh water

* The result of the FW for the end-of-life phase derived from the ecoinvent datasets and should be interpreted with caution.

Inventory flows indicator – Waste category indicators

Indicator	Unit	Total (no Benefits)	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
Hazardous waste disposed	kg	1.33E-04	1.27E-04	2.76E-06	2.53E-06	0.00E+00	5.62E-07	0.00E+00
Non- hazardous waste disposed	kg	5.01E-01	4.45E-01	3.82E-02	1.28E-02	0.00E+00	4.75E-03	0.00E+00
Radioactive waste disposed	kg	3.06E-05	3.00E-05	9.56E-08	4.30E-07	0.00E+00	2.18E-08	0.00E+00

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	7/21

Common base of mandatory indicators

Inventory flows indicator – Output flow indicators

Indicator	Unit	Total (no Benefits)	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	0.00E+00
Materials for recycling	kg	2.20E-01	2.17E-01	0.00E+00	2.88E-03	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	1.01E-01	2.13E-02	0.00E+00	7.94E-02	0.00E+00	0.00E+00	0.00E+00

Inventory flow indicator – other indicators

Indicator	Unit	Total (no Benefits)	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	0.00E+00
Biogenic carbon content of the associated packaging	kg of C	1.53E-02	1.51E-02	0.00E+00	1.25E-04	0.00E+00	0.00E+00	0.00E+00

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	8/21

Optional indicators

Environmental indicators

Indicator	Unit	Total (no Benefits)	Manu- facturing	Distri- bution	Installation	Use	End of life	Bene- fits
Total use of primary energy during the life cycle	MJ	1.63E+01	1.52E+01	4.44E-01	5.18E-01	0.00E+00	9.47E-02	0.00E+00
Emissions of fine particles	incidence of diseases	2.83E-07	2.76E-07	3.08E-09	3.57E-09	0.00E+00	8.59E-10	0.00E+00
Ionizing radiation, human health	kBq U235 eq.	1.04E-01	1.02E-01	4.02E-04	1.74E-03	0.00E+00	9.10E-05	0.00E+00
Ecotoxicity (fresh water)	CTUe	1.36E+01	1.30E+01	2.32E-01	2.70E-01	0.00E+00	9.49E-02	0.00E+00
Human toxicity, carcinogenic effects	CTUh	2.29E-08	2.26E-08	1.30E-11	2.64E-10	0.00E+00	8.54E-12	0.00E+00
Human toxicity, non-carcinogenic effects	incidence of diseases	2.66E-08	2.55E-08	3.19E-10	7.28E-10	0.00E+00	6.77E-11	0.00E+00
Impact related to land use/soil quality		8.13E+00	7.40E+00	4.44E-01	2.04E-01	0.00E+00	8.22E-02	0.00E+00

Other indicators

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

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	9/21

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)

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	2	en	10/21

Approach for extrapolation rules applied to a homogeneous environmental family

The PEP can cover products different from the reference product if they belong to a homogeneous environmental family. This means that the group of products must satisfy the following characteristics:

- same function;
- same product standard;
- same manufacturing technology: the same type of materials and same manufacturing processes.

The product analysed satisfy these conditions, so extrapolation rules were applied to assess the environmental impact of the products belonging to the family, following the PCR indication. No extrapolation rules are set in the PSR; thus, the next steps have been followed to define the extrapolation rule:

- Analyse the products covered by the PEP belonging to the same homogenous family;
- Perform the LCA of a representative product of the homogeneous family;
- Identify and quantify the product parameters that vary between the various products of the homogeneous environmental family (i.e. dimensions, the weight of parts, materials, energy consumption. etc.).

Lastly, a sensitivity analysis was performed for each life cycle stage to identify which parameters of the ones selected are sensitive to environmental impacts to create extrapolation rules.

The parameters identified are listed below and differ between the different stages of the life cycle:

- for the manufacturing and distribution stages:
 - weight of the product;
 - weight of the steel 10.5% recycled;
 - weight of the steel 57.3% recycled;
 - weight of the gross input of the Octagonal Shell;
 - weight of the packaging.
- for the installation stage:
 - weight of the packaging;
 - weight of the installation material.
- for the end of life stage:
 - weight of the product.

The representative product considered for the calculation of the extrapolation rules is the one analysed in this LCA report: BC54151-L Iberville steel box.

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	0	en	11/21

The results of the sensitive analysis show that the sensitive parameter are the weight of the product, the weight of the steel 10.5% recycled, the weight of the steel 57.3% recycled and the weight of the gross input of the Octagonal Shell. For this reason, these parameters have been used as coefficients for the variation of the input to calculate the environmental impacts of the Iberville steel box family variants. In line with the information included in the BoM provided by ABB, the range of recycled input is a constant parameter within the analysed variants and therefore does not affect the extrapolation rules.

The products included in the Iberville steel boxes family and considered for the application of the extrapolation rules are presented in the following tables. The difference between the two first series of the homogeneous family is that the input steel used for the production of the octagonal shell of the Serie with CI66 is also used for the production of another product, "CI66 product". For the Serie with CI66, to correctly attribute the impacts to the Iberville boxes and the CI66 product, in line with LCA principles, the allocation has been avoided applying the division principle.

Iberville ceiling boxes - Serie without CI66			
Variant	Weight of the product (kg)	Weight of the packaging referred to the functional unit (kg)	Weight of the product + referred to the functional unit (kg)
BC54151-L (reference product)	0.1936	0.0155	0.2091
BC54151-K	0.1939	0.0150	0.2089
BC54151-LB	0.2303	0.0298	0.2601
BC54151-LSSAX	0.2795	0.0409	0.3204
BC54151-LD	0.2251	0.0280	0.2531
BC54151-LA	0.2058	0.0155	0.2213
BC52151-K	0.2599	0.0230	0.2859
CI52151-KSB	0.2969	0.0240	0.3239
CI72151-K	0.3425	0.0325	0.3780
CI72171-KSS-X	0.4839	0.1090	0.5959
CI54151-KSSX	0.245	0.0484	0.2934
CI54171-KSSX-1	0.29	0.0459	0.3359
CI54171-LF	0.254	0.0262	0.2802
54151-k-crt	0.194	0.0150	0.2090
54151-la-crt	0.2058	0.0155	0.2213
54151-lb-crt	0.2303	0.0279	0.2582
54151-ld-crt	0.2251	0.0280	0.2531
54151-l-crt	0.194	0.0155	0.2095
54151-lssax-rt	0.2795	0.0409	0.3204
bc54151-lssax-ng	0.3	0.0623	0.3623
ci54151-lf	0.22	0.0272	0.2472
ci54171-kssx-5/8	0.3189	0.0522	0.3711
ci54171-lf	0.251	0.0262	0.2772
54171-lf-crt	0.251	0.0262	0.2772
BC54151-LMS	0.249	0.0294	0.2784
BC54151-LMSA	0.249	0.0294	0.2784
CI52151-KSB	0.2970	0.0240	0.3210
BC52171-1-SSX-1/2	0.3900	0.0558	0.4458
BC52151-KSSX	0.3250	0.0522	0.3772
CI52171-1	0.3300	0.0277	0.3577
BC52171-K	0.3400	0.0367	0.3767
BC52171-KSSX	0.3910	0.0552	0.4462
BC52171-KSSX-1/2	0.3880	0.0552	0.4432
52151-k-crt	0.2600	0.0232	0.2832

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	0	en	12/21

Iberville ceiling boxes - Serie without CI66

Variant	Weight of the product (kg)	Weight of the packaging referred to the functional unit (kg)	Weight of the product + referred to the functional unit (kg)
52151-KSSX-RT	0.3250	0.0522	0.3772
52171-K-CRT	0.3400	0.0367	0.3767
52171-KSSX-RT	0.3910	0.0552	0.4462
bc52151-kms	0.3220	0.0348	0.3568
bc52151-kssx-ng	0.3630	0.0740	0.4370
bc52171-kms	0.3860	0.0491	0.4351
bc52171-kssx-ng	0.4350	0.0722	0.5072
ci52171-1-ssx	0.3900	0.0552	0.4452
ci52171-1-ssx-1	0.3900	0.0552	0.4452
ci52171-kssx-1	0.3880	0.0552	0.4432
CI72171-1	0.4170	0.0429	0.4599
BC72171-K	0.4290	0.0441	0.4731
CI72171-KSB	0.5030	0.0512	0.5542
72171-1-crt	0.4170	0.0429	0.4599
72171-k-crt	0.4290	0.0441	0.4731
72171-kssx-crt	0.4840	0.1093	0.5933
bc72171-kms	0.4720	0.0720	0.5440
ci72171-1-ssx	0.4900	0.1093	0.5993
CI72151-KMS	0.3990	0.0484	0.4474

Iberville ceiling boxes - Serie with CI66

Variant	Weight of the product (kg)	Weight of the packaging referred to the functional unit (kg)	Weight of the product + referred to the functional unit (kg)
BC54171 - K	0.2439	0.0210	0.2649
CI54171-KSSX	0.3189	0.0522	0.3711
BC54171-L	0.2706	0.0210	0.2916
BC54171-LB	0.3046	0.0279	0.3325
BC54171-LD	0.3366	0.0495	0.3861
BC54171-LSSAX	0.3595	0.0522	0.4117
BC54171-LSSAX-5/8	0.3595	0.0522	0.4117
54171-k-rt	0.2439	0.0150	0.2589
54171-kssx-crt	0.3189	0.0522	0.3711
54171-lb-rt	0.3046	0.0279	0.3325
54171-l-rt	0.2076	0.0210	0.2286
BC54171-LA	0.2540	0.0262	0.2802

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	0	en	13/21

Iberville wall boxes			
Variant	Weight of the product (kg)	Weight of the packaging referred to the functional unit (kg)	Weight of the product + packaging referred to the functional unit (kg)
1004-CRT	0.2680	0.0212	0.2892
1004L-CRT	0.2460	0.0271	0.2731
1004LH-CRT	0.2490	0.0203	0.2693
1004LRB-CRT	0.2450	0.0245	0.2695
1104-CRT	0.2300	0.0200	0.2500
1104K-CRT	0.2280	0.0230	0.2510
1104LA-CRT	0.2220	0.0201	0.2421
1104LB-CRT	0.2210	0.0479	0.2689
1104L-CRT	0.2120	0.0200	0.2320
1104LHA-CRT	0.2180	0.0199	0.2379
1104LHT-CRT	0.2140	0.0182	0.2322
1104LRB-CRT	0.2130	0.0201	0.2331
1104LRW-CRT	0.2810	0.0314	0.3124
1304LHTQ-CRT	0.2100	0.0197	0.2297
2104LLE2-CRT	0.2950	0.0359	0.3309
2104LLE3-CRT	0.3860	0.0469	0.4329
2104LLE4-CRT	0.4890	0.0783	0.5673
2104LLE-CRT	0.1950	0.0287	0.2237
2104LN-CRT	0.2100	0.0211	0.2311
2104LRB2-CRT	0.3130	0.0547	0.3677
2104LRB-CRT	0.2000	0.0253	0.2253
2104LX-CRT	0.1910	0.0307	0.2217
2304LHTQ2-CRT	0.2990	0.0365	0.3355
2304LHTQ-CRT	0.2070	0.0204	0.2274
3104KSSX-CRT	0.2860	0.0427	0.3287
3104LH-RT	0.2170	0.0216	0.2386
3104LSSAX-RT	0.3030	0.0368	0.3398
3104LSSX-RT	0.2750	0.0427	0.3177
BC1004-L	0.2460	0.0271	0.2731
BC1004-LH	0.2561	0.0203	0.2764
BC1004-LRB	0.2450	0.0245	0.2695
BC1104	0.2300	0.0200	0.2500
BC1104-L	0.2254	0.0200	0.2454
BC1104-LA	0.2480	0.0201	0.2681
BC1104-LB	0.2210	0.0294	0.2504
BC1104-LE	0.2150	0.0307	0.2457
BC1104-LHA	0.2180	0.0199	0.2379
BC1104-LHT	0.2114	0.0182	0.2296
BC1104-LRB	0.2130	0.0201	0.2331
BC1104-LRW	0.2810	0.0314	0.3124
BC1104-LSSAX	0.2690	0.0424	0.3114
BC1104-LSSX	0.2690	0.0424	0.3114
BC1304-LHATQ	0.2220	0.0188	0.2408
BC1304-LHT	0.2080	0.0201	0.2281
BC1304-LHTQ	0.2157	0.0197	0.2354
BC2104-LLE	0.1937	0.0287	0.2224
BC2104-LLE-2	0.2920	0.0359	0.3279
BC2104-LLE-3	0.3860	0.0469	0.4329
BC2104-LLE-4	0.4890	0.0783	0.5673
BC2104-LMS	0.2650	0.0346	0.2996

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	0	en	14/21

Iberville wall boxes			
Variant	Weight of the product (kg)	Weight of the packaging referred to the functional unit (kg)	Weight of the product + packaging referred to the functional unit (kg)
BC2104-LMS-2	0.3610	0.0478	0.4088
BC2104-LMS-3	0.4990	0.0865	0.5855
BC2104-LMS-4	0.5580	0.1729	0.7309
BC2104-LMSA	0.2680	0.0346	0.3026
BC2104-LMSA-2	0.3760	0.0530	0.4290
BC2104-LN	0.2100	0.0211	0.2311
BC2104-LRB	0.1979	0.0253	0.2232
BC2104-LRB-2	0.3130	0.0547	0.3677
BC2104-LX	0.1910	0.0307	0.2217
BC2304-LHTQ	0.2025	0.0204	0.2229
BC2304-LHTQ-2	0.3002	0.0365	0.3367
BC2304-LHTQ-3	0.3980	0.0490	0.4470
BC2304-LHTQ-4	0.5310	0.0783	0.6093
BC3104KSS1X-1	0.2970	0.0498	0.3468
BC3104-LH	0.2170	0.0216	0.2386
BC3104-LHTQ	0.2230	0.0188	0.2418
BC3104-LSSAX	0.3190	0.0428	0.3618
BC3104-LSSAX-5/8	0.2903	0.0498	0.3401
BC3104-LSSAX-NG	0.3360	0.0728	0.4088
BC3104-LSSX	0.2750	0.0427	0.3177
CI1004	0.2680	0.0212	0.2892
CI1004-LB	0.2380	0.0226	0.2606
CI1004-LHA	0.2540	0.0196	0.2736
CI1104-B	0.2200	0.0161	0.2361
CI1104-K	0.2280	0.0230	0.2510
CI1104-LMS	0.2310	0.0221	0.2531
CI1104-LMSA	0.2420	0.0255	0.2675
CI1104-SB	0.2170	0.0183	0.2353
CI2104-LLEA	0.2070	0.0171	0.2241
CI2104-LSS1X-1	0.2550	0.0382	0.2932
CI-2104-LSS-2X	0.3544	0.0623	0.4166
CI2104-LSS2X-1	0.3520	0.0623	0.4143
CI-2104-LSS-3X	0.4635	0.1075	0.5710
CI2104-LSS3X-1	0.4560	0.1075	0.5635
CI2104-LSS-4X	0.5620	0.1271	0.6891
CI2104-LSSA1X-1	0.2820	0.0382	0.3202
CI2104-LSSA-2X	0.3760	0.0623	0.4383
CI2104-LSSA2X-1	0.3760	0.0623	0.4383
CI2104-LSSA-3X	0.5020	0.1075	0.6095
CI2104-LSSA-4X	0.6080	0.1271	0.7351
CI2104-LSSAX	0.2690	0.0424	0.3114
CI2104-LSSX	0.2540	0.0424	0.2964
CI3104-KSSX	0.3006	0.0427	0.3432
CI3104-KSSX-5/8	0.2990	0.0498	0.3488
CI3104-KSSX-NG	0.3310	0.3660	0.6970
CI3104-LHA	0.2310	0.0188	0.2498
CI3104-LSS1X-1	0.2780	0.0498	0.3278
CI-3104-LSSA1X-1	0.2904	0.0498	0.3402
CI3104-SSX	0.2810	0.0427	0.3237

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	0	en	15/21

Extrapolation rules

The extrapolation rules have been calculated based on the environmental impact assessment results of the reference product BC54151-L Iberville steel box, and the sensitivity analysis carried out.

Extrapolation rules calculations for ceiling boxes - Serie with CI66 & Serie without CI66

For the manufacturing stage, distribution stage and end-of-life stage, the parameters considered for the calculation of the LCIA impacts of the variants are weight of the product, the weight of the steel 10.5% recycled, the weight of the steel 57.3% recycled, the weight of the gross input of the Octagonal Shell and the weight of the packaging. The calculation of the LCIA impacts of the variants through these parameters indicated that the correlation between the impacts of the representative product and the variants is linear. For the creation of the extrapolation rules, the extrapolation principle applied is a linear correlation concerning weight (one variable).

Each environmental indicator value shall be calculated using the following formulas:

- For the manufacturing and distribution stages:

$$y = a_n x_1 + b_n$$

where x1 is the “weight of the product (kg) + weight of the packaging referred to the functional unit (kg)”.

- For the installation stage:

$$y = (0.003 + x_2) a_n + b_n$$

where x2 is the “weight of the packaging referred to the functional unit (kg)”.

- For the end-of-life stage:

$$y = a_n x_3 + b_n$$

where x3 is the “weight of the product (kg)”.

The use stage impacts are equal to zero for all the variants.

For the weight data of the variants, please refer to “Iberville ceiling boxes - Serie without CI66” & “Iberville ceiling boxes - Serie with CI66” tables.

The following table reports the linear coefficients a_n & b_n for each life cycle stage. For the manufacturing stage of the Serie with CI66 & Serie without CI66, two different series of functions have been found. For Manufacturing stage only, a_1 (w/o CI66) and b_1 (w/o CI66) coefficients shall be used only for the environmental impact calculation of the variants presented in table “Serie without CI66”; a_1 (w CI66) and b_1 (w CI66), coefficients shall be used only for the environmental impact calculation of the variants presented in “Serie with CI66”.

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	0	en	16/21

IMPACT CATEGORY	MANUFACTURING				DISTRIBUTION		INSTALLATION		USE		END OF LIFE	
	a ₁ (w/o Cl66)	b ₁ (w/o Cl66)	a ₁ (w Cl66)	b ₁ (w Cl66)	a ₂	b ₂	a ₃	b ₃	a ₄	b ₄	a ₅	b ₅
GWP-total	5.30E+00	-2.22E-01	3.01E+00	2.17E-01	1.43E-01	5.72E-06	1.56E+00	3.74E-02	-	-	4.45E-02	2.67E-04
GWP-fossil	5.56E+00	-2.65E-01	3.35E+00	1.46E-01	1.43E-01	5.71E-06	4.69E-02	4.06E-02	-	-	3.11E-02	1.87E-04
GWP-biogenic	-2.84E-01	4.29E-02	-3.56E-01	7.08E-02	5.28E-05	2.11E-09	1.51E+00	-3.26E-03	-	-	1.34E-02	8.04E-05
GWP-luluc	2.71E-02	-2.89E-04	1.84E-02	9.00E-04	7.13E-05	2.85E-09	1.62E-05	6.08E-05	-	-	2.85E-05	1.71E-07
ODP	9.84E-08	-3.93E-09	6.44E-08	2.42E-09	2.36E-09	9.42E-14	9.60E-10	6.36E-10	-	-	5.42E-10	3.25E-12
AP	1.04E-01	5.79E-04	8.24E-02	3.85E-03	6.27E-04	2.51E-08	2.88E-04	1.98E-04	-	-	1.48E-04	8.87E-07
EP-freshwater	2.92E-03	-1.84E-04	1.65E-03	6.15E-05	1.17E-05	4.65E-10	7.36E-06	1.71E-05	-	-	1.51E-05	9.03E-08
EP-marine	8.30E-03	-2.84E-04	5.60E-03	1.95E-04	2.30E-04	9.18E-09	1.38E-04	4.07E-05	-	-	5.35E-05	3.21E-07
EP-terrestrial	3.17E-01	5.29E-03	2.73E-01	1.15E-02	2.46E-03	9.81E-08	1.32E-03	4.06E-04	-	-	5.67E-04	3.40E-06
POCP	2.74E-02	-1.18E-03	1.68E-02	7.33E-04	8.84E-04	3.53E-08	3.65E-04	1.69E-04	-	-	2.01E-04	1.20E-06
ADPE	1.88E-04	5.99E-06	1.45E-04	7.40E-06	3.89E-07	1.55E-11	1.00E-07	3.50E-07	-	-	9.28E-08	5.57E-10
ADPF	6.85E+01	-3.21E+00	4.19E+01	1.71E+00	2.10E+00	8.37E-05	4.36E-01	4.55E-01	-	-	4.67E-01	2.80E-03
WDP	2.74E+00	-2.21E-01	1.42E+00	4.56E-02	1.07E-02	4.26E-07	6.20E-03	7.22E-03	-	-	-1.16E-02	-6.94E-05
PERT+PENRT	8.79E+01	-4.40E+00	5.77E+01	7.74E-01	2.12E+00	8.47E-05	4.45E-01	5.09E-01	-	-	4.74E-01	2.85E-03
PERE	1.55E+01	-6.70E-01	1.15E+01	-1.94E-01	2.65E-02	1.06E-06	8.93E-03	5.02E-02	-	-	7.42E-03	4.45E-05
PERM	3.95E+00	-5.30E-01	4.37E+00	-7.47E-01	0.00E+00	0.00E+00	0.00E+00	3.83E-03	-	-	0.00E+00	0.00E+00
PERT	1.94E+01	-1.20E+00	1.59E+01	-9.41E-01	2.65E-02	1.06E-06	8.93E-03	5.40E-02	-	-	7.42E-03	4.45E-05
PENRE	6.82E+01	-3.20E+00	4.14E+01	1.75E+00	2.10E+00	8.37E-05	4.36E-01	4.54E-01	-	-	4.67E-01	2.80E-03
PENRM	3.32E-01	-4.39E-03	4.23E-01	-3.28E-02	0.00E+00	0.00E+00	0.00E+00	1.82E-03	-	-	0.00E+00	0.00E+00
PENRT	6.85E+01	-3.20E+00	4.19E+01	1.72E+00	2.10E+00	8.37E-05	4.36E-01	4.55E-01	-	-	4.67E-01	2.80E-03
SM	7.94E-01	2.69E-02	5.97E-01	5.24E-02	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	1.23E-01	-6.98E-03	6.86E-02	3.20E-03	3.35E-04	1.34E-08	3.28E-04	3.05E-04	-	-	-2.43E-04	-1.46E-06
HWD	4.37E-04	3.15E-05	4.05E-04	1.07E-05	1.32E-05	5.28E-10	2.57E-06	2.49E-06	-	-	2.82E-06	1.69E-08
NHWD	2.41E+00	-8.56E-02	1.46E+00	7.98E-02	1.83E-01	7.29E-06	2.93E-02	1.23E-02	-	-	2.38E-02	1.43E-04
RWD	1.38E-04	1.02E-06	9.82E-05	6.51E-06	4.57E-07	1.83E-11	1.24E-07	4.28E-07	-	-	1.09E-07	6.56E-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	1.20E+00	-4.53E-02	7.25E-01	2.11E-02	0.00E+00	0.00E+00	0.00E+00	2.88E-03	-	-	0.00E+00	0.00E+00
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	8.47E-02	4.02E-03	1.14E-01	-4.40E-03	0.00E+00	0.00E+00	5.13E+00	-1.54E-02	-	-	0.00E+00	0.00E+00
PM	1.33E-06	-9.43E-09	9.87E-07	4.59E-08	1.47E-08	5.88E-13	3.52E-09	3.51E-09	-	-	4.30E-09	2.58E-11
IRP	4.74E-01	8.91E-04	3.35E-01	2.10E-02	1.92E-03	7.68E-08	5.06E-04	1.73E-03	-	-	4.56E-04	2.74E-06
ETP-fw	6.43E+01	-1.57E+00	4.31E+01	1.41E+00	1.11E+00	4.44E-05	8.51E-01	2.54E-01	-	-	4.75E-01	2.85E-03
HTP-c	1.09E-07	-4.18E-10	7.23E-08	4.91E-09	6.22E-11	2.48E-15	6.79E-11	2.62E-10	-	-	4.28E-11	2.57E-13
HTP-nc	1.72E-07	-1.55E-08	8.42E-08	2.30E-09	1.53E-09	6.10E-14	2.70E-09	6.78E-10	-	-	3.39E-10	2.03E-12
SQP	6.72E+01	-7.65E+00	6.29E+01	-8.34E+00	2.12E+00	8.48E-05	2.11E-01	2.00E-01	-	-	4.12E-01	2.47E-03

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	0	en	17/21

Extrapolation rules calculations for wall boxes

The calculation of the LCIA impacts of the SKUs analysed in this study indicated that the correlation between the impacts of the representative product and the variants is a multiple linear correlation for manufacturing stage, and a linear correlation with one variable for the distribution, installation and end-of-life stages. For the manufacturing stage, using the SimaPro impact results and the weights of packaging and product (two variables), the best fit equation was found. This equation shows the relative impact of the main environmental categories for each SKU analysed with an average error of <9%. To calculate the best fit equation the data was plugged into a data analysis software (Python). For the distribution stage, the variable considered for the calculation of the LCIA impacts of the variants is “weight of the products + weight of the packaging”. For the installation stage, the variable considered for the calculation of the LCIA impacts of the variants is the weight of the packaging. For the end of life stage, the variable considered for the calculation of the LCIA impacts of the variants is the weight of the product.

Each environmental indicator value shall be calculated using the following formulas:

- For the manufacturing stages:

$$y = a_n x_1 + b_n x_2 + c_n$$

where x1 is the “weight of the product (kg)” and x2 is the “weight of the packaging referred to the functional unit (kg)”.

- For the distribution stages:

$$y = a_n x_1 + b_n$$

where x1 is “the weight of the product (kg) + weight of the packaging referred to the functional unit (kg)”.

- For the installation stage:

$$y = (0.003 + x_2) a_n + b_n$$

where x2 is the “weight of the packaging referred to the functional unit (kg)”.

- For the end-of-life stage:

$$y = a_n x_3 + b_n$$

where x3 is the “weight of the product (kg)”.

For the weights of the components above reported for all the variants, please refer to “Iberville wall boxes” table. The calculation of the coefficients for the Use Stage was not performed because the selected parameters do not affect the values for this stage. The following tables reports the linear coefficients (a, b, c, ecc) for each life cycle stage

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01_EN	1	en	18/21

IMPACT CATEGORY	MANUFACTURING			DISTRIBUTION		INSTALLATION		USE		END OF LIFE	
	a ₁	b ₁	c ₁	a ₂	b ₂	a ₃	b ₃	a ₄	b ₄	a ₅	b ₅
GWP-total	5.40E+00	-4.43E+00	2.12E-02	1.15E-01	7.63E-17	1.65E+00	1.61E-02	-	-	2.53E-02	1.78E-04
GWP-fossil	5.36E+00	-3.25E+00	1.43E-02	1.15E-01	-1.39E-17	4.64E-02	2.02E-02	-	-	1.20E-02	1.14E-04
GWP-biogenic	5.75E-03	-1.16E+00	6.87E-03	4.24E-05	-1.36E-20	1.60E+00	-4.21E-03	-	-	1.33E-02	6.36E-05
GWP-luluc	3.04E-02	-1.62E-02	1.13E-04	5.73E-05	-3.05E-20	1.60E-05	3.04E-05	-	-	1.84E-05	1.18E-07
ODP	8.77E-08	2.21E-09	1.55E-09	1.90E-09	-1.03E-25	9.20E-10	3.18E-10	-	-	2.38E-10	2.04E-12
AP	8.39E-02	1.40E-01	3.90E-03	5.04E-04	8.13E-20	2.83E-04	9.89E-05	-	-	6.37E-05	5.55E-07
EP-freshwater	2.59E-03	-1.71E-03	3.08E-06	9.36E-06	-2.96E-21	7.43E-06	8.54E-06	-	-	1.34E-05	6.87E-08
EP-marine	7.09E-03	2.57E-03	1.34E-04	1.85E-04	-6.10E-20	1.36E-04	2.02E-05	-	-	2.26E-05	2.00E-07
EP-terrestrial	2.10E-01	7.46E-01	1.86E-02	1.97E-03	4.34E-19	1.30E-03	2.02E-04	-	-	2.37E-04	2.12E-06
POCP	2.69E-02	-1.53E-02	-1.58E-05	7.10E-04	-3.25E-19	3.60E-04	8.43E-05	-	-	8.75E-05	7.56E-07
ADPE	2.02E-04	4.10E-05	4.12E-06	3.13E-07	1.72E-22	9.89E-08	1.75E-07	-	-	3.12E-08	3.33E-10
ADPF	6.52E+01	-3.47E+01	3.25E-01	1.68E+00	-2.78E-16	4.31E-01	2.27E-01	-	-	1.96E-01	1.74E-03
WDP	2.15E+00	-1.32E+00	1.55E-02	8.57E-03	8.67E-19	1.31E-02	3.63E-03	-	-	6.31E-03	3.37E-05
PERT+PENRT	7.99E+01	-2.28E+01	2.44E-01	1.70E+00	5.55E-17	4.40E-01	2.54E-01	-	-	2.00E-01	1.77E-03
PERE	1.41E+01	-3.23E+00	-7.95E-02	2.13E-02	-1.73E-18	8.70E-03	2.51E-02	-	-	3.96E-03	2.92E-05
PERM	6.20E-01	1.51E+01	-2.45E-03	0.00E+00	0.00E+00	0.00E+00	1.91E-03	-	-	0.00E+00	0.00E+00
PERT	1.47E+01	1.19E+01	-8.19E-02	2.13E-02	-1.73E-18	8.70E-03	2.70E-02	-	-	3.96E-03	2.92E-05
PENRE	6.49E+01	-3.52E+01	3.26E-01	1.68E+00	-5.55E-17	4.31E-01	2.26E-01	-	-	1.96E-01	1.74E-03
PENRM	3.02E-01	4.42E-01	-7.29E-05	0.00E+00	0.00E+00	0.00E+00	9.10E-04	-	-	0.00E+00	0.00E+00
PENRT	6.52E+01	-3.47E+01	3.26E-01	1.68E+00	-5.55E-17	4.31E-01	2.27E-01	-	-	1.96E-01	1.74E-03
SM	9.92E-01	-3.40E-01	-6.25E-03	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
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
FW	1.12E-01	-8.10E-02	4.76E-04	2.69E-04	-4.07E-20	4.76E-04	1.53E-04	-	-	1.62E-04	8.88E-07
HWD	3.57E-04	9.80E-04	3.68E-05	1.06E-05	-6.35E-21	2.55E-06	1.24E-06	-	-	1.07E-06	1.03E-08
NHWD	2.51E+00	-1.97E+00	-1.80E-02	1.47E-01	-1.39E-17	2.87E-02	6.09E-03	-	-	1.06E-02	9.00E-05
RWD	1.60E-04	-7.28E-05	-3.15E-07	3.67E-07	-7.94E-23	1.21E-07	2.14E-07	-	-	5.46E-08	4.24E-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
MFR	1.28E+00	-1.32E+00	-1.65E-02	0.00E+00	0.00E+00	0.00E+00	1.44E-03	-	-	0.00E+00	0.00E+00
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
EE	1.10E-01	-4.55E-16	-3.47E-18	0.00E+00	0.00E+00	5.13E+00	-1.58E-02	-	-	0.00E+00	0.00E+00
PM	1.13E-06	1.11E-06	3.51E-08	1.18E-08	7.86E-24	3.49E-09	1.75E-09	-	-	2.73E-09	1.77E-11
IRP	5.36E-01	-2.31E-01	-4.33E-04	1.54E-03	1.63E-19	4.94E-04	8.63E-04	-	-	2.25E-04	1.76E-06
ETP-fw	5.21E+01	3.04E+01	1.91E+00	8.93E-01	5.55E-16	7.95E-01	1.28E-01	-	-	3.26E-01	2.00E-03
HTP-c	1.30E-07	-1.03E-07	-1.36E-09	5.00E-11	3.39E-26	6.59E-11	1.31E-10	-	-	3.39E-11	1.88E-13
HTP-nc	1.24E-07	-7.54E-08	1.86E-09	1.23E-09	3.10E-25	2.64E-09	3.36E-10	-	-	1.45E-10	1.27E-12
SQP	2.55E+01	1.45E+02	-5.54E-01	1.71E+00	5.55E-17	2.09E-01	9.98E-02	-	-	2.49E-01	1.67E-03

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01_EN	1	en	19/21

Comparability

EPDs published within the same product category, though originating from different programs, may not be comparable. Full conformance with a PCR allows PEP comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.


Applicable product standards

List of applicable product standards and certifications for Ty-rap products: Lloyd's Register of Shipping, DNV-GL, Mil Specification, American Bureau of Shipping (ABS), CE declaration, compliant to the low voltage directive, EN/IEC 62275, UL 62275, CSA 62275, MS3367/3368 and EN45545.

References

- PEP ecopassport® PROGRAM, PCR-ed4-EN-2021 09 06, Product Category Rules for Electrical, Electronic and HVAC-R Products.
- PEP ecopassport® PROGRAMME, PSR-0003-ed2-EN-2023 06 06, Specific rules for Cable Management Solutions.
- ISO 14040: Life cycle assessment. Environmental management. Principles and Framework. International Organization for Standardization, 2006.
- ISO 14044: Life cycle assessment. Environmental management. Requirements and guidelines. International Organization for Standardization, 2006.
- PRé Consultants, Software SimaPro 9.5, 2023 (www.simapro.com).
- Ecoinvent, 2022. Swiss Centre for Life Cycle Assessment, v 3.9.1 (Home - ecoinvent).
- UNI EN 15804:2012+A2:2019: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.
- EN 50693:2019: Product category rules for life cycle assessments of electronic and electrical products and systems.

STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00643-V03.01-EN	0	en	20/21

Registration number: ABBG-00643-V03.01-EN	Drafting Rules: PCR-ed4-EN-2021 09 06
	Supplemented by: PSR-0003-ed2.1-EN-2023 12 08
Verifier accreditation number: VH44	Information and reference documents: www.pep-ecopassport.org
Date of issue: 12-2024	Validity period: 5 years
Independent verification of the declaration and data, in compliance with ISO 14025: 2006	
Internal: <input type="radio"/>	External: <input checked="" type="radio"/>
The PCR review was conducted by a panel of experts chaired by Julie ORGELET (DDemain)	
PEP are compliant with XP C08-100-1 :2016 or EN 50693:2019 The components of the present PEP may not be compared with components from any other program.	
Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations"	
	

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Approved	Public	ABBG-00643-V03.01-EN	2	en	21/21