PRODUCT ENVIRONMENTAL PROFILE

Schneider Electric

DIRECT EXPANSION UNITS

PRODUCT FAMILY LDAV/LUAV/LDWV/LDEV (50-140 KW)

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Independent verification of the declaration and data, in compliance with ISO 14025: 2010	
Internal: ☐	External: ■
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain)	
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 Zhuhai, Guangdong, China, by Uniflair (Zhuhai) Electrical Appliance Manufacturing Co., Ltd. The full address of the manufacturing site is 5 Chuang Ye West Rd, Liangang Industry Park – Jin Wan District, Zhuhai, GuangDong, China.

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2. PRODUCT DESCRIPTION

The document aims to present the environmental profile of the direct expansion units of the family of Conditioners LDAV-LUAV-LDEV-LDWV (50-140 KW), for IT and mission critical applications. In particular, the reference product LDAV3822A with the condensing unit OCC3301AC (x2) is studied, as it represents the biggest and most complex product of its family.

LDAV-LUAV-LDEV-LDWV conditioners (50-140 kW) are direct expansion units with downflow and upflow configuration, scroll compressors and EC backward curved fans. Schneider Electric conditioners reshape cooling in mission critical applications and support the customer towards a new concept of green cooling, saving energy and enabling a planet conscious approach. Reduced energy consumption thanks to the latest generation of fixed-speed compressors and EC fan technology, and further improved savings potential thanks to precise control of the supply air temperature comply with ASHRAE recommendations. Direct freecooling operation further increases efficiency.

The units LDAV-LUAV (Downflow and Upflow air cooled) are combined with two external condensing unit, whereas the units LDEV (Energy saving conditioners) and LDWV (Water cooled) with two external dry coolers. There can be several outdoor units combined with a conditioner. This study examines the unit LDAV3822A with OCC3301AC outdoor condensing unit, chosen as the worst case in terms of energy consumption.

TECHNICAL CHARACTERISTICS

Table 1 shows technical data of the Conditioner LDAV3822A at the typical use scenario condition RAT 24°C; Outside air temperature 35%; Air temperature at unit outlet 12,4 °C.

Table 1: Technical description of LDAV3822A + OCC3301AC (x2) at the typical use scenario condition.

Technology	Air/air
Reversible/Non-reversible	Non-reversible
Cooling capacity	104,3 kW
Total power absorbed	44,4 kW
EER	2,3 kW/kW
Type of refrigerant	R410A
Refill threshold	2%

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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	1,3%	Steel	48,6%	Electrical material	5,7%
PVC	0,1%	Aluminium	16,8%	Wood	3,7%
ABS	<0,0%	Copper	13,7%	Cardboard	1,7%
Polycarbonate	<0,0%	Cast iron	7,9%	Rubber	<0,0%
Polyethylene	<0,0%	Steel, stainless	0,4%		
		Brass	0,1%		
		Silver	<0,0%		
Total plastics	**1,4%**	**Total metals**	**87,5%**	**Total other**	**11,1%**

Table 2: Material compositions of LDAV3822A+condensing unit.

The total mass of the reference product is 1.435,13 kg (including the condensing unit), 86,60 kg of which are packaging constituted mainly by wood, followed by cardboard and polypropylene.

The condensing unit weights 225 kg and is constituted by 70% aluminium, 23% copper and 6% steel. The LDAV model requires working with 2x condensing units.

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

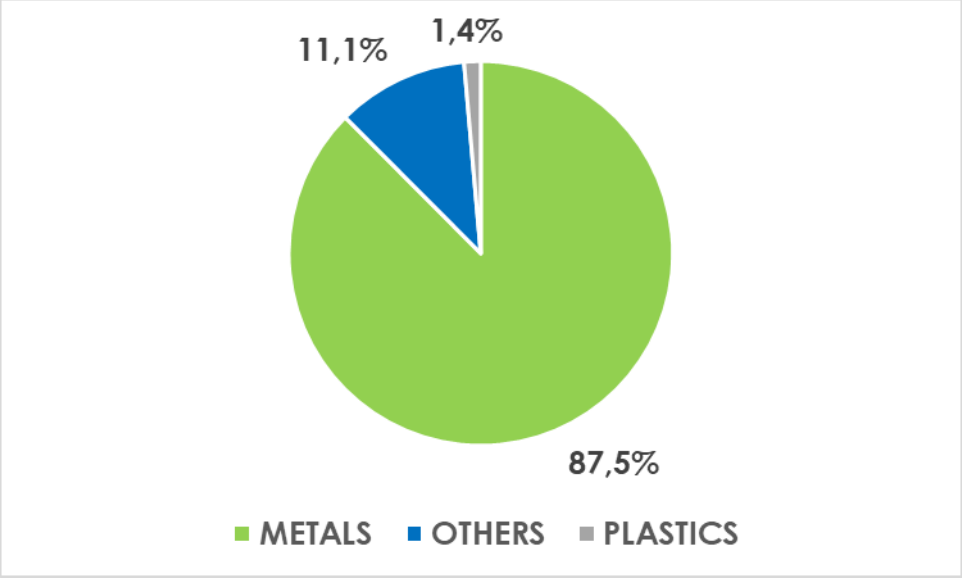

Figure 1: LDAV3822A+OCC3301AC (x2) Material composition.

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The LDAV3822A+OCC3301AC 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.

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	Global
Reference year	The reference time period is 2022
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 Zhuhai, China, is mainly an assembling process where the machine is assembled, the refrigerant circuit is filled 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 the following Ecoinvent databases:

- Energy from the grid: Electricity, medium voltage {CSG}| market for | Cut-off, U;
- Energy from photovoltaic: Electricity, low voltage {CN-GD}| electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted | Cut-off, U.

Uniflair plant in Zhuhai, China, is certified to the following ISO standards:

- ISO 14001 standard, with certification number CN044410, version: No.1, Revision date: 18-JULY-2023, valid until 30-JULY-2026;
- ISO 9001 with certification number CN044411, version: No.1, Revision date: 18-JULY-2020, valid until 30-JULY-2026;
- ISO 45001 with certification number CN044412, version: No.1, Revision date: 18-JULY-2020, valid until 30-JULY-2026.

Data on the manufacturing process and the bill of materials has been gathered from the company.

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Distribution stage

The actual transport distance was taken, as their specific destination was known. A distance of 2.722 km by container ship was considered. 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, sea, container ship {GLO}| transport, freight, sea, container ship | Cut-off, U.

Installation stage

During the installation phase, the product is moved in the final position, connected to the system and the refrigerant circuit if filled.
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. The modelling for the R410a refrigerant gas was carried out using the dataset Refrigerant R134a {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 104,3 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 238.871 kWh, which becomes 5.255.162 kWh over the Reference Life Time of 22 years. For the modelling of the energy mix specific data was used according to the countries of destination in 2022 and their % incidence.
During the usage phase the machine does not have any refrigerant leaks, because the company guarantees to produce a machine with a gas circuit that do not have any leaks. In addition, during the transportation the company pays attention to oxidation and any problem at the gas circuit. This can avoid any leak of refrigerant during the lifetime. Although chillers are designed to limit refrigerant

leaks, they can occur. At Uniflair, a campaign is underway involving, among others, technicians involved in the routine maintenance of chillers to investigate this aspect. At present, as primary data is not available, a 2% loss and consequent refill has been 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, 264 filters are to be changed. 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 countries of distribution in 2022.

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 refrigerant gas was modelled considering a scenario of recovery and incineration with % shares of 65% and 35% respectively. These data were taken from the 2022 report "Support contract for an Evaluation and Impact assessment for amending Regulation (EU) No 517/2014 on fluorinated greenhouse gases" prepared by the research institute Öko-Institut, where on page 28 a recovery scenario for refrigerant gases in the "industrial refrigeration - large" sector of 65% is presented. The 2011 report "Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated

greenhouse gases" by various European research institutes also supports this scenario. On page 188, it is reported that "recovery rates are relatively high, up to 70 per cent in larger plants and for equipment subject to systematic maintenance. Barrault and Clodic (2008) estimate that 2% or less of the refrigerant is recovered from small equipment at end-of-life. For larger equipment, they estimate a recovery rate of 70-80%" (Schwarz et al., 2011).

The electricity mix of the end of life depends on the chosen datasets, which are representative of a Global (RoW) context.

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, Cast iron, Brass	80%		20%
Copper	60%		40%
Aluminium	70%		30%
Mixed plastics and rubber		50%	50%
Electrical material		0%	100%
Polypropylene and ABS	20%	40%	40%
Refrigerant gas	65%	35%	

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

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

Technological representativeness: Materials and processes data are specific for the production of LDAV3822A manufactured in Zhuhai.

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	1,50E+02	3,53E-01	1,60E+01	3,80E+04	4,40E+01	3,82E+04
Climate change-Fossil GWP	Kg CO_2eq	1,49E+02	3,53E-01	1,52E+01	3,77E+04	4,37E+01	3,79E+04
Climate change-Biogenic GWP	Kg CO_2eq	8,18E-01	-4,25E-05	7,78E-01	1,45E+02	6,71E-03	1,47E+02
Climate change-Land use and land use change GWP	Kg CO_2eq	2,39E-01	2,57E-04	1,33E-02	1,04E+02	3,02E-01	1,05E+02
Ozone depletion ODP	Kg CFC11 eq	8,12E-06	7,00E-08	1,90E-04	1,63E-03	7,09E-06	1,84E-03
Acidification AP	Mol H+ eq.	2,26E+00	1,15E-02	1,87E-02	1,27E+02	2,99E-01	1,30E+02
Eutrophication, freshwater EP-freshwater	Kg P eq.	1,75E-01	1,15E-05	8,77E-04	2,51E+01	1,33E-02	2,53E+01
Eutrophication marine EP-marine	Kg N eq.	2,28E-01	2,82E-03	3,19E-03	2,58E+01	6,24E-02	2,61E+01
Eutrophication, terrestrial EP-terrestrial	Mol N eq.	2,99E+00	3,13E-02	3,23E-02	2,25E+02	5,85E-01	2,29E+02
Photochemical ozone formation POCP	Kg NMVOC eq.	7,42E-01	8,11E-03	1,22E-02	6,66E+01	1,55E-01	6,75E+01
Depletion of abiotic resources fossil fuels ADPF	MJ	1,65E+03	4,51E+00	3,75E+01	4,48E+05	6,41E+02	4,51E+05
Depletion of abiotic resources ADPE	Kg Sb eq.	4,28E-02	4,83E-07	5,58E-05	5,01E-02	3,14E-04	9,32E-02
Water use	m^3 world eq deprived	4,91E+01	7,77E-03	1,59E+00	5,05E+03	1,89E+01	5,12E+03

Table 6: Additional environmental impacts.

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
PM	Disease incident	1,45E-05	1,10E-08	2,44E-07	2,28E-04	3,67E-06	2,46E-04
IRP	kBq U235 eq.	8,26E+00	2,04E-02	2,08E-01	1,46E+02	8,93E+00	1,64E+02
ETP-fw	CTUe	1,71E+04	2,76E+00	1,19E+02	2,87E+05	1,68E+03	3,06E+05
HTP-nc	CTUh	2,21E-05	1,78E-09	9,06E-08	2,52E-04	1,21E-06	2,75E-04
HTP-c	CTUh	5,74E-07	2,12E-10	4,97E-09	5,64E-06	8,62E-08	6,30E-06
SQP	Pt	2,84E+03	6,06E-01	3,09E+01	3,11E+04	4,15E+02	3,43E+04

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Table 7: Use of resources.

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
PERE	MJ	3,76E+02	3,05E-02	8,90E+00	1,88E+04	8,96E+01	1,93E+04
PERM	MJ	7,21E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,21E+01
PERT	MJ	4,48E+02	3,05E-02	8,90E+00	1,88E+04	8,96E+01	1,94E+04
PENRE	MJ	1,71E+03	4,79E+00	4,03E+01	4,93E+05	6,74E+02	4,96E+05
PENRM	MJ	4,49E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,49E+01
PENRT	MJ	1,75E+03	4,79E+00	4,03E+01	4,93E+05	6,74E+02	4,96E+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	1,41E+00	2,63E-04	4,31E-02	1,75E+02	5,82E-01	1,77E+02

Table 8: Waste production.

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
HWD	kg	3,67E-02	4,21E-06	8,37E-05	3,35E-01	1,25E-02	3,84E-01
NHWD	kg	3,32E+01	1,11E-02	3,04E-01	3,10E+03	1,36E+01	3,15E+03
RWD	kg	3,72E-03	3,13E-05	7,95E-05	1,01E-01	3,01E-03	1,07E-01
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	6,13E-01	0,00E+00	6,76E-01	7,49E+00	9,19E+00	1,80E+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 LDAV/LUAV/LDWV/LDEV (50-140 KW) family includes the following units:

- LDAV1511A
- LDAV1911A
- LDAV2422A
- LDAV2522A
- LDAV2722A
- LDAV3822A
- LUAV1511A
- LUAV1911A
- LUAV2422A
- LUAV2522A
- LUAV2722A
- LUAV3822A
- LDEV2422A
- LDEV2422A
- LDEV2722A
- LDEV2722A
- LDWV2422A
- LDWV2422A
- LDWV2522A
- LDWV2522A
- LDWV2722A
- LDWV2722A
- LDWV3822A

The following is the list of the available condensing units and dry coolers:

- CAP5002P
- CAP6002P
- CAP7002P
- OCC2401AC
- OCC2601AC
- OCC3101AC

- OCC3301AC
- OCC3901AC
- OCC4702AC
- OCC5302AC
- OCC6202AC
- OCC6702AC
- OCC7702AC
- RAL3600P
- RAL5700P

This study analyses the environmental performance of a LDAV unit functioning with the specific condensing unit OCC2601AC. Since the internal unit can work with different condensing units, the extrapolation rules also study the extrapolation coefficients for the largest unit with the highest cooling capacity, i.e. LDAV3822A, with the different condensing units.

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Table 9: Extrapolation rules for the reference product with refrigerant R410A.

Typical use scenario condition	Unit + condensing unit/dry cooler	Manufacturing stage	Distribution stage	Installation	Use stage	End of life stage
RAT 24 °C/ Outside air temperature 35 °C. Air temperature at unit outlet 12.4 °C.	LDAV3822A + CAP5002P	0,98	0,98	1,00	0,76	0,98
	LDAV3822A + CAP6002P	0,93	0,93	1,00	0,72	0,93
	LDAV3822A + CAP7002P	1,00	1,00	1,00	0,67	1,00
	LDAV3822A + OCC2401AC (x2)	0,99	0,99	1,00	1,00	0,99
	LDAV3822A + OCC2601AC (x2)	1,00	1,00	1,00	0,96	1,00
	LDAV3822A + OCC3101AC (x2)	1,03	1,03	1,00	0,95	1,03
	LDAV3822A + OCC3301AC (x2)	**1,00**	**1,00**	**1,00**	**1,00**	**1,00**
	LDAV3822A + OCC3901AC (x2)	1,03	1,03	1,00	1,00	1,03
	LDAV3822A + OCC4702AC	0,99	0,99	1,00	0,94	0,99
	LDAV3822A + OCC5302AC	1,00	1,00	1,00	0,96	1,00
	LDAV3822A + OCC6202AC	1,03	1,03	1,00	0,95	1,03
	LDAV3822A + OCC6702AC	1,00	1,00	1,00	1,00	1,00
	LDAV3822A + OCC7702AC	1,03	1,03	1,00	1,00	1,03

	LDAV1511A + OCC3301AC	0,59	0,59	0,78	0,40	0,58
	LDAV1911A + OCC3301AC	0,62	0,62	0,78	0,56	0,61
	LDAV2422A + OCC3301AC (x2)	0,80	0,80	0,84	0,61	0,80
	LDAV2522A + OCC3301AC (x2)	0,89	0,89	1,00	0,60	0,89
	LDAV2722A + OCC3301AC (x2)	0,90	0,90	1,00	0,72	0,90
	LUAV1511A + OCC3301AC	0,59	0,59	0,78	0,40	0,58
	LUAV1911A + OCC3301AC	0,64	0,64	0,78	0,56	0,63
	LUAV2422A + OCC3301AC (x2)	0,79	0,79	0,84	0,61	0,78
	LUAV2522A + OCC3301AC (x2)	0,88	0,88	1,00	0,60	0,88
	LUAV2722A + OCC3301AC (x2)	0,89	0,89	1,00	0,72	0,88
	LUAV3822A + OCC3301AC (x2)	1,00	1,00	1,00	1,00	1,00
	LDEV2422A + RAL3600P	0,82	0,82	0,84	0,45	0,81
	LDEV2422A + RAL5700P	0,88	0,88	0,84	0,51	0,88
	LDEV2722A + RAL3600P	0,90	0,90	1,00	0,52	0,90
	LDEV2722A + RAL5700P	0,97	0,97	1,00	0,58	0,97

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	LDWV2422A + RAL3600P	0,77	0,77	0,84	0,55	0,77
	LDWV2422A + RAL5700P	0,84	0,84	0,84	0,67	0,84
	LDWV2522A + RAL3600P	0,87	0,87	1,00	0,50	0,86
	LDWV2522A + RAL5700P	0,93	0,93	1,00	0,60	0,93
	LDWV2722A + RAL3600P	0,87	0,87	1,00	0,64	0,86
	LDWV2722A + RAL5700P	0,94	0,94	1,00	0,73	0,93
	LDWV3822A + RAL5700P	1,03	1,03	1,00	0,93	1,04

Table 10: Extrapolation rules for the reference product per functional unit with refrigerant R410A.

Typical use scenario condition	Unit + condensing unit/dry cooler	Manufacturing stage	Distribution stage	Installation	Use stage	End of life stage
RAT 24 °C/ Outside air temperature 35 °C. Air temperature at unit outlet 12.4 °C.	LDAV3822A + CAP5002P	1,01	1,01	1,03	0,78	1,01
	LDAV3822A + CAP6002P	0,95	0,95	1,02	0,73	0,94
	LDAV3822A + CAP7002P	1,01	1,01	1,01	0,67	1,01
	LDAV3822A + OCC2401AC (x2)	0,97	0,97	0,98	0,98	0,97

	LDAV3822A + OCC2601AC (x2)	1,01	1,01	1,01	0,97	1,01
	LDAV3822A + OCC3101AC (x2)	1,03	1,03	1,00	0,95	1,03
	LDAV3822A + OCC3301AC (x2)	**1,00**	**1,00**	**1,00**	**1,00**	**1,00**
	LDAV3822A + OCC3901AC (x2)	1,02	1,02	0,99	0,99	1,02
	LDAV3822A + OCC4702AC	1,01	1,01	1,02	0,96	1,01
	LDAV3822A + OCC5302AC	1,01	1,01	1,01	0,97	1,01
	LDAV3822A + OCC6202AC	1,03	1,03	1,00	0,95	1,03
	LDAV3822A + OCC6702AC	1,00	1,00	1,00	1,00	1,00
	LDAV3822A + OCC7702AC	1,02	1,02	0,99	0,99	1,02
	LDAV1511A + OCC3301AC	1,21	1,21	1,60	0,82	1,20
	LDAV1911A + OCC3301AC	1,10	1,10	1,38	0,99	1,09
	LDAV2422A + OCC3301AC (x2)	1,16	1,16	1,22	0,89	1,16
	LDAV2522A + OCC3301AC (x2)	1,15	1,15	1,29	0,77	1,15
	LDAV2722A + OCC3301AC (x2)	1,09	1,09	1,21	0,87	1,09
	LUAV1511A + OCC3301AC	1,21	1,21	1,60	0,82	1,20

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	LUAV1911A + OCC3301AC	1,13	1,13	1,38	0,99	1,12
	LUAV2422A + OCC3301AC (x2)	1,14	1,14	1,22	0,89	1,14
	LUAV2522A + OCC3301AC (x2)	1,14	1,14	1,29	0,77	1,13
	LUAV2722A + OCC3301AC (x2)	1,07	1,07	1,21	0,87	1,07
	LUAV3822A + OCC3301AC (x2)	1,00	1,00	1,00	1,00	1,00
	LDEV2422A + RAL3600P	1,41	1,41	1,45	0,77	1,41
	LDEV2422A + RAL5700P	1,51	1,51	1,43	0,87	1,51
	LDEV2722A + RAL3600P	1,25	1,25	1,39	0,72	1,25
	LDEV2722A + RAL5700P	1,33	1,33	1,38	0,80	1,33
	LDWV2422A + RAL3600P	1,15	1,15	1,24	0,82	1,14
	LDWV2422A + RAL5700P	1,19	1,19	1,18	0,94	1,19
	LDWV2522A + RAL3600P	1,22	1,22	1,41	0,71	1,21
	LDWV2522A + RAL5700P	1,26	1,26	1,36	0,81	1,26
	LDWV2722A + RAL3600P	1,13	1,13	1,31	0,83	1,13
	LDWV2722A + RAL5700P	1,20	1,20	1,29	0,93	1,20

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	LDWV3822A + RAL5700P	1,04	1,04	1,01	0,94	1,05

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