



PRODUCT ENVIRONMENTAL PROFIL

GENERAL INFORMATION

VECTIOS IPJ R410a

REFERENCE PRODUCT

Commercial reference : VECTIOS IPJ 0380 R410a

Product family : VECTIOS IPJ R410a

Technical description :

The VECTIOS range is made up of air-to-air autonomous units with horizontal construction, roof-top type, which integrates inside all the components necessary for the proper conditioning of the air supplied to the installation.

- IPJ series: Reversible heat pump units.

The power range of these units allows the air conditioning of large areas for commercial or industrial use. The unit is directly connected to the duct network, without the need for additional units or elements, pipes, cables, etc. and thus avoiding the occupation of additional space. This design reduces the cost of installation, allowing for quick connection and ensuring reliable operation.

Category :

Rooftop, active product

FUNCTIONAL UNIT

"To produce 1 kW of heating or 1 kW of cooling according to the appropriate usage scenario defined in the EN 148252 standard and during the 22 year reference lifetime of the product."

INFORMATION ON THE COMPANY

Contact :

Company :

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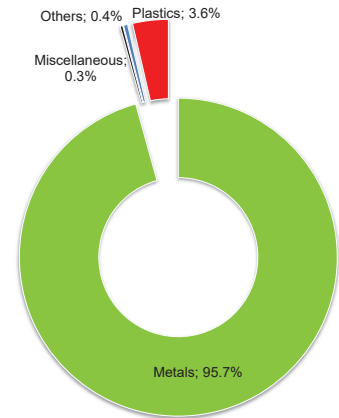
MASS OF THE REFERENCE PRODUCT

Total weight : 1220.0 kg
including the product, its packaging and the additional components supplied with the reference product

COMPONENT MATERIALS

PEP material category	Materials	Weight (kg)	Pourcentage
Metals	steel 35% recycled	813.23	66.7%
Metals	copper	222.69	18.3%
Metals	aluminium	121.60	10.0%
Plastics	polyethylene low density (PE-LD) film	10.00	0.8%
Plastics	polypropylene (PP)	9.42	0.8%
Plastics	polyvinyl chloride (PVC)	8.82	0.7%
Plastics	polyamide 6,6 (PA 6,6)	7.96	0.7%
Others	glass wool	5.08	0.4%
Metals	steel	5.00	0.4%
Plastics	nitrile-butadiene rubber (NBR)	4.35	0.4%
Miscellaneous	miscellaneous	3.31	0.3%
Metals	brass	2.51	0.2%
Metals	stainless steel	2.27	0.2%
Plastics	polycarbonate (PC)	2.25	0.2%
Plastics	rubber	0.80	< 0,1%
Plastics	ethylene-propylene diene rubber (EPDM)	0.68	< 0,1%
	Total	1220.0	100.0%

	Plastics
	Others
	Metals
	Miscellaneous



ADDITIONAL ENVIRONMENTAL INFORMATION

MANUFACTURING :

The VECTIOS range of products is manufactured in Spain at a CIAT production plant, which implements an ISO 14001-certified environmental management system. The manufacturing site has also obtained ISO 9001 and OHSAS 18001 certification.

Hazardous substances :

The ranges of products from the CARRIER Group comply with the requirements of the "RoHS" Directive (EU) 2015/863 of 31 March 2015 and 2011/65/EU of 8 June 2011 and the "REACH" regulation 1907/2006 of 18 December 2006. The CARRIER Group's suppliers are obliged to inform them of any change in the composition of the components.

DISTRIBUTION :

INSTALLATION :

USE :

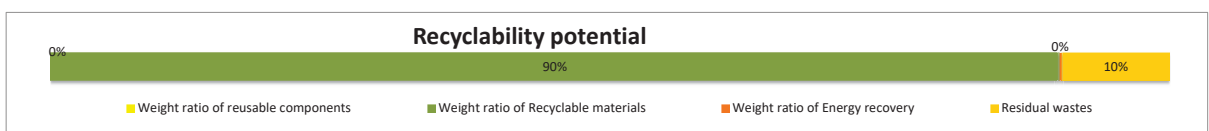
There are eight filters of type G4 (pre-filter) ; four fan and four compressor.

END OF LIFE :

The environmental impacts are calculated using a Life Cycle Analysis of the product in accordance with ISO standards 14040 and 14044.

All the stages of the manufacture, distribution, installation (packaging end of life), maintenance and end of life of the product are included in this study.

Recyclability rate: 90%



LIFE CYCLE ANALYSIS METHODOLOGY

The Life Cycle Analysis used as the basis for this Product Environmental Profile (PEP) was drawn up in line with the criteria set by PCR-ed3-FR-2015 04 02 for the PEP ecopassport® program

Reference service life:

22 years

The environmental impacts are calculated using a Life Cycle Analysis of the product in accordance with ISO standards 14040 and 14044.

All the stages of the manufacture, distribution, installation (packaging end of life), maintenance and end of life of the product are included in this study.

Manufacturing stage :



Energy model :

Electricity grid mix; AC; consumption mix, at consumer; 230V; ES

During the manufacturing phase, a procurement scenario is taken into account; information on the provenance of the components and the mode of transport has been gathered from the CIAT Purchasing department. The production of the refrigerant fluid R410A is also taken into account.

Distribution stage :



Energy model :

ELCD - Lorry Transport; articulated lorry, 27t capacity; RER ; ELCD - Transoceanic transport, Container ship, 27 500 t capacity; RER

The distribution scenario has been defined using data recommended by the PEP Ecopassport® program, adjusted to the average sales distance for our customers. The environmental impact is then calculated pro rata using the total weight of the products transported, to ensure trucks carry an optimised load when outbound and are 25% full on their return. The scenario retained is distribution of the range to the following destinations: 17.9% France; 55.8% Europe and 26.3% rest of world.

Installation stage :



Energy model :

ELCD - Lorry transport; Small lorry, 3,3 t capacity; RER

If the product is supplied packed, the impact of the end of life for this packaging is taken into account in this phase. We therefore take into consideration an average journey of 200 km in a van, the water consumption, the refrigerant consumption and the lubricating oil consumption.

Usage stage :



Energy model :

For France: the model chosen is: "Electricity mix; AC; consumption mix, at consumer; 230 V; FR"

For Europe: the model chosen is: "Electricity Mix; AC; consumption mix, at consumer; < 1 kV; EU-27"

For the rest of the world: as there is no electricity model for modelling the rest of the world, we have used the European model. "Electricity Mix; AC; consumption mix, at consumer; < 1 kV; EU-27"

The use scenario is 600 operating hours per year in cooling, with a SEER of 4.45 and a cooling capacity of 90.18 [kW], and 1400 operating hours per year in heating, with a SCOP of 3.58 and a heating capacity of 89.66 [kW]. We obtain for C [kWh] :

Consumption = 1 038 877 kWh
Consumption in France: 365 903.4 kWh
Consumption in Europe: 1 140 637.4 kWh
Consumption in rest of world: 537 612.2 kWh

An annual check of the device is carried out 21 times throughout the reference lifetime (the first year the check does not take place).

The refrigeration circuit is refill to compensate the fluid leakage, oil changes are also taken into account.

The fluid emission level is 2 % of total load per year.

The filters are changed one per year
FMA are changed once during the life cycle
End of life of the FMA follows a WEEE disposal process.

End of life stage :



Energy model :

Waste pretreatment of electrical and electronic equipment (WEEE); including dismantling and material separation ;

- technology mix, at waste pretreatment plant; GLO ;
- Waste recycling; in compliance with stock method; World, GLO ;
- Waste incineration of WEEE; after dismantling; GLO ; Landfill of WEEE; after dismantling; GLO

The product end of life follows a WEEE disposal process :

- stage 1: the equipment is collected with a 200 km van journey.
- stage 2 : decontamination, crushing then sorting of the various materials.
- stage 3: specific processing of the electronic components, electrical heaters, cables, bulbs and screens.
- stage 4: recycling of other materials (this flow is outside of the system and its benefit is not recorded), with a 100 km van journey.
- stage 5: incineration without energy recovery of components with no re-use value, with a 100 km journey.
- stage 6: offloading of the rest of the material, with a 100 km journey.

Per kW corresponding to the functional unit

MANDATORY INDICATORS		VECTIOS IPJ 0380 R410a					
Impact indicators	Unit	Total	Manufacturing	Distribution	Installation	Use (Σ B1-B7)	End of life
Global warming	kg CO2 eq	5.95E+03	6.31E+02	2.02E+00	0*	5.32E+03	1.05E+00
Depletion of the ozone layer	kg CFC-11 eq	1.12E-03	3.54E-04	0*	0*	7.65E-04	0*
Acidification of soil and water	kg SO2 eq	2.08E+01	3.62E-01	2.79E-02	0*	2.04E+01	0*
Eutrophication of water	kg (PO4) ³⁻ eq	1.34E+00	7.22E-02	3.48E-03	0*	1.27E+00	4.70E-04
Photochemical ozone creation	kg C2H4 eq	1.17E+00	4.00E-02	1.50E-03	0*	1.13E+00	2.75E-04
Depletion of abiotic resources - elements	kg Sb eq	9.26E-03	6.11E-03	0*	0*	3.15E-03	0*
Inventory flow							
Life cycle total use of primary energy	MJ	1.19E+05	3.33E+03	2.76E+01	0*	1.15E+05	1.34E+01
Net use of fresh water	m³	2.22E+04	3.05E+00	0*	0*	2.22E+04	0*

The Life Cycle Analysis was conducted using EIME software: 5.9.3

With its database version: CODDE-2020-12

Only the energy mix changes based on the place of use: 17.9% France, 55.8% Europe and 26.3% rest of world.

OPTIONAL INDICATORS		VECTIOS IPJ 0380 R410a					
Impact indicators	Unit	Total	Manufacturing	Distribution	Installation	Use (Σ B1-B7)	End of life
Depletion of abiotic resources - fossil fuels	MJ	5.67E+04	7.94E+02	2.74E+01	0*	5.58E+04	9.18E+00
Water pollution	m³	2.10E+05	5.16E+03	3.21E+02	0*	2.04E+05	2.16E+02
Air pollution	m³	2.67E+05	3.67E+04	1.59E+02	0*	2.30E+05	1.24E+02
Inventory flow							
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	1.34E+04	4.81E+01	0*	0*	1.33E+04	0*
Use of renewable primary energy resources as raw materials	MJ	2.65E-02	2.65E-02	0*	0*	0*	0*
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.34E+04	4.81E+01	0*	0*	1.33E+04	0*
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	1.05E+05	3.25E+03	2.75E+01	0*	1.02E+05	1.34E+01
Use of non-renewable primary energy resources as raw materials	MJ	1.18E+02	3.51E+01	0*	3.14E+00	7.97E+01	0*
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.05E+05	3.28E+03	2.75E+01	0*	1.02E+05	1.34E+01
Use of secondary materials	kg	9.62E+00	6.06E+00	0*	0*	3.55E+00	0*
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazardous waste disposed	kg	7.49E+02	5.18E+02	0*	0*	2.16E+02	1.53E+01
Non-hazardous waste disposed	kg	1.79E+04	6.43E+01	0*	0*	1.78E+04	0*
Radioactive waste disposed	kg	1.85E+01	5.18E-02	0*	0*	1.84E+01	0*
Materials for recycling	kg	1.61E+01	0*	0*	2.34E-02	3.87E+00	1.22E+01
Components for reuse	kg	2.05E-01	0*	0*	0*	0*	2.05E-01
Materials for energy recovery	kg	8.55E-01	0*	0*	3.56E-02	7.92E-01	2.69E-02
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

The PEP was drawn up under the assumption 1 kW of heating or cooling power being supplied. The real impact of the stages of the life cycle of a product installed in an actual situation is calculated by the user of the PEP by multiplying the impact concerned by the total heating and cooling capacity in kW.

* represents less than 0.01% of the total life cycle of the reference flow

Per kW corresponding to the functional unit

MANDATORY INDICATORS		VECTIOS IPJ 0380 R410a						
Impact indicators	Unit	B1	B2	B3	B4	B5	B6	B7
Global warming	kg CO2 eq	4.05E+02	3.78E+01	0.00E+00	0.00E+00	0.00E+00	4.88E+03	0.00E+00
Depletion of the ozone layer	kg CFC-11 eq	1.37E-04	2.43E-06	0.00E+00	0.00E+00	0.00E+00	6.25E-04	0.00E+00
Acidification of soil and water	kg SO2 eq	1.05E-02	1.20E-01	0.00E+00	0.00E+00	0.00E+00	2.02E+01	0.00E+00
Eutrophication of water	kg (PO4) ³⁻ eq	2.64E-03	1.71E-02	0.00E+00	0.00E+00	0.00E+00	1.25E+00	0.00E+00
Photochemical ozone creation	kg C2H4 eq	1.56E-03	1.31E-02	0.00E+00	0.00E+00	0.00E+00	1.11E+00	0.00E+00
Depletion of abiotic resources - elements	kg Sb eq	1.06E-05	2.62E-03	0.00E+00	0.00E+00	0.00E+00	5.14E-04	0.00E+00
Inventory flow								
Life cycle total use of primary energy	MJ	8.19E+01	1.80E+03	0.00E+00	0.00E+00	0.00E+00	1.13E+05	0.00E+00
Net use of fresh water	m ³	1.10E-01	1.08E+00	0.00E+00	0.00E+00	0.00E+00	2.22E+04	0.00E+00

The Life Cycle Analysis was conducted using EIME software: 5.9.3

With its database version: CODDE-2020-12

Only the energy mix changes based on the place of use: 17.9% France, 55.8% Europe and 26.3% rest of world.

OPTIONAL INDICATORS		VECTIOS IPJ 0380 R410a						
Impact indicators	Unit	B1	B2	B3	B4	B5	B6	B7
Depletion of abiotic resources - fossil fuels	MJ	9.52E+01	3.55E+02	0.00E+00	0.00E+00	0.00E+00	5.54E+04	0.00E+00
Water pollution	m ³	2.51E+00	8.92E+02	0.00E+00	0.00E+00	0.00E+00	2.03E+05	0.00E+00
Air pollution	m ³	8.37E+03	1.35E+04	0.00E+00	0.00E+00	0.00E+00	2.08E+05	0.00E+00
Inventory flow								
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	7.48E-06	1.47E+01	0.00E+00	0.00E+00	0.00E+00	1.33E+04	0.00E+00
Use of renewable primary energy resources as raw materials	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	7.48E-06	1.47E+01	0.00E+00	0.00E+00	0.00E+00	1.33E+04	0.00E+00
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	1.60E+01	1.78E+03	0.00E+00	0.00E+00	0.00E+00	1.00E+05	0.00E+00
Use of non-renewable primary energy resources as raw materials	MJ	6.60E+01	1.37E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	8.19E+01	1.79E+03	0.00E+00	0.00E+00	0.00E+00	1.00E+05	0.00E+00
Use of secondary materials	kg	0.00E+00	3.55E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazardous waste disposed	kg	3.85E-02	2.13E+02	0.00E+00	0.00E+00	0.00E+00	2.85E+00	0.00E+00
Non-hazardous waste disposed	kg	3.89E-01	1.75E+01	0.00E+00	0.00E+00	0.00E+00	1.78E+04	0.00E+00
Radioactive waste disposed	kg	3.59E-05	1.42E-02	0.00E+00	0.00E+00	0.00E+00	1.84E+01	0.00E+00
Materials for recycling	kg	7.86E-01	3.08E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	7.86E-01	6.57E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

As part of the life cycle analysis of buildings, the environmental impacts of the use stage must be declared according to modules B1 to B7 (B1: use; B2: maintenance; B3: repair; B4: replacement; B5: rehabilitation; B6: energy use; B7: water use).

Per device corresponding to the reference product

MANDATORY INDICATORS		VECTIOS IPJ 0380 R410a					
Impact indicators	Unit	Total	Manufacturing	Distribution	Installation	Use (Σ B1-B7)	End of life
Global warming	kg CO2 eq	5.35E+05	5.66E+04	1.82E+02	0*	4.78E+05	9.42E+01
Depletion of the ozone layer	kg CFC-11 eq	1.00E-01	3.18E-02	0*	0*	6.87E-02	0*
Acidification of soil and water	kg SO2 eq	1.86E+03	3.25E+01	2.51E+00	0*	1.83E+03	0*
Eutrophication of water	kg (PO4) ³⁻ eq	1.21E+02	6.49E+00	3.12E-01	0*	1.14E+02	4.22E-02
Photochemical ozone creation	kg C2H4 eq	1.05E+02	3.59E+00	1.35E-01	0*	1.01E+02	2.47E-02
Depletion of abiotic resources - elements	kg Sb eq	8.31E-01	5.49E-01	0*	0*	2.83E-01	0*
Inventory flow							
Life cycle total use of primary energy	MJ	1.07E+07	2.99E+05	2.48E+03	0*	1.04E+07	1.20E+03
Net use of fresh water	m ³	1.99E+06	2.74E+02	0*	0*	1.99E+06	0*

The Life Cycle Analysis was conducted using EIME software: 5.9.3

With its database version: CODDE-2020-12

Only the energy mix changes based on the place of use: 17.9% France, 55.8% Europe and 26.3% rest of world.

OPTIONAL INDICATORS		VECTIOS IPJ 0380 R410a					
Impact indicators	Unit	Total	Manufacturing	Distribution	Installation	Use (Σ B1-B7)	End of life
Depletion of abiotic resources - fossil fuels	MJ	5.09E+06	7.13E+04	2.46E+03	0*	5.01E+06	8.25E+02
Water pollution	m ³	1.89E+07	4.63E+05	2.88E+04	0*	1.83E+07	1.94E+04
Air pollution	m ³	2.39E+07	3.30E+06	1.43E+04	0*	2.06E+07	1.12E+04
Inventory flow							
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	1.20E+06	4.32E+03	0*	0*	1.20E+06	0*
Use of renewable primary energy resources as raw materials	MJ	2.38E+00	2.38E+00	0*	0*	0*	0*
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.20E+06	4.32E+03	0*	0*	1.20E+06	0*
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	9.45E+06	2.92E+05	2.47E+03	0*	9.16E+06	1.20E+03
Use of non-renewable primary energy resources as raw materials	MJ	1.06E+04	3.15E+03	0*	2.82E+02	7.16E+03	0*
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	9.46E+06	2.95E+05	2.47E+03	0*	9.16E+06	1.20E+03
Use of secondary materials	kg	8.64E+02	5.45E+02	0*	0*	3.19E+02	0*
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazardous waste disposed	kg	6.73E+04	4.65E+04	0*	0*	1.94E+04	1.38E+03
Non-hazardous waste disposed	kg	1.61E+06	5.77E+03	0*	0*	1.60E+06	0*
Radioactive waste disposed	kg	1.66E+03	4.66E+00	0*	0*	1.65E+03	0*
Materials for recycling	kg	1.45E+03	0*	0*	2.10E+00	3.47E+02	1.10E+03
Components for reuse	kg	1.85E+01	0*	0*	0*	0*	1.85E+01
Materials for energy recovery	kg	7.68E+01	0*	0*	3.20E+00	7.12E+01	2.42E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

* represents less than 0.01% of the total life cycle of the reference flow

Per device corresponding to the reference product

MANDATORY INDICATORS		VECTIOS IPJ 0380 R410a						
Impact indicators	Unit	B1	B2	B3	B4	B5	B6	B7
Global warming	kg CO2 eq	3.64E+04	3.40E+03	0.00E+00	0.00E+00	0.00E+00	4.38E+05	0.00E+00
Depletion of the ozone layer	kg CFC-11 eq	1.23E-02	2.19E-04	0.00E+00	0.00E+00	0.00E+00	5.62E-02	0.00E+00
Acidification of soil and water	kg SO2 eq	9.46E-01	1.08E+01	0.00E+00	0.00E+00	0.00E+00	1.82E+03	0.00E+00
Eutrophication of water	kg (PO4) ³⁻ eq	2.37E-01	1.53E+00	0.00E+00	0.00E+00	0.00E+00	1.12E+02	0.00E+00
Photochemical ozone creation	kg C2H4 eq	1.41E-01	1.17E+00	0.00E+00	0.00E+00	0.00E+00	1.00E+02	0.00E+00
Depletion of abiotic resources - elements	kg Sb eq	9.51E-04	2.36E-01	0.00E+00	0.00E+00	0.00E+00	4.62E-02	0.00E+00
Inventory flow								
Life cycle total use of primary energy	MJ	7.36E+03	1.62E+05	0.00E+00	0.00E+00	0.00E+00	1.02E+07	0.00E+00
Net use of fresh water	m³	9.88E+00	9.72E+01	0.00E+00	0.00E+00	0.00E+00	1.99E+06	0.00E+00

The Life Cycle Analysis was conducted using EIME software: 5.9.3

With its database version: CODDE-2020-12

Only the energy mix changes based on the place of use: 17.9% France, 55.8% Europe and 26.3% rest of world.

OPTIONAL INDICATORS		VECTIOS IPJ 0380 R410a						
Impact indicators	Unit	B1	B2	B3	B4	B5	B6	B7
Depletion of abiotic resources - fossil fuels	MJ	8.55E+03	3.19E+04	0.00E+00	0.00E+00	0.00E+00	4.97E+06	0.00E+00
Water pollution	m³	2.26E+02	8.01E+04	0.00E+00	0.00E+00	0.00E+00	1.83E+07	0.00E+00
Air pollution	m³	7.52E+05	1.21E+06	0.00E+00	0.00E+00	0.00E+00	1.87E+07	0.00E+00
Inventory flow								
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	6.71E-04	1.32E+03	0.00E+00	0.00E+00	0.00E+00	1.19E+06	0.00E+00
Use of renewable primary energy resources as raw materials	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	6.71E-04	1.32E+03	0.00E+00	0.00E+00	0.00E+00	1.19E+06	0.00E+00
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	1.43E+03	1.59E+05	0.00E+00	0.00E+00	0.00E+00	9.00E+06	0.00E+00
Use of non-renewable primary energy resources as raw materials	MJ	5.93E+03	1.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	7.36E+03	1.61E+05	0.00E+00	0.00E+00	0.00E+00	9.00E+06	0.00E+00
Use of secondary materials	kg	0.00E+00	3.19E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazardous waste disposed	kg	3.46E+00	1.92E+04	0.00E+00	0.00E+00	0.00E+00	2.56E+02	0.00E+00
Non-hazardous waste disposed	kg	3.49E+01	1.57E+03	0.00E+00	0.00E+00	0.00E+00	1.60E+06	0.00E+00
Radioactive waste disposed	kg	3.22E-03	1.27E+00	0.00E+00	0.00E+00	0.00E+00	1.65E+03	0.00E+00
Materials for recycling	kg	7.06E+01	2.77E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	7.06E+01	5.90E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

As part of the life cycle analysis of buildings, the environmental impacts of the use stage must be declared according to modules B1 to B7 (B1: use; B2: maintenance; B3: repair; B4: replacement; B5: rehabilitation; B6: energy use; B7: water use).

EXTRAPOLATION TO THE OTHER SIZES IN THE RANGE

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	Capacity [kW]	manufacturing	distribution	installation	use	end of life
VECTIOS IPJ 0090 R410a	22.0	2.086	2.086	2.856	1.003	2.080
VECTIOS IPJ 0120 R410a	27.7	1.717	1.717	2.266	1.012	1.712
VECTIOS IPJ 0140 R410a	33.2	1.629	1.629	1.895	1.021	1.627
VECTIOS IPJ 0160 R410a	36.7	1.473	1.473	1.713	1.028	1.471
VECTIOS IPJ 0180 R410a	41.7	1.295	1.295	1.507	1.033	1.293
VECTIOS IPJ 0190 R410a	44.4	1.221	1.221	1.417	1.037	1.220
VECTIOS IPJ 0200 R410a	51.5	1.487	1.487	1.571	0.980	1.487
VECTIOS IPJ 0220 R410a	56.4	1.365	1.365	1.433	0.976	1.365
VECTIOS IPJ 0240 R410a	59.1	1.319	1.319	1.367	0.994	1.318
VECTIOS IPJ 0280 R410a	67.9	1.308	1.308	1.323	1.010	1.308
VECTIOS IPJ 0320 R410a	71.9	1.235	1.235	1.249	1.000	1.234
VECTIOS IPJ 0360 R410a	80.5	1.112	1.112	1.116	0.999	1.112
VECTIOS IPJ 0380 R410a	89.8	1.000	1.000	1.000	1.000	1.000

Extrapolation coefficients are given for the environmental impact of the functional unit, i.e. the emission of 1 kW of heating or cooling power. For each stage of the life cycle, the environmental impacts of the product concerned are calculated by multiplying the impacts of the declaration corresponding to the reference product by the extrapolation coefficient. The "Total" column should be calculated by adding the environmental impacts of each stage of the life cycle.

EXTRAPOLATION AT THE SCALE OF THE DECLARE PRODUCT

	manufacturing	distribution	installation	use	end of life
VECTIOS IPJ 0090 R410a	0.511	0.511	0.700	0.246	0.510
VECTIOS IPJ 0120 R410a	0.530	0.530	0.700	0.313	0.529
VECTIOS IPJ 0140 R410a	0.602	0.602	0.700	0.377	0.601
VECTIOS IPJ 0160 R410a	0.602	0.602	0.700	0.420	0.601
VECTIOS IPJ 0180 R410a	0.602	0.602	0.700	0.480	0.601
VECTIOS IPJ 0190 R410a	0.603	0.603	0.700	0.512	0.603
VECTIOS IPJ 0200 R410a	0.852	0.852	0.900	0.561	0.852
VECTIOS IPJ 0220 R410a	0.857	0.857	0.900	0.613	0.857
VECTIOS IPJ 0240 R410a	0.868	0.868	0.900	0.654	0.868
VECTIOS IPJ 0280 R410a	0.988	0.988	1.000	0.763	0.988
VECTIOS IPJ 0320 R410a	0.988	0.988	1.000	0.801	0.988
VECTIOS IPJ 0360 R410a	0.996	0.996	1.000	0.895	0.996
VECTIOS IPJ 0380 R410a	1.000	1.000	1.000	1.000	1.000

Glossary

The set of indicators used in this study is : **Indicators for PEP ecopassport® - PCR 3 - 2015**

The mandatory indicators are :

GWP (Global Warming Potential) :

This indicator is used to calculate the global warming potential caused by emissions in the air contributing to the greenhouse effect. It is expressed in **kg CO2 eq**. The calculation methodology comes from the IPCC (International Panel of Climate Change, US, 2007), and we used a 100-year horizon. (IPCC 2007 method via CML, GWP 100).

ODP (Ozone Depletion) :

This indicator is used to calculate the contribution of atmospheric emissions to the depletion of the stratospheric ozone layer. It is expressed in **kg CFC-11 eq**. The calculation methodology comes from the WMO (World Meteorological Organization, CML 2012).

A (Acidification for soil and water) :

This indicator is used to calculate the acidification of the soil and water. It is expressed in **kg SO2-eq**. The calculation methodology was developed by Huijbregts (CML, 2012).

EP (Eutrophication) :

This indicator is used to calculate the eutrophication (enrichment with nutrients) of oceans and lakes by effluent. It is expressed in **kg PO43-eq**. Eutrophication of water courses results from excessive enrichment with nutrient molecules (organic molecules) in the environment. Phosphorus, nitrogen, carbon and potassium allow the development of algae and aquatic species that can lead to a reduction in the oxygen level and an unbalanced biocoenosis. The calculation methodology was developed by Heijungs et al. 1992 (CML, 2012).

POCP (Photochemical Oxidation) :

This indicator, expressed in **kg C2H4-eq**, is used to calculate the amount of ozone produced in the troposphere due to the action of solar radiation on oxidising gas emissions (known as summer smog; see summer peak ozone levels). The calculation methodology was developed by Jenkin & Hayman - Derwent et al. (CML, 2012).

ADPe (Depletion of Abiotic Resources - Elements) :

This indicator is used to calculate the depletion of non-renewable mineral resources by taking into account the extent of natural reserves. It is expressed in equivalents of kilograms of antimony (**kg Sb-eq**). The calculation methodology was developed by Oers et al. (CML, 2012).

EP (Total use of primary energy) :

This indicator is used to calculate the primary energy consumption during the life cycle of the product. It is expressed in **MJ**.

NUFW (Net use of fresh water) :

This indicator represents the net consumption of fresh water used for the system. It is expressed in **m3**. In EIME, fresh water is broken down into river, lake, underground and surface water, as well as water of unspecified origin. Water extracted and discharged into these environments with the same quality level is not covered by this indicator.

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