TECK MC FITTINGS

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"

ORGANIZATION		CONTACT INFORMATION			
ABB Electrification Canada inc.		Oscar Sarmiento Penuela - oscar.sarmiento-penuela@ch.abb.com			
ADDRESS		WEBSITE			
Quebec (CA)		abb.com			
STATUS	SECURITY LEVEL	REGISTRATION NUMBER	REV.	LANG.	PAGE
Approved	Public	ABBG-00696-V01.01-EN	0	en	1/26

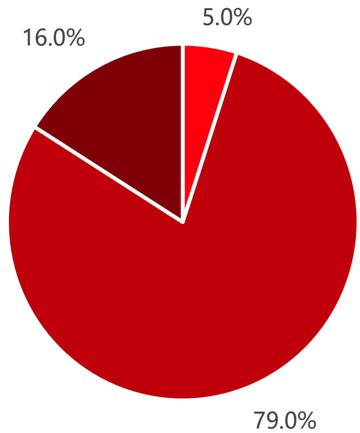
ABB Purpose & Embedding Sustainability

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	ST050-464
Description of the product	ABB Teck fittings are used to terminate and secure armored cables, such as Teck and jacketed MC cables, to enclosures or junction boxes. The fittings offer protection against environmental elements (e.g. ingress protection) while also protecting against mechanical stress (i.e. strain relief) and potential damage to electrical wiring. ABB Teck fittings are designed for industrial and hazardous area applications, including petrochemical plants, mining, commercial and industrial construction, infrastructure, and utilities.
Functional unit	The functional unit of the reference product ST050-464 is to terminate and secure armored cables to enclosures or junction boxes from environmental elements and mechanical stress for a product's Reference Service Life of 20 years.
Other products covered	List of other products covered in this PEP is presented in the paragraph which concerned the extrapolation rules.

Constituent Materials



Total weight of reference product included packaging and installation materials (g)	72	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%
Silicone	4.0	Aluminium	74.0	Wood	7.0
Rubber	1.0	Steel	5.0	Cardboard	6.0
				Lubricating oil	2.0
				Paper	1
				Acrylic	< 1

The weight of the reference product is 60.2 g, the weight of its installation materials is 1.6 g, and the weight of its packaging is 10.2 g.

Additional Environmental Information

Manufacturing	The manufacturing stage includes the production and transportation to the manufacturer’s last logistic platform of Teck MC Fittings, its intallation materials and its packaging. The final assembly of the product is carried out at ABB's plant located in Saint-Jean-Sur-Richelieu, CA.
Distribution	The transport from the ABB factory (Saint-Jean-Sur-Richelieu, 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	This phase includes the disposal of the packaging and installation materials.
Use	No material and energy consumption occur during the use stage. No maintenance occurs during the use phase, the environmental impacts related 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 the Teck MC Fittings (100% incineration).
Benefits and loads beyond the system boundaries	No benefits and loads beyond the system boundaries has been considered.

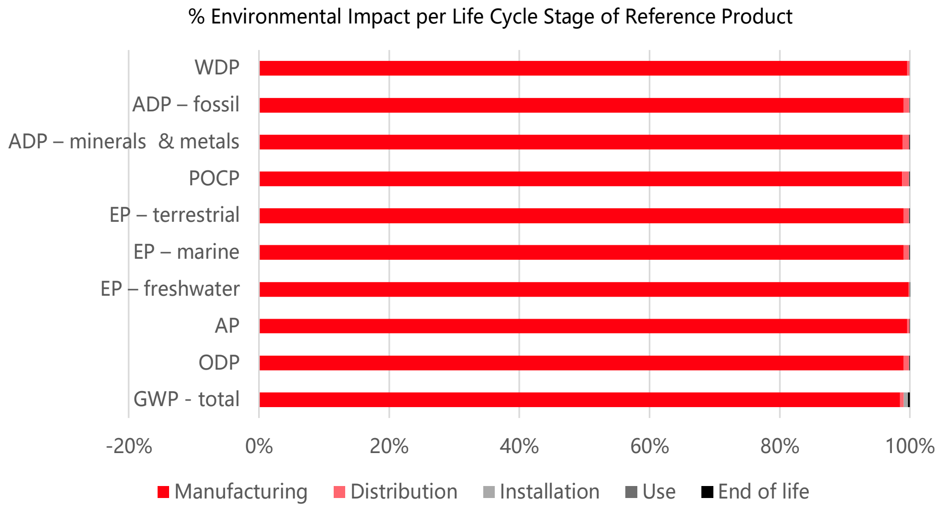
Environmental Impacts

Reference lifetime	20 years
Product category	Electrical, Electronic and Heating Ventilation Air Conditioning-Refrigeration (HVAC-R) products
Installation elements	Some installation material is used for handling the product components (e.g.: nitrile gloves).
Use scenario	No material and energy consumption occur during the use stage. No maintenance phase is planned for the Teck MC Fittings.
Geographical representativeness	The suppliers are collocated all over the world, the products are assembled in Saint-Jean-Sur-Richelieu (CA) and distributed all over the world.
Technological representativeness	Technological representativeness refers to the specific production process for primary data.
Software and database used	SimaPro 9.6 and ecoinvent 3.9.1

Energy model used

Manufacturing	Manufacturing internal and storage: the Canadian residual mix has been considered. The energy-related processes used for all the other inputs of the manufacturing stage are those included in the ecoinvent 3.9.1 datasets selected for the analysis.
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.

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.	3.36E+00	3.31E+00	1.94E-02	2.06E-02	0.00E+00	1.10E-02	0.00E+00
GWP-fossil	kg CO_2 eq.	3.35E+00	3.31E+00	1.93E-02	5.00E-03	0.00E+00	1.04E-02	0.00E+00
GWP-biogenic	kg CO_2 eq.	7.99E-04	-1.54E-02	7.14E-06	1.56E-02	0.00E+00	5.79E-04	0.00E+00
GWP-luluc	kg CO_2 eq.	9.57E-03	9.56E-03	9.64E-06	2.13E-07	0.00E+00	2.13E-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.	3.86E-08	3.82E-08	3.19E-10	1.45E-11	0.00E+00	4.47E-11	0.00E+00
ODP = Depletion potential of the stratospheric ozone layer								
AP	H+ eq.	2.19E-02	2.18E-02	8.48E-05	3.66E-06	0.00E+00	1.18E-05	0.00E+00
AP = Acidification potential, Accumulated Exceedance								
EP-freshwater	kg P eq.	1.05E-03	1.04E-03	1.58E-06	3.70E-07	0.00E+00	3.23E-07	0.00E+00
EP-marine	kg N eq.	3.66E-03	3.62E-03	3.11E-05	1.70E-06	0.00E+00	4.67E-06	0.00E+00
EP-terrestrial	mol N eq.	3.79E-02	3.76E-02	3.32E-04	1.65E-05	0.00E+00	4.73E-05	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.	1.19E-02	1.18E-02	1.20E-04	4.50E-06	0.00E+00	1.58E-05	0.00E+00
POCP = Formation potential of tropospheric ozone								
ADP-minerals & metals	kg Sb eq.	5.27E-06	5.21E-06	5.26E-08	1.37E-09	0.00E+00	6.35E-09	0.00E+00
ADP-fossil	MJ	3.23E+01	3.20E+01	2.83E-01	5.49E-03	0.00E+00	3.30E-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.	4.42E-01	4.40E-01	1.44E-03	1.69E-04	0.00E+00	-9.73E-05	0.00E+00
WDP = Water Deprivation potential								

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	3.58E+00	3.58E+00	3.59E-03	1.24E-04	0.00E+00	5.48E-04	0.00E+00
PERM	MJ	1.91E-01	1.91E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.77E+00	3.77E+00	3.59E-03	1.24E-04	0.00E+00	5.48E-04	0.00E+00
PENRE	MJ	3.22E+01	3.18E+01	2.83E-01	5.50E-03	0.00E+00	3.30E-02	0.00E+00
PENRM	MJ	1.31E-01	1.31E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.23E+01	3.20E+01	2.83E-01	5.50E-03	0.00E+00	3.30E-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	4.40E-03	4.40E-03	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	1.93E-02	1.93E-02	4.52E-05	6.17E-06	0.00E+00	2.67E-06	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

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	7.60E-04	7.58E-04	1.79E-06	3.92E-08	0.00E+00	1.96E-07	0.00E+00
Non- hazardous waste disposed	kg	7.30E-01	7.04E-01	2.47E-02	4.05E-04	0.00E+00	1.64E-03	0.00E+00
Radioactive waste disposed	kg	1.54E-05	1.53E-05	6.18E-08	1.73E-09	0.00E+00	7.99E-09	0.00E+00

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	1.43E-01	1.43E-01	0.00E+00	0.00E+00	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	6.79E-03	6.79E-03	0.00E+00	0.00E+00	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	6.18E-03	6.18E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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	3.61E+01	3.57E+01	2.87E-01	5.62E-03	0.00E+00	3.35E-02	0.00E+00
Emissions of fine particles	incidence of diseases	2.78E-07	2.76E-07	1.99E-09	5.71E-11	0.00E+00	2.84E-10	0.00E+00
Ionizing radiation, human health	kBq U235 eq.	6.22E-02	6.19E-02	2.60E-04	7.00E-06	0.00E+00	3.32E-05	0.00E+00
Ecotoxicity (fresh water)	CTUe	1.06E+01	1.04E+01	1.50E-01	1.08E-02	0.00E+00	1.03E-01	0.00E+00
Human toxicity, car-cinogenic effects	CTUh	4.81E-09	4.80E-09	8.41E-12	1.20E-12	0.00E+00	2.67E-12	0.00E+00
Human toxicity, non-carcinogenic effects	incidence of diseases	6.14E-08	6.11E-08	2.06E-10	3.57E-11	0.00E+00	4.65E-11	0.00E+00
Impact related to land use/soil quality		8.16E+00	7.84E+00	2.87E-01	2.65E-03	0.00E+00	3.05E-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								

Environmental Impact Indicator Glossary

Impact indicators

Indicator	Description	Distri-bution
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	Distri-bution
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)

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 Teck MC Fittings product family 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 for cable management products are set in the PSR, thus the next steps have been followed to define the extrapolation rules:

- 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:

- Product weight;
- Packaging weight;
- Product composition;
- Packaging composition;
- Installation materials composition.

The representative product considered for the calculation of the extrapolation rules is ST050-464 Teck MC Fittings. This product is most representative for the sales.

The results of the sensitivity analysis show that all the parameters considered, except for packaging weight, are sensitive.

The products included in the Teck MC Fittings product family and considered for the application of the extrapolation rules are resented in the following table. Two tables will be reported: the first groups some of the products in the “High weights” category, and the second groups the remaining in the “Low weights” category.

SKU (High weight)	Product	Installation material	Paper	Packaging	Neoprene	Aluminum	Wood	Recycled cardboard	Zinc
	Weights (kg)								
STX050-462	1.08E-01	7.59E-03	7.38E-04	4.48E-02	0.00E+00	9.86E-02	1.74E-02	2.64E-02	0.00E+00
STX050-464	1.09E-01	7.59E-03	7.38E-04	4.60E-02	0.00E+00	1.00E-01	1.54E-02	2.68E-02	0.00E+00
STX075-466	1.36E-01	7.59E-03	7.38E-03	5.28E-02	0.00E+00	1.25E-01	1.54E-02	2.68E-02	0.00E+00
STX075-465	1.42E-01	7.59E-03	7.38E-04	3.03E-02	0.00E+00	1.28E-01	1.54E-02	1.38E-02	0.00E+00
STEX075	1.72E-01	7.59E-03	6.63E-03	6.77E-02	0.00E+00	1.55E-01	2.31E-02	1.65E-02	0.00E+00
CITEK-100-137	2.31E-01	1.16E-02	2.80E-03	2.68E-02	0.00E+00	2.02E-01	6.77E-03	1.96E-02	0.00E+00
STX100-467	2.32E-01	7.59E-03	1.50E-03	5.86E-02	0.00E+00	2.12E-01	2.31E-02	3.39E-02	0.00E+00
ST90-075-468	2.27E-01	1.59E-03	2.13E-03	6.38E-02	0.00E+00	2.00E-01	1.74E-02	3.65E-02	0.00E+00
STX100-468	2.59E-01	7.59E-03	1.50E-03	5.53E-02	0.00E+00	2.37E-01	1.19E-02	3.39E-02	0.00E+00
ST90-100-469	2.77E-01	1.59E-03	7.50E-04	8.00E-02	0.00E+00	2.52E-01	2.79E-02	4.59E-02	0.00E+00
STEX100	2.86E-01	7.59E-03	6.63E-03	6.54E-02	0.00E+00	2.55E-01	2.08E-02	3.44E-02	0.00E+00
CITEK-125-176	2.88E-01	1.16E-02	3.76E-04	3.86E-02	0.00E+00	2.52E-01	1.06E-02	2.76E-02	0.00E+00
CITEK-125-157	3.03E-01	1.16E-02	1.88E-04	3.84E-02	0.00E+00	2.65E-01	1.06E-02	2.76E-02	0.00E+00
ST125-471	3.29E-01	1.59E-03	2.60E-03	6.89E-02	0.00E+00	2.78E-01	3.57E-02	3.06E-02	0.00E+00
STX125-469	3.45E-01	7.59E-03	1.50E-03	7.83E-02	0.00E+00	3.15E-01	1.71E-02	5.27E-02	0.00E+00
ST125-550	3.60E-01	1.59E-03	2.60E-03	6.89E-02	0.00E+00	3.05E-01	3.57E-02	3.06E-02	0.00E+00
CITEK-150-198	3.84E-01	1.16E-02	3.76E-04	3.86E-02	0.00E+00	3.35E-01	1.06E-02	2.76E-02	0.00E+00
STEX125	3.95E-01	7.59E-03	3.00E-03	1.03E-01	0.00E+00	3.50E-01	2.38E-02	6.78E-02	0.00E+00
ST125-470	3.99E-01	1.59E-03	2.60E-03	6.89E-02	0.00E+00	3.38E-01	3.57E-02	3.06E-02	0.00E+00
ST150-473	4.63E-01	1.59E-03	2.60E-03	6.07E-02	0.00E+00	3.92E-01	2.75E-02	3.06E-02	0.00E+00
ST150-472	4.85E-01	1.59E-03	2.60E-03	5.75E-02	0.00E+00	4.10E-01	2.75E-02	2.19E-02	0.00E+00
CITEK-200-220	5.35E-01	1.16E-02	1.88E-03	4.58E-02	0.00E+00	4.67E-01	3.01E-02	1.38E-02	0.00E+00
STX150-471	5.90E-01	7.59E-03	3.75E-03	1.40E-01	0.00E+00	5.39E-01	3.32E-02	9.17E-02	0.00E+00
ST200-474	5.99E-01	1.59E-03	2.60E-03	6.89E-02	0.00E+00	5.07E-01	3.57E-02	3.06E-02	0.00E+00
STX150-550	6.17E-01	7.59E-03	3.75E-03	1.40E-01	0.00E+00	5.64E-01	3.32E-02	9.17E-02	0.00E+00
STX150-470	6.35E-01	7.59E-03	3.75E-03	1.40E-01	0.00E+00	5.80E-01	3.32E-02	9.17E-02	0.00E+00
CITEK-200-241	6.35E-01	1.16E-02	1.88E-03	4.58E-02	0.00E+00	5.55E-01	3.01E-02	1.38E-02	0.00E+00
STE200	6.52E-01	1.59E-03	2.58E-03	7.05E-02	0.00E+00	5.32E-01	3.57E-02	3.22E-02	0.00E+00
ST200-551	6.62E-01	1.59E-03	2.60E-03	6.89E-02	0.00E+00	5.60E-01	3.57E-02	3.06E-02	0.00E+00
CITEK-200-262	6.80E-01	1.16E-02	1.88E-03	4.58E-02	0.00E+00	5.94E-01	3.01E-02	1.38E-02	0.00E+00
ST200-476	6.99E-01	1.59E-03	2.60E-03	8.34E-02	0.00E+00	5.91E-01	4.20E-02	3.88E-02	0.00E+00
STE200GRL	7.12E-01	1.59E-03	2.70E-03	7.06E-02	0.00E+00	5.81E-01	3.57E-02	3.22E-02	0.00E+00
ST200-475	7.21E-01	1.59E-03	2.60E-03	8.34E-02	0.00E+00	6.10E-01	4.20E-02	3.88E-02	0.00E+00
STX200-473	7.75E-01	7.59E-03	1.50E-02	1.30E-01	0.00E+00	7.08E-01	3.49E-02	8.00E-02	0.00E+00
STX200-472	7.94E-01	7.59E-03	1.50E-02	1.30E-01	0.00E+00	7.25E-01	3.49E-02	8.00E-02	0.00E+00
STEX150	8.36E-01	7.59E-03	7.85E-03	1.44E-01	0.00E+00	7.25E-01	3.32E-02	9.31E-02	0.00E+00
STX200-474	9.53E-01	7.59E-03	1.50E-02	1.30E-01	0.00E+00	8.70E-01	3.49E-02	8.00E-02	0.00E+00
STEX200	9.92E-01	7.59E-03	1.50E-02	1.17E-01	0.00E+00	8.80E-01	2.40E-02	7.80E-02	0.00E+00

ST250-478	1.23E+00	1.59E-03	2.60E-03	1.31E-01	1.20E-01	1.04E+00	6.94E-02	5.90E-02	0.00E+00
STX250-476	1.23E+00	7.59E-03	1.50E-02	1.87E-01	1.73E-01	1.12E+00	9.23E-02	8.00E-02	0.00E+00
STX250-475	1.29E+00	7.59E-03	1.50E-02	1.87E-01	0.00E+00	1.18E+00	9.23E-02	8.00E-02	0.00E+00
ST250-477	1.32E+00	1.59E-03	2.60E-03	8.91E-02	1.12E-01	1.11E+00	2.75E-02	5.90E-02	0.00E+00
STE250	1.47E+00	1.59E-03	2.58E-03	1.32E-01	1.20E-01	1.22E+00	7.81E-02	4.26E-02	0.00E+00
ST300-481	1.57E+00	1.59E-03	3.25E-03	1.41E-01	1.55E-01	1.32E+00	6.44E-02	7.38E-02	0.00E+00
STEX250	1.63E+00	7.59E-03	1.50E-02	2.14E-01	0.00E+00	1.44E+00	1.18E-01	8.00E-02	0.00E+00
STE250GRL	1.63E+00	1.59E-03	2.70E-03	1.23E-01	1.20E-01	1.33E+00	7.81E-02	4.26E-02	0.00E+00
ST300-480	1.68E+00	1.59E-03	3.25E-03	1.13E-01	1.57E-01	1.42E+00	3.57E-02	7.38E-02	0.00E+00
ST300-479	1.70E+00	1.59E-03	3.25E-03	1.37E-01	1.37E-01	1.44E+00	5.95E-02	7.38E-02	0.00E+00
ST350-482	1.94E+00	1.59E-03	6.44E-03	1.68E-01	1.65E-01	1.64E+00	7.31E-02	8.80E-02	0.00E+00
ST350-483	1.94E+00	1.59E-03	6.44E-03	1.68E-01	1.73E-01	1.64E+00	7.31E-02	8.80E-02	0.00E+00
STE300	1.97E+00	1.59E-03	3.25E-03	1.78E-01	1.60E-01	1.61E+00	8.80E-02	8.63E-02	0.00E+00
STX300-478	2.15E+00	7.59E-03	1.50E-02	1.87E-01	1.20E-01	1.96E+00	9.23E-02	8.00E-02	0.00E+00
STE300GRL	2.18E+00	1.59E-03	3.35E-03	1.78E-01	1.60E-01	1.78E+00	8.80E-02	8.63E-02	0.00E+00
STE350	2.27E+00	1.59E-03	6.44E-03	3.51E-01	1.71E-01	1.89E+00	1.95E-01	1.23E-01	0.00E+00
STX300-479	2.43E+00	7.59E-03	1.50E-02	1.87E-01	1.37E-01	2.22E+00	9.23E-02	8.00E-02	0.00E+00
STE400	2.65E+00	1.59E-03	6.44E-03	3.32E-01	1.94E-01	2.18E+00	1.76E-01	1.23E-01	0.00E+00
STEX300	2.68E+00	7.59E-03	1.50E-02	2.14E-01	1.20E-01	2.38E+00	1.18E-01	8.00E-02	0.00E+00
STX350-481	2.99E+00	7.59E-03	1.50E-02	1.87E-01	1.57E-01	2.73E+00	9.23E-02	8.00E-02	0.00E+00
STX400-482	3.58E+00	7.59E-03	1.50E-02	1.87E-01	1.73E-01	3.27E+00	9.23E-02	8.00E-02	0.00E+00
STEX350	3.78E+00	7.59E-03	1.50E-02	2.14E-01	1.60E-01	3.36E+00	1.18E-01	8.00E-02	0.00E+00
STX400-485	4.63E+00	7.59E-03	1.50E-02	1.87E-01	1.87E-01	4.23E+00	9.23E-02	8.00E-02	0.00E+00
STX400-484	4.65E+00	7.59E-03	1.50E-02	1.87E-01	1.80E-01	4.24E+00	9.23E-02	8.00E-02	0.00E+00

SKU (Low weight)	Product	Installation material	Paper	Packaging	Neoprene	Aluminum	Wood	Recycled cardboard	Zinc
	Weights (kg)								
STE050DATA	5.90E-02	1.59E-03	6.44E-04	1.05E-02	0.00E+00	4.81E-02	6.44E-04	5.20E-03	0.00E+00
ST050-464	6.02E-02	1.59E-03	6.44E-04	1.03E-02	0.00E+00	5.30E-02	5.21E-03	4.40E-03	0.00E+00
STE050DATAGRL	6.30E-02	1.59E-03	5.69E-03	1.05E-02	0.00E+00	5.14E-02	6.44E-04	5.20E-03	0.00E+00
ST050-462	6.40E-02	1.59E-03	6.44E-04	9.86E-03	0.00E+00	5.41E-02	4.81E-03	4.40E-03	0.00E+00
CITEK-50-066	6.90E-02	1.16E-02	1.88E-04	2.39E-02	0.00E+00	6.03E-02	9.92E-03	1.38E-02	5.00E-03
CITEK-50-079	7.65E-02	1.16E-02	1.88E-04	2.19E-02	0.00E+00	6.40E-02	7.94E-03	1.38E-02	5.00E-03
ST050-466	7.70E-02	1.59E-03	6.44E-04	1.11E-02	0.00E+00	6.51E-02	5.21E-03	5.20E-03	0.00E+00
CITEK-50-092	8.25E-02	1.16E-02	1.88E-04	2.72E-02	0.00E+00	7.00E-02	1.32E-02	1.38E-02	5.00E-03
ST050-465	8.67E-02	1.59E-03	6.44E-04	1.11E-02	0.00E+00	7.30E-02	5.21E-03	5.20E-03	0.00E+00
STE050	8.86E-02	1.59E-03	6.44E-04	1.05E-02	0.00E+00	7.30E-02	4.63E-03	5.20E-03	0.00E+00
STE050GRL	1.02E-01	1.59E-03	5.69E-03	1.59E-02	0.00E+00	7.60E-02	4.63E-03	5.60E-03	0.00E+00
CITEK-75-105	1.09E-01	1.16E-02	1.88E-04	1.34E-02	0.00E+00	9.52E-02	3.38E-03	9.80E-03	0.00E+00
ST90-050-464	1.17E-01	1.59E-03	1.13E-03	4.65E-02	0.00E+00	1.09E-01	1.54E-02	2.68E-02	0.00E+00
ST90-050-466	1.22E-01	1.59E-03	2.03E-03	4.74E-02	0.00E+00	1.11E-01	1.54E-02	2.68E-02	0.00E+00
CITEK-75-120	1.28E-01	1.16E-02	1.88E-04	3.29E-02	0.00E+00	1.19E-01	1.89E-02	1.38E-02	0.00E+00
ST075-468	1.54E-01	1.59E-03	6.44E-04	2.07E-02	0.00E+00	1.30E-01	9.92E-03	1.01E-02	0.00E+00
ST075-467	1.55E-01	1.59E-03	6.44E-04	3.02E-02	0.00E+00	1.27E-01	1.54E-02	1.34E-02	0.00E+00
ST100-469	1.83E-01	1.59E-03	1.30E-03	2.66E-02	0.00E+00	1.55E-01	1.16E-02	1.37E-02	0.00E+00
STE100	1.95E-01	1.59E-03	1.30E-03	2.66E-02	0.00E+00	1.59E-01	1.16E-02	1.37E-02	0.00E+00
STE100GRL	2.25E-01	1.59E-03	1.40E-03	2.67E-02	0.00E+00	1.84E-01	1.16E-02	1.37E-02	0.00E+00

Extrapolation rules

The extrapolation rules have been calculated based on the environmental impact assessment results considering all the products, and the sensitivity analysis carried.

For the manufacturing stage and distribution stage, the influential parameters considered for the calculation of the LCIA impacts are product weight, installation materials weight, neoprene weight, zinc weight, wood weight, recycled cardboard weight, and paper weight (packaging). For the installation stage, the influential parameters considered for the calculation of the LCIA impacts of the products are packaging weight and installation materials weight. For the end-of-life stage, the influential parameters considered for the calculation of the LCIA impacts of the products are product weight, zinc weight, neoprene weight, and aluminum weight.

The calculation of the LCIA impacts of the products through these parameters indicated that the correlation between the impacts of the representative product and the products is a multiple linear correlation. Using the SimaPro impact results and the weights of multiple variables, the best fit equation was found. This equation shows the impact based on each SKUs with an error of < 10%. To calculate the best fit equation the data was plugged into a data analysis software (Python).

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

- For the manufacturing and distribution stage:

$$y\ (High\ weight) = ax_1 + \mathrm{b}x_2 + \mathrm{c}x_3 + \mathrm{d}x_4 + e$$

Where: x_1 = product weight
x_2 = installation materials weight
x_3 = paper weight
x_4 = neoprene weight

$$y\ (Low\ weight) = ax_1 + \mathrm{b}x_2 + \mathrm{c}x_3 + \mathrm{d}x_4 + e$$

Where: x_1 = product weight
x_2 = wood weight
x_3 = recycled cardboard weight
x_4 = zinc weight

- For the installation stage:

$$y\ (High\ \&\ Low\ weight) = ax_1 + \mathrm{b}x_2 + c$$

Where: x_1 = packaging weight
x_2 = installation materials weight

- For the end-of-life stage:

$$y\ (High\ weight) = ax_1 + \mathrm{b}x_2 + \mathrm{c}x_3 + d$$

Where: x_1 = product weight
x_2 = neoprene weight
x_3 = aluminum weight

$$y\ (Low\ weight) = ax_1 + \mathrm{b}x_2 + \mathrm{c}x_3 + d$$

Where: x_1 = product weight
x_2 = aluminum weight
x_3 = zinc weight

For the weights of the components above reported for all the products, please refer to the tables above.

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 for each life cycle stage, subdivided by two subfamilies:

1. High weight Teck MC Fittings;
2. Low weight Teck MC Fittings.

Manufacturing Stage – High weight					
Impact category	**a**	**b**	**c**	**d**	**e**
GWP-total	4.12E+01	1.10E+03	3.08E+02	-9.22E+01	-4.34E+00
GWP-fossil	4.10E+01	1.10E+03	3.15E+02	-8.93E+01	-4.32E+00
GWP-biogenic	1.35E-02	-3.04E+00	-7.01E+00	-2.60E+00	-1.28E-02
GWP-luluc	1.17E-01	3.14E+00	9.80E-01	-2.55E-01	-1.25E-02
ODP	5.13E-07	1.02E-05	2.38E-06	-2.09E-06	-3.83E-08
AP	3.09E-01	7.67E+00	1.91E+00	-1.06E+00	-3.58E-02
EP-freshwater	1.49E-02	3.65E-01	9.66E-02	-5.34E-02	-1.74E-03
EP-marine	4.64E-02	1.21E+00	3.41E-01	-1.17E-01	-4.94E-03
EP-terrestrial	5.53E-01	1.32E+01	2.80E+00	-2.09E+00	-6.40E-02
POCP	1.48E-01	3.92E+00	1.12E+00	-3.53E-01	-1.59E-02
ADPE	4.65E-04	5.35E-03	-6.92E-04	-5.24E-03	-7.59E-05
ADPF	4.01E+02	1.06E+04	2.96E+03	-8.18E+02	-4.09E+01
WDP	5.13E+00	1.25E+02	3.61E+01	-8.60E+00	-3.12E-01
PE	4.45E+02	1.17E+04	3.38E+03	-9.02E+02	-4.51E+01
PERE	4.27E+01	1.06E+03	3.75E+02	-8.55E+01	-3.98E+00
PERM	1.68E+00	5.23E+01	4.28E+01	1.22E+00	-1.65E-01
PERT	4.44E+01	1.11E+03	4.18E+02	-8.43E+01	-4.15E+00
PENRE	3.98E+02	1.05E+04	2.96E+03	-8.64E+02	-4.11E+01
PENRM	2.92E+00	8.39E+01	2.75E+00	4.54E+01	2.42E-01
PENRT	4.01E+02	1.06E+04	2.96E+03	-8.18E+02	-4.09E+01
SM	4.09E-02	2.46E+00	2.55E-01	-3.22E-01	-9.78E-03
RSF	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
FW	2.27E-01	5.83E+00	1.71E+00	-4.32E-01	-1.88E-02
HWD	7.97E-03	3.81E-01	1.12E-01	-2.43E-02	-1.59E-03
NHWD	7.73E+00	2.06E+02	5.67E+01	-1.68E+01	-7.11E-01
RWD	2.02E-04	4.77E-03	1.20E-03	-5.86E-04	-2.02E-05
CRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	1.48E+00	5.41E+01	1.59E+01	-3.23E+00	-2.00E-01
MER	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	1.10E-01	1.10E-01	-9.68E-15	1.14E-15	6.94E-17
PM	3.61E-06	9.38E-05	2.48E-05	-9.83E-06	-4.00E-07
IRP	8.20E-01	1.93E+01	4.86E+00	-2.37E+00	-8.20E-02
ETP-fw	1.65E+02	3.74E+03	8.42E+02	-7.16E+02	-1.97E+01
HTP-c	5.51E-08	1.40E-06	3.78E-07	-1.39E-07	-5.15E-09
HTP-nc	1.07E-06	2.37E-05	5.43E-06	-5.59E-06	-1.39E-07
SQP	9.97E+01	2.23E+03	1.17E+03	-1.97E+02	-9.00E+00
Biogenic C content_packaging	5.50E-02	1.64E+00	1.32E+00	3.26E-02	-5.33E-03
Biogenic C content_product	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Manufacturing Stage – Low weight					
Impact category	**a**	**b**	**c**	**d**	**e**
GWP-total	6.89E+01	1.03E+02	-1.89E+02	5.01E+02	-3.41E-01
GWP-fossil	6.89E+01	1.03E+02	-1.89E+02	5.02E+02	-3.41E-01
GWP-biogenic	-1.75E-01	-1.08E+00	-5.54E-02	-2.53E+00	1.18E-03
GWP-luluc	1.94E-01	2.73E-01	-5.03E-01	1.40E+00	-8.93E-04
ODP	1.01E-06	2.69E-07	-2.09E-06	5.45E-06	-1.79E-08
AP	4.61E-01	6.14E-01	-1.23E+00	3.31E+00	-2.62E-03
EP-freshwater	2.19E-02	2.96E-02	-5.82E-02	1.57E-01	-1.24E-04
EP-marine	7.60E-02	1.05E-01	-2.02E-01	5.48E-01	-4.11E-04
EP-terrestrial	8.03E-01	1.00E+00	-2.12E+00	5.73E+00	-4.69E-03
POCP	2.45E-01	3.47E-01	-6.61E-01	1.77E+00	-1.26E-03
ADPE	1.79E-04	-4.84E-04	-2.06E-04	2.68E-03	-2.32E-06
ADPF	6.55E+02	1.11E+03	-1.84E+03	4.97E+03	-2.61E+00
WDP	1.01E+01	6.77E+00	-2.32E+01	7.45E+01	-7.64E-02
PE	7.29E+02	1.23E+03	-2.03E+03	5.49E+03	-2.94E+00
PERE	7.36E+01	8.81E+01	-1.82E+02	4.82E+02	-3.89E-01
PERM	4.53E-01	2.94E+01	-1.31E+00	3.48E+01	5.30E-02
PERT	7.41E+01	1.18E+02	-1.83E+02	5.17E+02	-3.36E-01
PENRE	6.57E+02	1.04E+03	-1.82E+03	4.86E+03	-2.95E+00
PENRM	-1.54E+00	6.67E+01	-2.35E+01	1.18E+02	3.47E-01
PENRT	6.55E+02	1.11E+03	-1.84E+03	4.97E+03	-2.61E+00
SM	9.66E-02	-1.74E-01	1.31E-01	1.28E+00	-7.48E-05
RSF	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
FW	4.17E-01	4.10E-01	-1.03E+00	3.06E+00	-2.52E-03
HWD	1.98E-02	1.94E-02	-6.39E-02	1.93E-01	-2.15E-04
NHWD	1.51E+01	1.02E+01	-3.58E+01	9.19E+01	-9.71E-02
RWD	3.13E-04	5.16E-04	-8.73E-04	2.38E-03	-1.45E-06
CRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	3.49E+00	1.78E+00	-9.22E+00	2.64E+01	-3.37E-02
MER	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	1.04E-01	9.55E-02	-3.56E-02	1.67E-01	4.09E-04
PM	5.80E-06	8.00E-06	-1.56E-05	4.13E-05	-3.25E-08
IRP	1.27E+00	2.12E+00	-3.55E+00	9.63E+00	-5.89E-03
ETP-fw	2.18E+02	3.37E+02	-5.99E+02	2.13E+03	-1.24E+00
HTP-c	1.03E-07	5.92E-08	-2.35E-07	6.20E-07	-6.89E-10
HTP-nc	1.29E-06	1.62E-06	-3.40E-06	9.55E-06	-7.78E-09
SQP	1.39E+02	4.05E+02	-3.36E+02	1.01E+03	-6.24E-01
Biogenic C content_packaging	2.49E-02	7.80E-01	2.61E-02	8.00E-01	1.28E-03
Biogenic C content_product	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Distribution Stage – High weight					
Impact category	**a**	**b**	**c**	**d**	**e**
GWP-total	3.04E-01	1.80E-01	1.29E+00	-5.83E-02	2.60E-03
GWP-fossil	3.04E-01	1.80E-01	1.29E+00	-5.82E-02	2.60E-03
GWP-biogenic	1.12E-04	6.65E-05	4.75E-04	-2.15E-05	9.60E-07
GWP-luluc	1.51E-04	8.98E-05	6.41E-04	-2.90E-05	1.30E-06
ODP	5.01E-09	2.97E-09	2.12E-08	-9.61E-10	4.29E-11
AP	1.33E-03	7.90E-04	5.65E-03	-2.55E-04	1.14E-05
EP-freshwater	2.47E-05	1.47E-05	1.05E-04	-4.74E-06	2.12E-07
EP-marine	4.88E-04	2.90E-04	2.07E-03	-9.36E-05	4.18E-06
EP-terrestrial	5.22E-03	3.09E-03	2.21E-02	-1.00E-03	4.47E-05
POCP	1.88E-03	1.11E-03	7.96E-03	-3.60E-04	1.61E-05
ADPE	8.26E-07	4.90E-07	3.50E-06	-1.58E-07	7.08E-09
ADPF	4.45E+00	2.64E+00	1.89E+01	-8.53E-01	3.81E-02
WDP	2.26E-02	1.34E-02	9.60E-02	-4.34E-03	1.94E-04
PE	4.50E+00	2.67E+00	1.91E+01	-8.64E-01	3.86E-02
PERE	5.63E-02	3.34E-02	2.39E-01	-1.08E-02	4.83E-04
PERM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	5.63E-02	3.34E-02	2.39E-01	-1.08E-02	4.83E-04
PENRE	4.45E+00	2.64E+00	1.89E+01	-8.53E-01	3.81E-02
PENRM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	4.45E+00	2.64E+00	1.89E+01	-8.53E-01	3.81E-02
SM	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
NRSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	7.10E-04	4.21E-04	3.01E-03	-1.36E-04	6.09E-06
HWD	2.80E-05	1.66E-05	1.19E-04	-5.38E-06	2.41E-07
NHWD	3.87E-01	2.30E-01	1.64E+00	-7.43E-02	3.32E-03
RWD	9.71E-07	5.76E-07	4.12E-06	-1.86E-07	8.32E-09
CRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	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
PM	3.13E-08	1.85E-08	1.33E-07	-6.00E-09	2.68E-10
IRP	4.08E-03	2.42E-03	1.73E-02	-7.83E-04	3.50E-05
ETP-fw	2.36E+00	1.40E+00	1.00E+01	-4.52E-01	2.02E-02
HTP-c	1.32E-10	7.83E-11	5.60E-10	-2.53E-11	1.13E-12
HTP-nc	3.24E-09	1.92E-09	1.37E-08	-6.21E-10	2.78E-11
SQP	4.50E+00	2.67E+00	1.91E+01	-8.64E-01	3.86E-02
Biogenic C content_packaging	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic C content_product	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Distribution Stage – Low weight					
Impact category	**a**	**b**	**c**	**d**	**e**
GWP-total	2.64E-01	3.91E-01	2.54E-01	3.32E-01	8.14E-04
GWP-fossil	2.63E-01	3.91E-01	2.54E-01	3.32E-01	8.14E-04
GWP-biogenic	9.72E-05	1.44E-04	9.37E-05	1.22E-04	3.00E-07
GWP-luluc	1.31E-04	1.95E-04	1.27E-04	1.65E-04	4.06E-07
ODP	4.35E-09	6.45E-09	4.19E-09	5.47E-09	1.34E-11
AP	1.16E-03	1.71E-03	1.11E-03	1.45E-03	3.57E-06
EP-freshwater	2.15E-05	3.18E-05	2.07E-05	2.70E-05	6.63E-08
EP-marine	4.24E-04	6.28E-04	4.08E-04	5.33E-04	1.31E-06
EP-terrestrial	4.53E-03	6.71E-03	4.36E-03	5.70E-03	1.40E-05
POCP	1.63E-03	2.42E-03	1.57E-03	2.05E-03	5.03E-06
ADPE	7.17E-07	1.06E-06	6.91E-07	9.02E-07	2.21E-09
ADPF	3.86E+00	5.72E+00	3.72E+00	4.86E+00	1.19E-02
WDP	1.97E-02	2.91E-02	1.89E-02	2.47E-02	6.07E-05
PE	3.91E+00	5.80E+00	3.77E+00	4.92E+00	1.21E-02
PERE	4.89E-02	7.25E-02	4.71E-02	6.15E-02	1.51E-04
PERM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	4.89E-02	7.25E-02	4.71E-02	6.15E-02	1.51E-04
PENRE	3.86E+00	5.72E+00	3.72E+00	4.86E+00	1.19E-02
PENRM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	3.86E+00	5.72E+00	3.72E+00	4.86E+00	1.19E-02
SM	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
NRSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	6.16E-04	9.14E-04	5.94E-04	7.76E-04	1.90E-06
HWD	2.43E-05	3.61E-05	2.35E-05	3.07E-05	7.52E-08
NHWD	3.36E-01	4.99E-01	3.24E-01	4.23E-01	1.04E-03
RWD	8.43E-07	1.25E-06	8.12E-07	1.06E-06	2.60E-09
CRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	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
PM	2.71E-08	4.02E-08	2.62E-08	3.42E-08	8.38E-11
IRP	3.54E-03	5.25E-03	3.41E-03	4.46E-03	1.09E-05
ETP-fw	2.05E+00	3.04E+00	1.97E+00	2.58E+00	6.32E-03
HTP-c	1.15E-10	1.70E-10	1.10E-10	1.44E-10	3.54E-13
HTP-nc	2.81E-09	4.17E-09	2.71E-09	3.54E-09	8.68E-12
SQP	3.91E+00	5.80E+00	3.77E+00	4.92E+00	1.21E-02
Biogenic C content_packaging	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic C content_product	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Installation Stage – High weight			
Impact category	**a**	**b**	**c**
GWP-total	1.56E+00	2.22E+00	1.10E-03
GWP-fossil	4.26E-02	1.28E+00	2.55E-03
GWP-biogenic	1.52E+00	9.48E-01	-1.45E-03
GWP-luluc	1.68E-05	3.92E-05	-1.93E-08
ODP	1.06E-09	4.28E-09	-2.41E-12
AP	2.99E-04	7.90E-04	-6.40E-07
EP-freshwater	7.14E-06	5.69E-06	2.84E-07
EP-marine	1.44E-04	4.20E-04	-4.40E-07
EP-terrestrial	1.36E-03	3.46E-03	-2.89E-06
POCP	3.75E-04	9.09E-04	-7.78E-07
ADPE	1.04E-07	2.28E-07	-3.58E-11
ADPF	4.45E-01	8.57E-01	-4.02E-04
WDP	1.05E-02	1.53E-01	-1.40E-04
PE	4.54E-01	8.87E-01	-4.18E-04
PERE	9.50E-03	2.96E-02	-1.59E-05
PERM	0.00E+00	0.00E+00	0.00E+00
PERT	9.50E-03	2.96E-02	-1.59E-05
PENRE	4.45E-01	8.57E-01	-4.02E-04
PENRM	0.00E+00	0.00E+00	0.00E+00
PENRT	4.45E-01	8.57E-01	-4.02E-04
SM	0.00E+00	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	0.00E+00
FW	4.57E-04	4.77E-03	-4.85E-06
HWD	2.61E-06	4.99E-06	4.82E-09
NHWD	3.06E-02	9.27E-02	-5.93E-05
RWD	1.32E-07	4.00E-07	-2.04E-10
CRU	0.00E+00	0.00E+00	0.00E+00
MFR	0.00E+00	0.00E+00	0.00E+00
MER	0.00E+00	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00	0.00E+00
PM	3.56E-09	5.46E-09	1.19E-11
IRP	5.37E-04	1.59E-03	-8.14E-07
ETP-fw	9.99E-01	6.09E+00	-7.58E-03
HTP-c	7.26E-11	2.96E-10	-1.63E-14
HTP-nc	2.84E-09	9.80E-09	-9.12E-12
SQP	2.15E-01	3.91E-01	-1.77E-04
Biogenic C content_packaging	0.00E+00	0.00E+00	0.00E+00
Biogenic C content_product	0.00E+00	0.00E+00	0.00E+00

Installation Stage – Low weight			
Impact category	**a**	**b**	**c**
GWP-total	1.59E+00	1.53E+00	1.86E-03
GWP-fossil	4.70E-02	5.05E-02	4.45E-03
GWP-biogenic	1.54E+00	1.48E+00	-2.59E-03
GWP-luluc	1.80E-05	1.91E-05	2.04E-09
ODP	1.29E-09	9.14E-10	-1.48E-14
AP	3.21E-04	3.54E-04	-9.86E-08
EP-freshwater	6.49E-06	1.08E-05	2.90E-07
EP-marine	1.55E-04	1.84E-04	-1.11E-07
EP-terrestrial	1.43E-03	1.64E-03	-3.69E-07
POCP	3.95E-04	4.46E-04	-1.46E-07
ADPE	1.11E-07	1.09E-07	7.69E-11
ADPF	4.64E-01	4.93E-01	3.92E-05
WDP	2.08E-02	-5.31E-03	-4.24E-05
PE	4.75E-01	5.02E-01	3.93E-05
PERE	1.08E-02	9.06E-03	1.38E-07
PERM	0.00E+00	0.00E+00	0.00E+00
PERT	1.08E-02	9.06E-03	1.38E-07
PENRE	4.64E-01	4.93E-01	3.92E-05
PENRM	0.00E+00	0.00E+00	0.00E+00
PENRT	4.64E-01	4.93E-01	3.92E-05
SM	0.00E+00	0.00E+00	0.00E+00
RSF	0.00E+00	0.00E+00	0.00E+00
NRSF	0.00E+00	0.00E+00	0.00E+00
FW	7.72E-04	-3.40E-05	-1.89E-06
HWD	2.72E-06	2.87E-06	7.11E-09
NHWD	3.28E-02	4.86E-02	1.52E-05
RWD	1.50E-07	1.27E-07	6.93E-12
CRU	0.00E+00	0.00E+00	0.00E+00
MFR	0.00E+00	0.00E+00	0.00E+00
MER	0.00E+00	0.00E+00	0.00E+00
EE	0.00E+00	0.00E+00	0.00E+00
PM	3.66E-09	3.87E-09	1.39E-11
IRP	6.07E-04	5.21E-04	1.85E-08
ETP-fw	1.36E+00	3.51E-01	-4.03E-03
HTP-c	8.11E-11	1.12E-10	2.53E-13
HTP-nc	3.09E-09	4.07E-09	-5.80E-13
SQP	2.21E-01	2.63E-01	3.24E-05
Biogenic C content_packaging	0.00E+00	0.00E+00	0.00E+00
Biogenic C content_product	0.00E+00	0.00E+00	0.00E+00

End-of-Life Stage – High weight				
Impact category	**a**	**b**	**c**	**d**
GWP-total	2.73E+00	-1.83E-01	-2.79E+00	-3.69E-03
GWP-fossil	2.73E+00	-1.84E-01	-2.81E+00	-3.72E-03
GWP-biogenic	-1.40E-03	1.83E-03	1.19E-02	3.09E-05
GWP-luluc	2.79E-05	4.43E-07	8.32E-06	7.33E-09
ODP	3.20E-09	3.05E-10	-2.76E-09	2.95E-12
AP	7.10E-04	1.91E-05	-5.71E-04	8.79E-09
EP-freshwater	9.09E-06	4.52E-06	-4.99E-06	6.22E-08
EP-marine	3.93E-04	1.70E-05	-3.50E-04	7.86E-08
EP-terrestrial	3.39E-03	7.00E-05	-2.88E-03	-3.10E-07
POCP	8.77E-04	1.76E-05	-6.81E-04	-6.24E-08
ADPE	1.92E-07	8.11E-09	-9.60E-08	6.63E-11
ADPF	7.52E-01	1.35E-02	-2.25E-01	6.50E-05
WDP	1.34E-01	1.93E-02	-1.52E-01	1.97E-04
PE	7.76E-01	1.56E-02	-2.42E-01	8.47E-05
PERE	2.43E-02	2.01E-03	-1.71E-02	1.98E-05
PERM	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	2.43E-02	2.01E-03	-1.71E-02	1.98E-05
PENRE	7.52E-01	1.35E-02	-2.25E-01	6.49E-05
PENRM	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	7.52E-01	1.35E-02	-2.25E-01	6.49E-05
SM	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
NRSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	4.23E-03	5.94E-04	-4.71E-03	6.06E-06
HWD	4.54E-06	-3.66E-07	-1.36E-06	-5.69E-09
NHWD	6.26E-02	2.30E-03	-3.93E-02	1.39E-05
RWD	3.12E-07	2.44E-08	-2.01E-07	2.41E-10
CRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	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
PM	4.31E-09	1.11E-10	4.48E-10	1.55E-12
IRP	1.24E-03	9.46E-05	-7.75E-04	9.37E-07
ETP-fw	5.83E+00	8.74E-01	-4.64E+00	9.42E-03
HTP-c	2.51E-10	2.23E-11	-2.32E-10	2.08E-13
HTP-nc	8.83E-09	4.53E-10	-8.96E-09	2.33E-12
SQP	2.68E-01	-1.13E-02	2.69E-01	-7.23E-05
Biogenic C content_packaging	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic C content_product	0.00E+00	0.00E+00	0.00E+00	0.00E+00

End-of-Life Stage – Low weight				
Impact category	**a**	**b**	**c**	**d**
GWP-total	1.88E+00	-1.84E+00	-1.81E+00	-4.56E-03
GWP-fossil	1.88E+00	-1.85E+00	-1.81E+00	-4.59E-03
GWP-biogenic	3.08E-03	6.93E-03	4.62E-03	2.56E-05
GWP-luluc	2.81E-05	8.20E-06	8.93E-05	9.82E-10
ODP	2.27E-09	-1.65E-09	1.67E-09	-4.28E-12
AP	5.21E-04	-3.52E-04	2.17E-04	-9.26E-07
EP-freshwater	1.01E-05	-5.58E-06	3.85E-05	1.24E-08
EP-marine	2.78E-04	-2.16E-04	-5.46E-05	-5.56E-07
EP-terrestrial	2.44E-03	-1.79E-03	2.52E-05	-4.66E-06
POCP	6.51E-04	-4.20E-04	1.11E-04	-1.12E-06
ADPE	1.57E-07	-5.59E-08	5.39E-07	-1.61E-10
ADPF	6.56E-01	-1.13E-01	9.91E-01	-4.69E-04
WDP	8.23E-02	-9.07E-02	-4.13E-02	-2.33E-04
PE	6.74E-01	-1.23E-01	1.03E+00	-4.96E-04
PERE	1.84E-02	-9.99E-03	3.84E-02	-2.72E-05
PERM	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	1.84E-02	-9.99E-03	3.84E-02	-2.72E-05
PENRE	6.56E-01	-1.13E-01	9.91E-01	-4.69E-04
PENRM	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	6.56E-01	-1.13E-01	9.91E-01	-4.69E-04
SM	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
NRSF	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	2.64E-03	-2.81E-03	-1.40E-03	-7.15E-06
HWD	4.05E-06	-8.38E-07	6.31E-05	-3.06E-09
NHWD	4.94E-02	-2.39E-02	8.65E-01	-6.34E-05
RWD	2.40E-07	-1.16E-07	4.73E-07	-3.25E-10
CRU	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	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
PM	4.29E-09	4.85E-10	6.31E-09	3.96E-14
IRP	9.65E-04	-4.45E-04	1.91E-03	-1.26E-06
ETP-fw	3.89E+00	-2.31E+00	-2.92E+00	-8.47E-03
HTP-c	1.78E-10	-1.45E-10	-3.04E-12	-3.36E-13
HTP-nc	5.94E-09	-5.60E-09	1.84E-08	-1.39E-11
SQP	3.18E-01	2.10E-01	1.42E+00	2.32E-04
Biogenic C content_packaging	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic C content_product	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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-0003-ed2.1-EN-2023 12 08, Specific rules for Cable Management Solutions.

[3] PRé Consultants. Software SimaPro 9.6. 2024 (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 1:2020. 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] Ecoinvent. 2022. Swiss Centre for Life Cycle Assessment. v3.9.1 (www.ecoinvent.ch).

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

[10] 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.

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

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.

Registration number: **ABBG-00696-V01.01-EN**	Drafting Rules: ***PCR-ed4-EN-2021 09 06*** ***Supplemented by:*** -
Verifier accreditation number: ***VH44***	Information and reference documents: **www.pep-ecopassport.org**
Date of issue: ***11-2024***	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)	
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"	