PRODUCT ENVIRONMENTAL PROFILE

Schneider Electric

FRONT FLOW CHILLED WATER UNITS

PRODUCT FAMILY FWCV (200-500 KW)

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PEP is compliant with EN 50693. The elements of the present PEP cannot be compared with elements from another program.	
Document in compliance with ISO 14025: 2010 « Environmental labels and declarations. Type III environmental declarations »	

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1. COMPANY

Uniflair S.p.a. is a company with a sole shareholder owned and directed by Schneider Electric SE. It is specialised in precision cooling and raised technical floors, founded 25 years ago, and continues today in Schneider Electric, thanks to constant attention to innovation, product quality and technical support.

The ISO 9001, ISO 14001 and ISO 50001 certifications, in respect of the highest production and environmental standards, the care in the design of the machines, the flexibility of the solution and the simplicity of installation are the elements for which the Uniflair-Schnieider Electric cooling division has achieved a prominent position, among the world leaders in the sector, with exports to all over the world.

The synergies with Schneider Electric solutions for automation and control, physical infrastructure for Data Center, electrical distribution and energy efficiency add to the cooling division all the advantages of the integrated solution: the union of technology, functionality and design to give the data center and soul, intelligence and efficiency.

The cooling division of Schneider Electric is specialized to develop, design and assemble cooling products for datacenter and mission critical applications.

Based on the merge of multiple brands, operating since more than 40 years in the business, the cooling division has been established in 2011 and it is based on 3 global production sites, located in Italy, China and India, 4 design centers, based in USA, Italy, India and China and 4 testing areas and locations.

Leveraging on the wide product ranges and the long technical expertise, Schneider Electric cooling is one of the top 3 players in mission critical business.

The product is manufactured in Conselve, Padova, Italy, by Uniflair SpA. As per Chamber of Commerce survey dated 11/06/2021 issued by the Chamber of Commerce, the Uniflair company is wholly owned by Schneider Electric.

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2. PRODUCT DESCRIPTION

FWCV is a front-flow chilled water conditioner consisting of 1 or 2 modules, each equipped with chilled water coil, fans and chilled water valve. Hot-dip galvanised sheet steel riveted for the frame, switch cabinet frame and internal parts of the unit frame. Continuous monitoring with integrated inlet and outlet water temperature sensors and integrated supply and return air temperature sensor.

This study examines the FWCV40L2A air conditioner, the largest and most complex of the family.

It should be noted that the FWCV40L2A was not produced in 2022. The product was developed between 2022 and 2023 and launched in the market in 2023 but not yet distributed. Therefore, it is considered appropriate to indicate 2023 as the reference year.

TECHNICAL CHARACTERISTICS

Table 1 shows technical data of the Conditioner FWCV40L2A at the typical use scenario condition RAT 37°C/25°C; water 20/30.

Table 1: Technical description of FWCV40L2A at the typical use scenario condition.

Technology	Air/Water
Reversible/Non-reversible	Non-reversible
Cooling capacity	475,1 kW
Total power absorbed	28,9 kW
EER	16,4 kW/kW

PRODUCT COMPOSITION

The list of individual components and their respective functional groups is shown in table 2. All components have been considered in the assessment.

Plastics as % of weight		**Metals as % of weight**		**Other as % of weight**	
Polypropylene	0,4%	Steel	66,9%	Wood	5,1%
Polystyrene	0,1%	Copper	11,1%	Electrical material	1,5%
Polyethylene	0,1%	Aluminium	7,0%	Cardboard	0,3%

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ABS	<0,0%	Cast iron	6,0%	Kevlar	<0,0%
PC	<0,0%	Steel, stainless	0,9%	SBR	<0,0%
		Brass	0,6%		
Total plastics	**0,6%**	**Total metals**	**92,5%**	**Total other**	**6,9%**

Table 2: Material compositions of FWCV40L2A.

The total mass of the reference product is 4.196,81 kg, 230,78 kg of which are packaging constituted mainly by wood, followed by cardboard and polystyrene.

Figure 2 presents a distribution of the materials including the packaging.

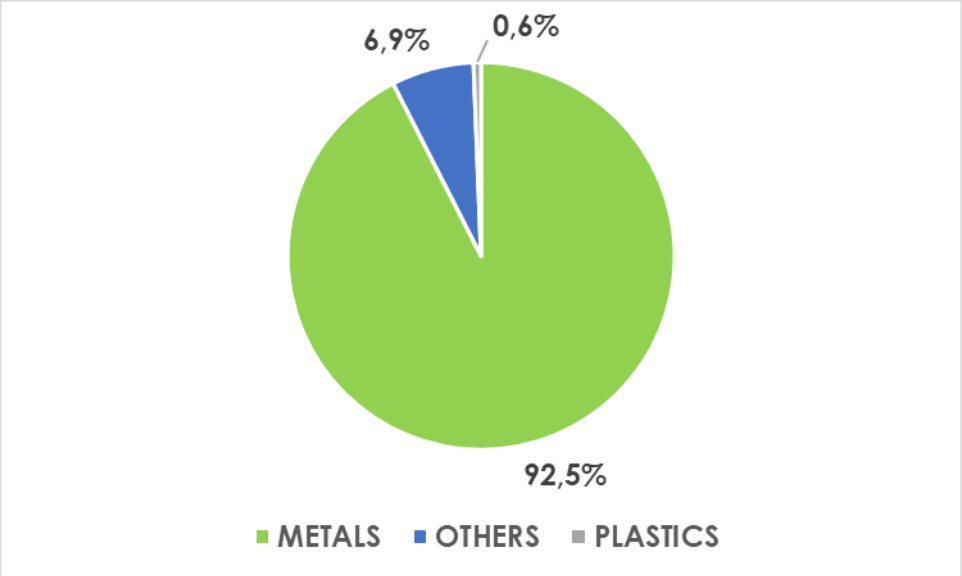

Figure 1: FWCV40L2A Material composition.

The FWCV40L2A machine does not contain substances classified as SVHC (Substance of Very High Concern for Authorization) in concentrations higher than the threshold limits, established in the SVHC list of substances (Candidate List of SVHC).

The product from Schneider Electric group complies 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.

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3. METHODOLOGY

The methodology followed as a reference standard is that of the Life Cycle Assessment (LCA); "The LCA deals with environmental aspects and potential environmental impacts (for example the use of resources and the environmental consequences of releases) throughout the life cycle of the product from the acquisition of raw materials through manufacturing and use up to end-of-life treatment, recycling and final disposal (ie from cradle to grave) [ISO 14040: 2006/Amd 1:2020].

LCA is divided into 4 basic phases:

- PHASE 1: Goal and scope definition;
- PHASE 2: Life cycle inventory;
- PHASE 3: Impact assessment;
- PHASE 4: Interpretation.

Simapro 9.4.0.2 software, specifically designed to carry out life cycle analyses, was used to process the data and results. This software is accompanied by a series of databases: for the study in question, Ecoinvent 3.8 was adopted.

Table 3: Methodology information.

Geographic validity	Europe
Reference year	The reference time period is 2023
Database used:	Ecoinvent 3.8
Software:	SimaPro 9.4.0.2

FUNCTIONAL UNIT

The functional unit is the reference unit for quantifying the environmental impacts along the life cycle of the product, with reference to the type of service that the product itself provides. The main task of the functional unit is to define a reference unit to which to allocate all the inputs and outputs of the LCA study. A correct functional unit must consider:

- The actual function of the product;
- The level of performance achieved, calculated according to standards applied to the product analysed;

- The useful life of the product itself (Reference Life Time - RLT).

According to PSR-0013-ed2.0-EN-2019 12 06 (Specific Rules for thermodynamic generators with electric compression for space heating and / or cooling and / or the production of domestic hot water) the functional unit must:

To produce 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.

The inputs and outputs of the processes related to the product life cycle, i.e. the production of the materials in the product, including packaging, the assembly process, distribution, installation, use phase, dismantling and the final destination of the materials at the end of life, are considered for the calculation of the potential environmental impacts, which are allocated to the production of 1 KW of cooling.

SYSTEM BOUNDARIES

The system boundaries represent the limits that identify which processes are to be considered or excluded within the life cycle analysis. The environmental information included in the PEP cover all the stages of the life cycle, from cradle to grave.

Table 4: Life Cycle Stages included.

Manufacturing stage			Distribution stage	Installation stage	Use stage							End of life stage			
Supply of Raw Materials	Transport	Manufacture	Transport	Installation process	Use	Maintenance	Repair	Replacement	Rehabilitation	Energy use during usage of the building	Water use during usage of the building	Demolition	Transport	Waste treatment	Disposal
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4

Manufacturing stage

The production process in Conselve, Italy is mainly an assembling process where the machine is assembled and the circuit is tested.

The company draws the energy from the Italian network, using only electrical energy for the production processes. The model has been implemented using Ecoinvent database:

- Residual Energy Mix 2021(AIB). The use of 2021 data is still considered representative as it is conservative compared to the value of kg CO2eq/kWh stated in the updated AIB report "2022 European Residual Mix".

Uniflair plant in Conselve, Padova, Italy is certified to the following ISO standards:

- ISO 14001 standard, with certification number 195539-A159-UK, version: No.1, Revision date: 15-JANUARY-2021, valid until July 2023;
- ISO 9001 with certification number IT303737, version: No.1, Issue date: 28-JANUARY-2021, valid until July 2023;
- ISO 50001 with certification number IND.20.9124/EN/U-27, version: No.2, Revision date: 28-SEPTEMBER-2021, valid until August 2023;
- ISO 45001 with certification number 196455-141-UK, version: No.1, Revision date: 6-SEPTEMBER-2022, valid until October 2025.

During the manufacturing stage the information about the provenance of the components and suppliers has been gathered from the company.

Distribution stage

The transport scenario suggested by the reference PCR was considered, as their specific destination is unknown. Considering a European-type scenario for the two products, a distance of 3.500 km by truck was considered for intra-continental transport as defined by the standard in section 2.5.3. The modelling in the software considered the total weight of the overall machine and the weight of the final packaging. The Ecoinvent dataset used is Transport, freight, lorry 16-32 metric ton, EURO4 {RoW}| transport, freight, lorry 16-32 metric ton, EURO4 | Cut-off, U.

Installation stage

During the installation phase, the product is moved in the final position, filled with 166,2 litres of water and connected to the system.
The handling phase has been modelled with the Ecoinvent dataset of a powerful machine used for handling activities: Machine operation, diesel, < 18.64 kW, low load factor {GLO}| market for | Cut-off, U.
This phase also considers the disposal of packaging.

Usage stage

During the usage phase the machine needs an energy consumption to guarantee the cooling capacity.
The energy consumption during the reference lifetime of the chiller to guarantee a cooling capacity equal to 475,1 kW at the working conditions required by the EN 14825 standard, has been evaluated considering the annual consumption with the climatic profile of Strasbourg. Schneider Electric uses UNICALC SOFTWARE, 2023 version 10.0.23. The software calculates the energy consumption considering the climate profile and the cooling capacity defined with the client and the working conditions (the machine works energy days 24 hours). The results reported an annual energy consumption of 253.164 kWh, which becomes 5.569.608 over the Reference Life Time of 22 years.

For the modelling of the energy mix, since the product has not yet been sold, the European energy mix was taken into account, namely Electricity, medium voltage {RER}| market group for | Cut-off, U. This choice was made in order not to tie the impacts of this phase to a variable statistic in the event that sales estimates referring to similar products already sold were considered.

Moreover, the use phase considers the substitution of the air filters every 4 months, namely 3 times per year. Considering a reference service life of 22 years, 1.716 filters are to be changed, equal to 3.128 kg. The disposal of old filters was also considered.

End of Life stage

For the transport of the machines to specialised treatment plants, a distance of 1000 km was used.
The products that will be recycled follows the WEEE disposal processes of:

1. Decontamination, crushing and sorting of the various materials;
2. Specific processing of the electronics components, cable;
3. Recycling of other materials (with benefits outside of the burdens – module D)
4. Incineration without energy recovery and disposal of hazardous materials.

For the information related to the treatment process of WEEE, reference has been made to the online publications of SAFE Group, which includes several consortia for the management and treatment of the end of life of WEEE in Italy. In particular, Ridomus, a consortium included in SAFE Group, published a study on the management of professional refrigeration machines and air conditioners. The latter indicates an energy consumption of 130 kWh/ton for securing, dismantling and shredding the materials, which has been included in the end of life modelling.

The energy model used for the pre-treatment phase reflects the European scenario.
The electricity mix of the end of life depends on the chosen datasets, which are representative of the European (RER) and Rest of World (RoW) contexts.

As far as the destination of end-of-life materials is concerned, the % collection rates suggested by EN 50693 and given in PCR-ed4-EN-2021 09 06 in Appendix D were taken.

The following table shows the % rates and datasets used for the recycling, incineration and landfill disposal of the unit components at the end of life.

Material	Ecoinvent Module		
	Recycling	Incineration	Landfill
Steel and Cast iron	80%	-	20%
Copper	60%	-	40%
Aluminium	70%	-	30%
Mixed plastics and rubber	-	50%	50%
Electrical material	-	0%	100%
Polypropylene and ABS	20%	40%	40%
Water	100%	-	-

Table 5: scenario % rates of recycling, incineration and landfill disposal of FWCV40L2A components.

Geographical representativeness: Raw materials & Manufacturing: [Europe / Global]; Assembly: [Italy]; Distribution / Use: [Europe]; specific destination EoL: [Europe/Global].

Technological representativeness: Materials and processes data are specific for the production of FWCV40L2A manufactured in Conselve.

4. RESULTS

The PEP is drawn up under the assumption 1 kW of 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 cooling capacity in kW.

Table 5: Environmental indicators.

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
Climate change GWP	Kg CO_2eq	5,63E+01	5,31E+00	8,16E-01	4,70E+03	1,69E+01	4,78E+03
Climate change-Fossil GWP	Kg CO_2eq	5,64E+01	5,31E+00	1,65E-01	4,54E+03	1,68E+01	4,62E+03
Climate change-Biogenic GWP	Kg CO_2eq	-1,44E-01	2,86E-03	6,49E-01	1,49E+02	1,47E-02	1,49E+02
Climate change-Land use and land use change GWP	Kg CO_2eq	6,76E-02	2,20E-03	1,35E-03	1,07E+01	1,41E-01	1,09E+01
Ozone depletion ODP	Kg CFC11 eq	3,37E-06	1,15E-06	1,42E-08	2,26E-04	3,53E-06	2,34E-04
Acidification AP	Mol H+ eq.	9,77E-01	2,69E-02	7,44E-04	2,44E+01	1,20E-01	2,56E+01
Eutrophication, freshwater EP-freshwater	Kg P eq.	7,86E-02	3,99E-04	4,51E-05	4,52E+00	5,62E-03	4,61E+00
Eutrophication marine EP-marine	Kg N eq.	8,44E-02	9,12E-03	2,01E-04	4,24E+00	2,69E-02	4,36E+00
Eutrophication, terrestrial EP-terrestrial	Mol N eq.	1,02E+00	9,96E-02	1,97E-03	3,70E+01	2,46E-01	3,83E+01
Photochemical ozone formation POCP	Kg NMVOC eq.	3,06E-01	2,84E-02	5,26E-04	1,01E+01	6,39E-02	1,05E+01
Depletion of abiotic resources fossil fuels ADPF	MJ	6,18E+02	7,88E+01	1,97E+00	9,69E+04	2,87E+02	9,79E+04
Depletion of abiotic resources ADPE	Kg Sb eq.	1,99E-02	1,82E-05	6,42E-07	1,10E-02	1,56E-04	3,10E-02
Water use	m^3 world eq deprived	2,15E+01	2,72E-01	6,12E-02	1,07E+03	9,87E+00	1,11E+03

Table 6: Additional environmental impacts.

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
PM	Disease incident	4,90E-06	4,66E-07	1,22E-08	7,41E-05	1,48E-06	8,10E-05
IRP	kBq U235 eq.	3,95E+00	3,62E-01	1,27E-02	2,65E+03	4,80E+00	2,66E+03
ETP-fw	CTUe	7,37E+03	6,77E+01	6,79E+00	5,06E+04	6,21E+02	5,87E+04
HTP-nc	CTUh	1,10E-05	6,57E-08	2,44E-09	4,27E-05	4,87E-07	5,42E-05
HTP-c	CTUh	3,05E-07	2,01E-09	9,74E-11	1,44E-06	4,24E-08	1,78E-06
SQP	Pt	4,39E+02	5,34E+01	3,17E+00	1,42E+04	2,10E+02	1,49E+04

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Table 7: Use of resources.

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
PERE	MJ	7,35E+01	9,08E-01	8,26E-01	1,72E+04	4,28E+01	1,73E+04
PERM	MJ	9,07E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,07E+00
PERT	MJ	8,26E+01	9,08E-01	8,26E-01	1,72E+04	4,28E+01	1,73E+04
PENRE	MJ	6,45E+02	8,37E+01	2,11E+00	1,02E+05	3,01E+02	1,03E+05
PENRM	MJ	11,5449097	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,15E+01
PENRT	MJ	6,57E+02	8,37E+01	2,11E+00	1,02E+05	3,01E+02	1,03E+05
SM	Kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	6,09E-01	9,02E-03	1,79E-03	8,24E+01	2,89E-01	8,33E+01

Table 8: Waste production.

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
HWD	kg	1,79E-02	2,08E-04	5,80E-06	3,57E-02	3,79E-03	5,76E-02
NHWD	kg	1,45E+01	4,01E+00	3,17E-02	3,31E+02	6,70E+00	3,57E+02
RWD	kg	1,58E-03	5,15E-04	6,56E-06	7,13E-01	1,58E-03	7,17E-01
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	1,95E-01	0,00E+00	5,91E-01	5,27E+00	6,27E+00	1,23E+01
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Legend:
GWP = 100-year global warming potential;
ODP = ozone depletion potential in the stratosphere;
POCP = potential for the formation of photochemical oxidants of tropospheric ozone;
AP = potential for acidification of the soil and water;
EP = eutrophication potential;
ADPE = potential for depletion of abiotic non-fossil resources;
ADPF = potential for depletion of abiotic fossil resources.
PERE = Use of renewable primary energy excluding primary renewable energy resources used as raw materials;
PERM = Use of renewable energy resources as raw materials;
PERT = Total use of primary renewable energy resources;
PENRE = Use of non-renewable primary energy resources excluding primary non-renewable energy resources used as raw materials;
PENRM = Use of non-renewable primary energy resources as raw materials;
PENRT = Total use of non-renewable primary energy resources;
SM = Use of secondary materials;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Use of fresh water.
HWD = Hazardous waste disposed of;
NHWD = Non-hazardous waste disposed of;
RWD = Radioactive waste disposed of;
CRU = Components for reuse;

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MFR = Materials for recycling;
MER = Materials for energy recovery;
EEE = Electric energy exported.
EET = Thermal energy exported.

5. EXTRAPOLATION RULES

The PEP was drawn up under the assumption 1 kW of 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 cooling capacity in kW.

Extrapolation coefficients are given for the environmental impact of the functional unit, i.e. the emission of 1 kW 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.

The FWCV (200-500 kW) family includes the following units:

- FWCV36L1A
- FWCV36L1F
- FWCV36L1H
- FWCV36L2A
- FWCV36L2F
- FWCV36L2H
- FWCV40L1A
- FWCV40L1F
- FWCV40L1H
- FWCV40L2A
- FWCV40L2F
- FWCV40L2H

This study analyses the environmental performance of a specific FWCV unit. The extrapolation coefficients for calculating the impacts of the other family-specific products are presented below.

Table 9: Extrapolation rules for the reference product.

Typical use scenario condition	Product	Manufacturing stage	Distribution stage	Installation	Use stage	End of life stage
RAT 37°C/25; 30/20 water	FWCV36L1A	0,48	0,48	1,00	0,34	0,46
	FWCV36L1F	0,48	0,48	1,00	0,34	0,46
	FWCV36L1H	0,48	0,48	1,00	0,34	0,46

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	FWCV36L2A	0,91	0,91	1,00	0,67	0,91
	FWCV36L2F	0,91	0,91	1,00	0,67	0,91
	FWCV36L2H	0,91	0,91	1,00	0,67	0,91
	FWCV40L1A	0,53	0,53	1,00	0,50	0,51
	FWCV40L1F	0,53	0,53	1,00	0,50	0,51
	FWCV40L1H	0,53	0,53	1,00	0,50	0,51
	FWCV40L2A	**1,00**	**1,00**	**1,00**	**1,00**	**1,00**
	FWCV40L2F	1,00	1,00	1,00	1,00	1,00
	FWCV40L2H	1,00	1,00	1,00	1,00	1,00

Table 10: Extrapolation rules for the reference product per functional unit.

Typical use scenario condition	Product	Manufacturing stage	Distribution stage	Installation	Use stage	End of life stage
RAT 37°C/25; 30/20 water	FWCV36L1A	1,19	1,19	2,47	0,84	1,14
	FWCV36L1F	1,19	1,19	2,47	0,84	1,14
	FWCV36L1H	1,19	1,19	2,47	0,84	1,14
	FWCV36L2A	1,13	1,13	1,23	0,83	1,12
	FWCV36L2F	1,13	1,13	1,23	0,83	1,12
	FWCV36L2H	1,13	1,13	1,23	0,83	1,12
	FWCV40L1A	1,05	1,05	2,00	1,00	1,02
	FWCV40L1F	1,05	1,05	2,00	1,00	1,02
	FWCV40L1H	1,05	1,05	2,00	1,00	1,02
	FWCV40L2A	1,00	1,00	1,00	1,00	1,00
	FWCV40L2F	1,00	1,00	1,00	1,00	1,00
	FWCV40L2H	1,00	1,00	1,00	1,00	1,00

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6. REFERENCES

[1] ISO 14040: 2006/Amd 1:2020, Environmental management - Life cycle assessment - Principles and reference framework.

[2] ISO 14044: 2006/Amd 1:2017+Amd 2:2020, Environmental management - Life cycle assessment - Requirements and guidelines.

[3] UNI EN ISO 14025: 2010, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

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

[5] PCR-ed4-EN-2021 09 06 - Product Category Rules for Electrical, Electronic and HVAC-R Products.

[6] PSR-0013-ed2.0-EN-2019 12 06 (Specific Rules for thermodynamic generators with electric compression for space heating and/or cooling and/or the production of domestic hot water)

[7] PEP general instructions ed4.1 EN 2017 10 17.

[8] LCA Study Life cycle analysis for air conditioning and refrigeration products for commercial and collective residential buildings. Product families FWCV, L*AV, I*AV, I*EV, I*WV, InRow. UNIFLAIR S.P.A. July 2023.

[9] Öko-Institut (2022). Support Contract for an Evaluation and Impact Assessment for Amending Regulation (EU) No 517/2014 on Fluorinated Greenhouse Gases: Final Report. CLIMA.A2/ETU/2019/0016.

[10] Schwarz et al. 2011: Schwarz, W., Gschrey, B., Leisewitz, A., Herold, A., Gores, S. Papst, I., Usinger, J., Oppelt, D., Croiset, I, Pedersen, P.-H, Colbourne, D. , Kauffeld, M., Kaar, K., Lindborg, A. (2011). Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases: Final Report.