

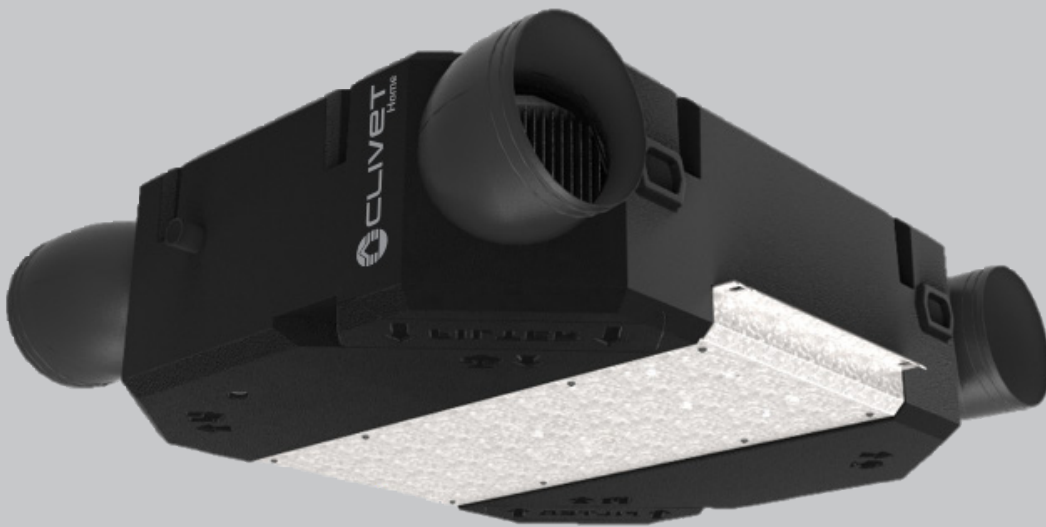


*Make up and purification unit  
with active thermodynamic  
recovery for indoor installation*

# ELFOFresh EVO

CPAN-YIN - SIZE 2 RANGE

TECHNICAL BULLETIN



SIZE	SIZE 2
COOLING CAPACITY KW	1,92

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# Features and benefits

## The role of ventilation

People spend over 90% of their time in closed environments: it is essential to maintain healthy and comfortable conditions throughout the year.

By insulating the building and installing efficient air conditioning systems it is possible to create or renovate buildings in order to achieve a very low energy consumption. This, however, makes it necessary to improve air quality as well:

- ▶ the indoor air must be renewed to prevent pollutants from “stagnating” and avoid the formation of mould
- ▶ Make-up air introduced from outdoors can be polluted with particles and other substances, so it is necessary to perform filtering and purifying operations before introducing it into the building
- ▶ The energy contained in the exhaust air can be recovered to reduce consumption, instead of wasting it by directly discharging it outdoors

Air renewal allows to always keep the home environment clean and comfortable: ELFOFresh EVO is the perfect solution to do this in an economical and eco-friendly way:

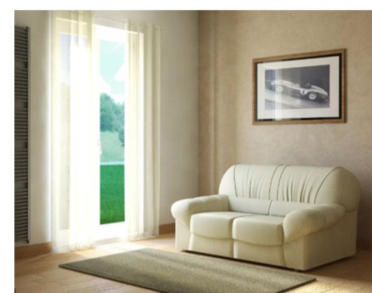
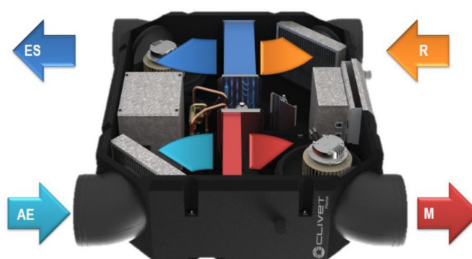
ELFOFresh EVO is the innovative air renewal and purification system, with active thermodynamic recovery and R32 refrigerant, ideal for new buildings, renovations, homes and offices between 90 m<sup>2</sup> and 250 m<sup>2</sup>.

The unit is designed to facilitate installation into false ceilings (it is only 290mm high)



## ELFOFresh EVO: the best solution for well-being and energy efficiency

ELFOFresh EVO uses active thermodynamic recovery, which guarantees a performance far superior to traditional technologies on the market. Its operation is easy: it renews, purifies and conditions the air in the house.



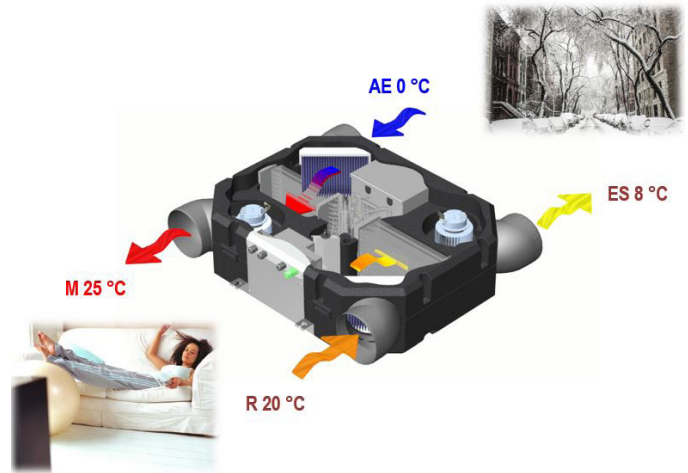
- R** = Indoor air extraction for thermodynamic heat recovery
- AE** = Fresh air from outdoors to be purified
- M** = Clean supply air to the building, with heating/cooling contribution to the room and stable humidity level
- ES** = Discharge air to outdoors

Three typical examples of operation:

**Winter**

ELFOFresh EVO recovers energy from the extracted air and uses it to warm up the air supplied to the room.

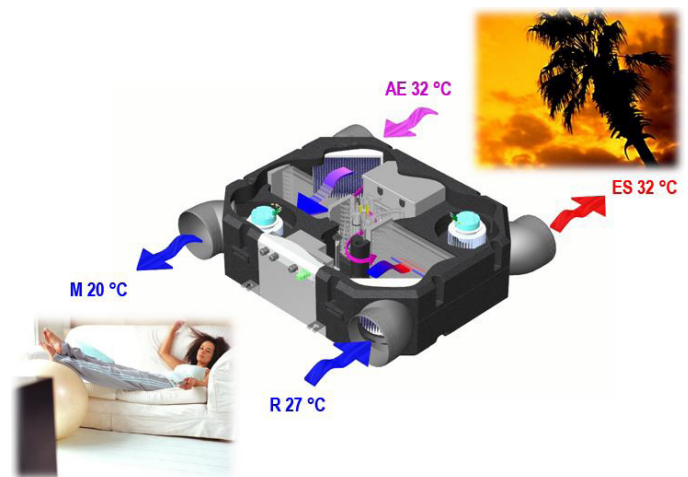
- ▶ For most of winter time the unit is able to cover part of the thermal load of the building, thus reducing the energy consumption of the primary heating system of the building.



**Summer**

ELFOFresh EVO cools the air entering the room by transferring heat to the exhaust air.

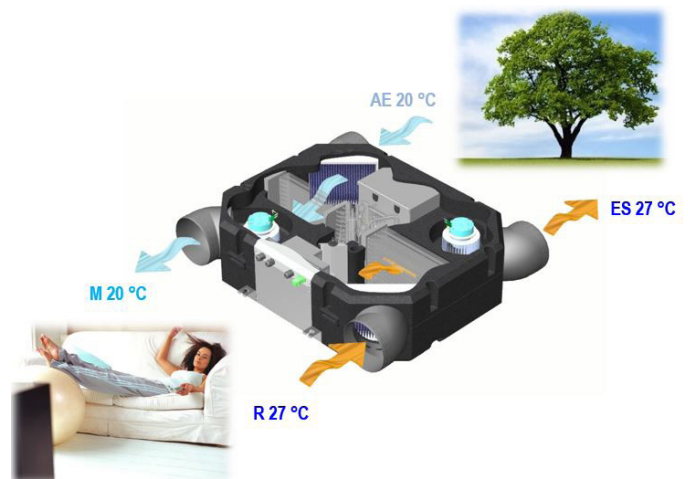
- ▶ Also during summer time, it is able to cover part of the cooling load of the house, thus reducing the use of the primary air conditioning system.
- ▶ In cooling mode, the unit automatically stabilizes the humidity level of the air supply.



**Mid-seasons**

ELFOFresh EVO introduces outdoor air without heating it or cooling it (Free-Cooling).

- ▶ ELFOFresh EVO replaces the air conditioning systems.





# Features and benefits

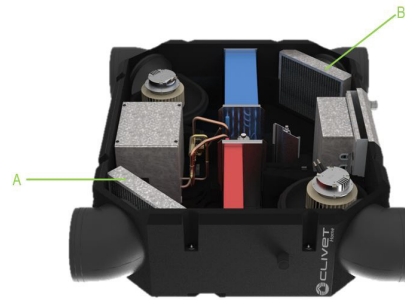
## The characteristics of the air renewal

### Purification

Pollutants are filtered from the air to ensure a healthy and clean environment.

**A - Fresh air filter** also available in the electrostatic channel version  
It purifies the outdoor air.

**B - Exhaust air filter**  
It purifies the air extracted from the environment to keep the machine clean and prevent clogging problems

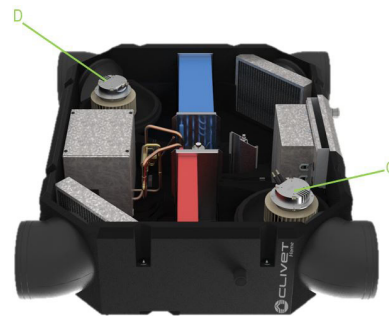


### Ventilation

EC fans automatically adjust their speed in order to match the pressure drops of the air distribution system, thus ensuring a constant air flow. This proves useful on different levels:

- It simplifies the design of the air distribution system, thereby allowing greater tolerances when designing it
- It facilitates installation and makes the unit versatile, in case the installed air distribution system differs from its original design
- It guarantees reliability and continuity of operation: if the pressure drops increase, due to dirty filters or other cause, the machine continues to operate perfectly
- Thank to two available settings of the noise reduction function, it is possible to achieve top acoustic comfort during night-time by reducing the fan speed

C / D - Supply / exhaust fan



### Active thermodynamic recovery

While traditional heat recovery system use a heat exchanger to transfer energy between exhaust and supply air, ELFOFresh EVO uses the energy as source for a heat pump cycle, internal to the unit, thus reaching far higher performances.

#### R32 refrigerant

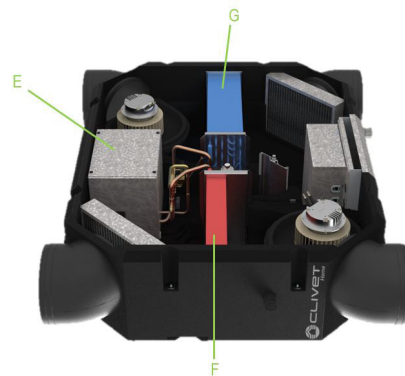
- Low GWP (Global Warming Potential) and lower CO2 emissions
- Better performance in extreme conditions
- Requires less refrigerant charge in the system
- High heat exchange coefficient

#### E - Inverter compressor

The compressor is optimised for low power operation, with a high level of performance all year round. The compartment is insulated to drastically reduce noise emission.

#### F / G - Renewal / exhaust air heat exchangers

This type of heat exchangers ensure reduced pressure drops compared with traditional passive recovery units: energy consumption is extremely low



### Structure

The new structure ensures 100% safe operation, reduced weight and noise reduction.

#### H - Frame (sheet metal + polypropylene + antivibration mounts)

The insulation coating makes operations extremely silent and prevents leakages and cross-flow contamination

#### I - Adjustable spigots

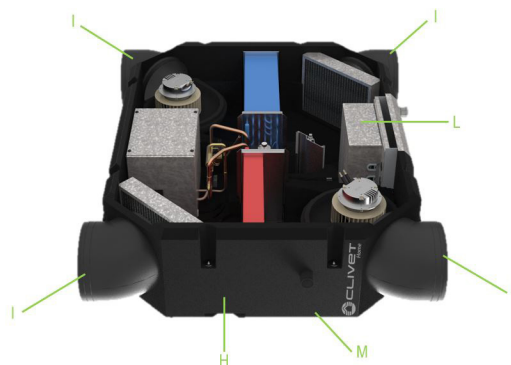
The flanges can be rotated to give the unit numerous installation solutions

#### L - Electrical panel

Easily accessible from underneath or from the side

#### M - Condensate drain pump with water level sensor

To properly dispose of the condensate. The water level sensor prevents leakages in case of drain pump malfunction.



## High filtration efficiency and reduction of management costs

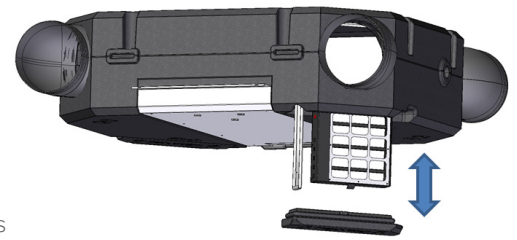
High efficiency filters with active electrostatic system with an intense dielectric field are additional filtration components to standard PM10 50% filters. They are effective on a broad spectrum of pollutants, including pollen, dust, microdust and nanodust, toner, moulds, smog, bacteria and viruses.

They have a very high filtration efficiency with low pressure drops and therefore reduced ventilation consumption compared to traditional filters. Typical air crossing speeds of Clivet units ensure filtration efficiencies higher than ISO 16890 ePM1 90% (equivalent to class E10 of absolute filters in accordance with EN 1822).

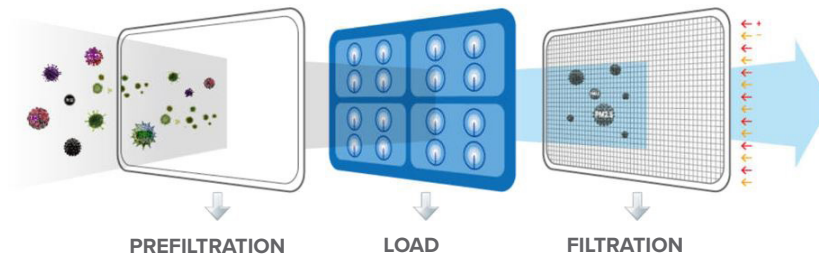
The air filtration process follows the most advanced of all air purification technologies and consists of these phases:

- First pre-filtration phase
- Second ionisation phase in which the particles are charged by passing through a thin perforated metal plate with needle electrodes in the centre of each hole.
- Third absorption phase in which the charged dust particles are captured by a strong and intense dielectric field formed by a honeycomb tube.

Filters must be cleaned at least every six months; we recommend quarterly or more frequent cleaning if the units are located in excessively polluted areas. Intervention on the filters during the unit's routine maintenance includes washing the electronic cells on site. This is extremely simple and is done by washing them with a standard kitchen degreaser. This means that the filter cell does not need replacing, just washing.



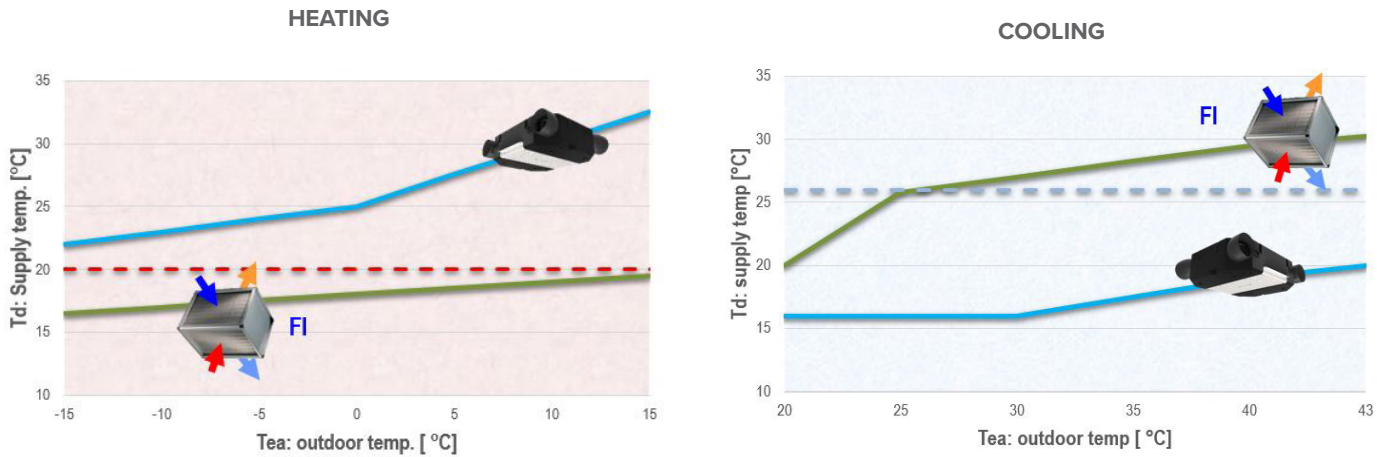
Integrated filter inside the unit



# Features and benefits

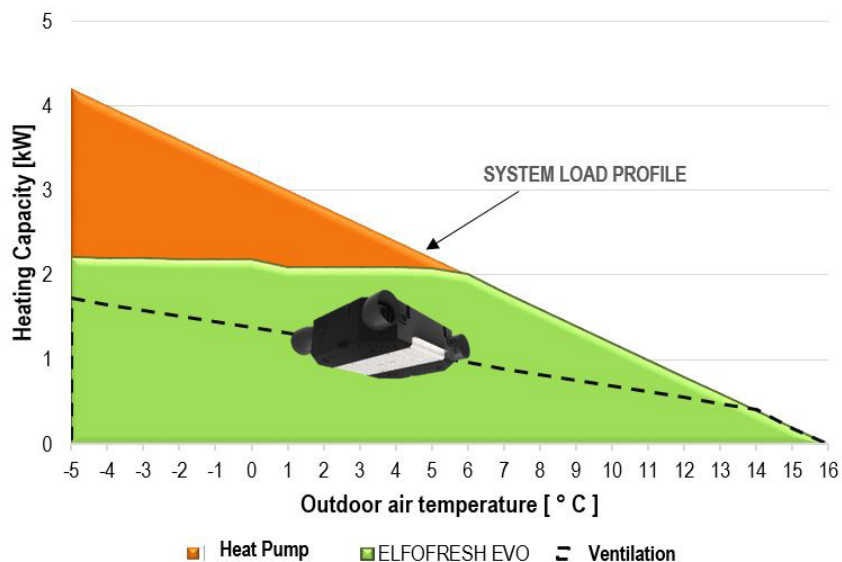
## Active thermodynamic recovery

Year-round energy contribution: ELFOFresh EVO always provides positive impact to the room, supplying air at higher than room temperature conditions during heating periods and lower during cooling. This is evidence to the fact that the thermodynamic heat recovery technology is able to fully cover the thermal load of the fresh air intake, as well as part of the building thermal load connected to transmissions. This result cannot be reached by a traditional passive heat recovery system.



Td = Supply air temperature  
 Tae = Ambient temperature  
 --- = Inside temperature  
 FI = Passive heat recovery system

ELFOFresh EVO not only recovers the energy contained in the exhaust air flow, but, thanks to the heat pump technology, covers up to 85% of the building's thermal demand, reaching 100% coverage in mid-season



## Active thermodynamic recovery

Fig.1 and Fig.2 display how ELFOFresh EVO can contribute throughout the year in covering up to 85% of the total energy consumption in cooling and heating.

## Comparison with traditional passive cross-flow recovery units with 90% efficiency in heating and 75% in cooling

A passive recovery unit is able to supply only a small percentage of the energy required by the building. The remaining part of the thermal load, much greater than in ELFOFresh EVO case, has to be supplied by the primary heating/cooling system of the house. You can see how the energy contribution of the passive recovery unit is much lower than ELFOFresh EVO, both in heating Fig.3 and in cooling Fig.4

### HEATING

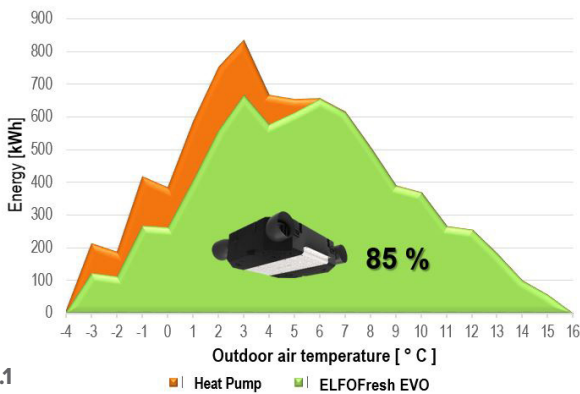


Fig.1

### HEATING

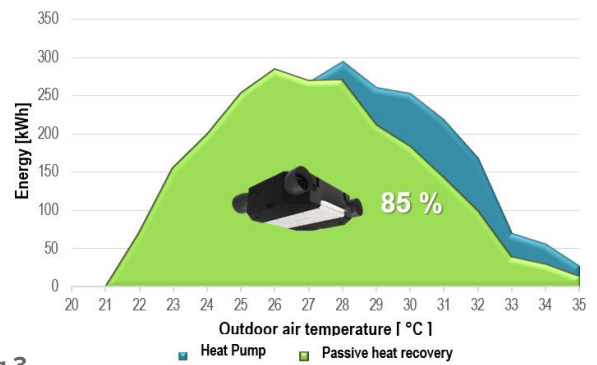


Fig.3

### COOLING

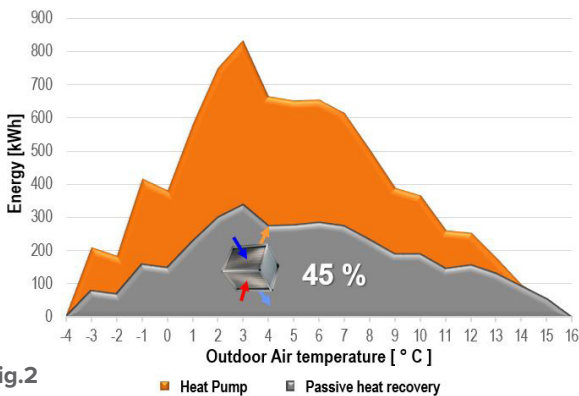


Fig.2

### COOLING

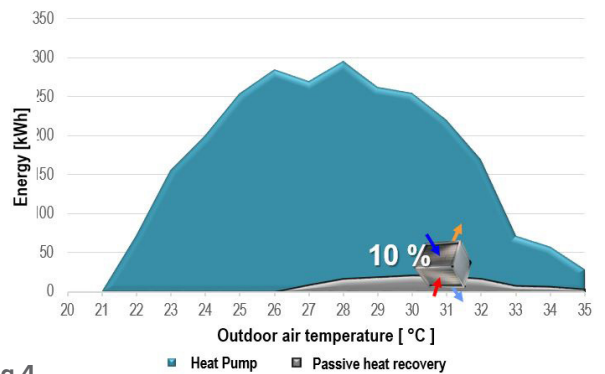


Fig.4

NOTE:

The example is referred to a single house in Milan (Italy), E climate zone, with the following characteristics:

**Surface:** 150 m<sup>2</sup>; gross heated volume: 579 m<sup>3</sup>; exchanging surface: 340 m<sup>2</sup>; S/V ratio: 0,70 m<sup>-1</sup>.

**Coating:** transmittance: (U<sub>wall</sub> 0,21; U<sub>cover</sub> 0,20; U<sub>basement</sub> 0,21; U<sub>frame</sub> 1,2 W/m<sup>2</sup>K).

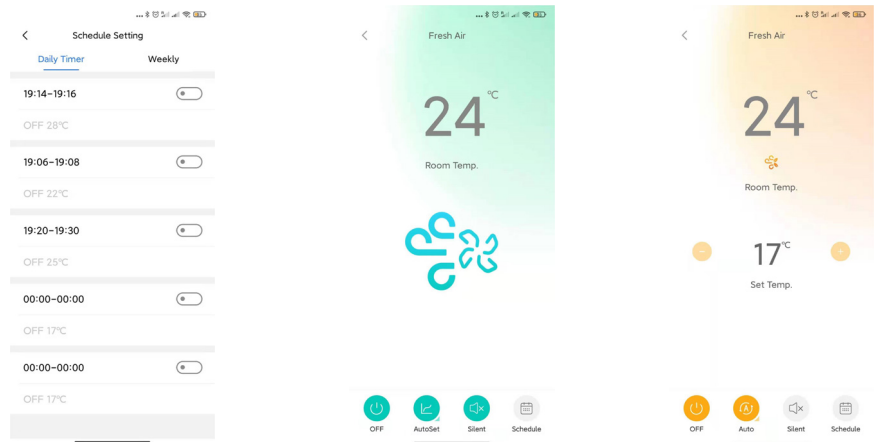
# Features and benefits

## Integrated wifi for connection to the dedicated APP

The keypad has an intelligent control system based on a built-in module, which receives the signal from the APP.

The main functions that can be managed with the APP are:

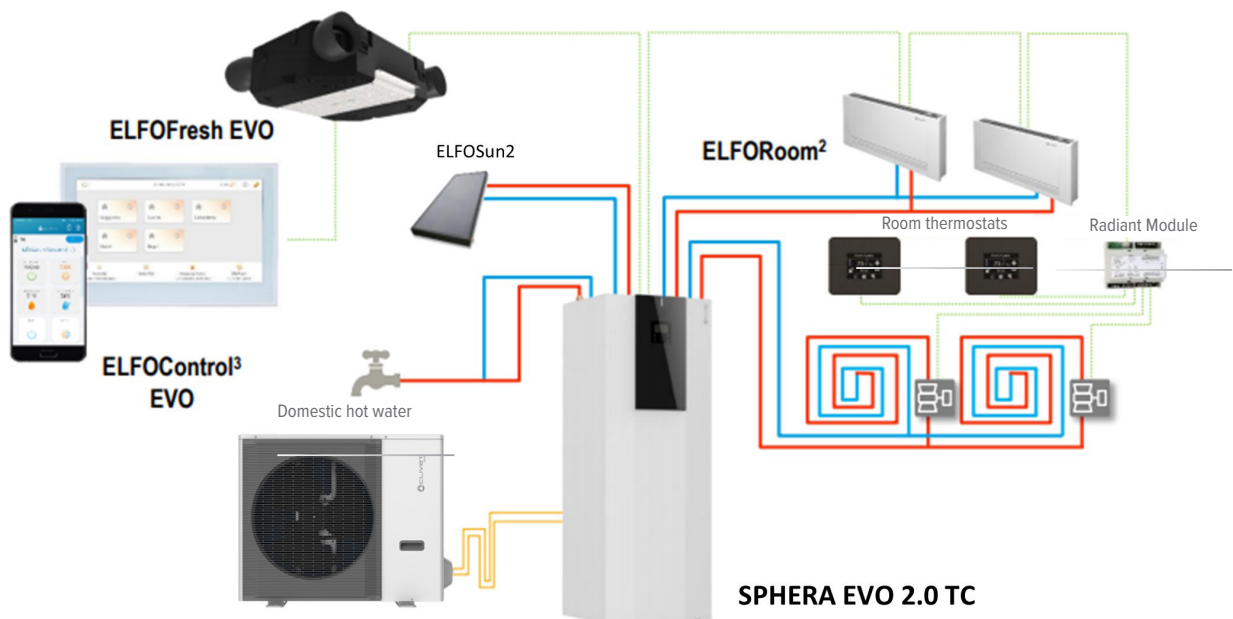
- on/off
- change summer/winter mode
- set ventilation only mode
- set silent mode
- set the desired temperature



## ELFOFresh EVO compatible with ELFOControl³ EVO

ELFOControl³ EVO is the advanced control system to manage the operation of the entire system.

- ▶ High seasonal efficiency thanks to the available optimization algorithm operating on all the system components
- ▶ Optimization of units efficiency and operation
- ▶ Comfort improvement (temperature, humidity, air quality, domestic hot water)
- ▶ Simple and intuitive interface
- ▶ Connected to all system equipments, it is able to combine the operation of different products to achieve higher system reliability.



## Compressor

Inverter controlled rotary-type hermetic compressor equipped with a motor protection device for overheating, overcurrents and excessive temperatures of the supply gas. It is installed on anti-vibration mounts and it is equipped with oil charge.

The compressor is housed in a dedicated compartment, made of 20/10mm zinc-magnesium sheet metal clad with sound-absorbing and soundproofing material in polyester fibre, to minimise noise output.

## Structure

Supporting structure made of zinc-magnesium sheet metal (density 60g/l) that ensures excellent mechanical features and high long-term resistance against corrosion.

Secondary structure in expanded polypropylene which gives the unit excellent thermal insulation, fire protection, air tightness (A1 class UNI EN 13141-7 in treatment area) and lightness during installation and maintenance.

The unit is fitted with rubber antivibration mounts for installation

## Internal exchanger

Finned exchanger, made from copper pipes arranged in staggered rows and mechanically expanded for better adherence to the collar of the fins. The fins are made from aluminium with a special corrugated surface, set a suitable distance apart to ensure maximum heat exchange efficiency.

## External exchanger

Finned exchanger, made from copper pipes arranged in staggered rows and mechanically expanded for better adherence to the collar of the fins. The fins are made from aluminium with a special corrugated surface, set a suitable distance apart to ensure maximum heat exchange efficiency.

## Fan

Brushless centrifugal supply and exhaust fan with high energy efficiency with single suction directly coupled to an electric motor with EC electronic control with screw built into the expanded polypropylene structure.

Thanks to electronic regulation of the motor, the unit is able to maintain a constant air flow rate in order to reach a maximum static pressure value, according to the flow rate setting out of 5 levels selectable from the remote control.

## Refrigeration circuit

Refrigeration circuit with:

- refrigerant charge
- High pressure safety pressure switch
- Low pressure safety pressure switch
- 4-way reverse cycle valve
- electronic expansion valve

## The unit includes R32 refrigerant charge (300g).

### Filter

Folded filter in outdoor air return and in room return.

Filter in synthetic fiber, bent at constant pitch with heat-shaping. Ecologic frame.

ISO EN16890 and PM10 50% efficiency.

The filter can be completely incinerated.

## Drain pan

Condensate collection tray in thermoformed ABS directly housed in the expanded polypropylene mould.

The tray has a condensate drain pump, safety float and emergency drain.

## Electrical panel

Electrical panel located inside the unit and can be easily accessed from the bottom or sides via the removable panels. The control section is made up of a card with microprocessor control that allows the unit control according to the different air input conditions.

The control section includes:

- Probe of the outdoor air temperature.
- supply air temperature probe
- supply air humidity probe
- temperature probe for air drawn from the room

## Remote keypad for the user

Local room control allows you to:

- control only one ELFOFresh Evo unit
- set the desired temperature
- set the desired air flow rate
- turn it on/off
- change from Summer/Winter
- set ventilation only mode
- set the Automode operating mode
- set the dehumidify function (Low / Standard / ECO)
- set the silent function (Silent / Super silent)
- remote on-off
- manage diagnostics with a specific code for the type of error
- Integrated wifi for connection to the dedicated APP
- Modbus connection

Size: 120X120X20 mm

The thermostat is connected to the unit by a shielded cable, 5x0.75mm<sup>2</sup> cable+shield (cables for energy, signals and controls transmission, shielded), at a maximum distance of 50m.

The cable must be installed chased or in a protected conduit, so that it is impossible for the end user to access it.

## Outdoor air external bypass damper

Damper that draws air from the fresh air intake and brings it up to the exhaust coil. The damper, by means of an on-off actuator, is opened in summer operating, with the compressor in operation and with exhaust fan at max. speed, so as to increase the air flow to the condensing coil: In this way, cooling efficiency is increased without creating negative pressure in the room.

## Accessories

EI - In-view installation

FIFD - Electronic filters with iFD technology (ISO 16890 ePM1 90%)

## Test

Unit built to ISO 9001 quality standards and subjected to functional testing at the end of the production line

# Built-in options

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**EI**

**In-view installation**

Mandatory configuration when unit is installed in rooms where accidental contact with people or things can occur.

The unit is supplied with an additional cover in painted sheet. The accesses for ordinary maintenance remain unchanged.

**FIFD**

**Electronic filters with iFD technology (ISO 16890 ePM1 90%)**

Filtro ad alta efficienza con sistema elettrostatico attivo a campo dielettrico intenso.

Attivo su un ampio spettro di inquinanti, tra cui pollini, polveri, micropolveri e nanopolveri, toner, muffe, smog, batteri e virus





## Performance

### Size – CPAN-YIN

Supply airflow	l/s	35	42	58	75	89
Supply airflow	m <sup>3</sup> /h	125	150	210	270	320
<b>A7</b>						
▶ Heating capacity	kW	1,42	1,55	1,86	2,05	2,49
Total power input	kW	0,46	0,42	0,45	0,42	0,54
COP (EN 14511:2018)	-	3,09	3,69	4,13	4,93	4,61
<b>A-5</b>						
▶ Heating capacity	kW	1,97	2,10	2,21	2,37	2,45
Total power input	kW	0,40	0,52	0,47	0,37	0,32
COP (EN 14511:2018)	-	4,93	4,04	4,70	6,50	7,66
<b>A30</b>						
▶ Cooling capacity	kW	0,92	1,38	1,47	1,72	2,07
Total power input	kW	0,36	0,52	0,48	0,54	0,81
EER (EN 14511:2018)	-	2,56	2,65	3,06	3,21	2,56
<b>A35</b>						
▶ Cooling capacity	kW	1,57	1,64	1,73	1,92	2,23
Total power input	kW	0,36	0,52	0,53	0,55	0,81
EER (EN 14511:2018)	-	4,34	3,15	3,26	3,50	2,77
Rated static pressure supply fan	Pa	50	50	50	50	50
Max. static pressure supply fan	Pa	120	120	120	120	120
Standard power supply	V	220-240/~/50	220-240/~/50	220-240/~/50	220-240/~/50	220-240/~/50
Min. entering air temperature (D.B.)	(2) °C	-15	-15	-15	-15	-15
Sound pressure level	(1) dB(A)	34	35	37	41	45

All the data provided meets standard EN 14511:2018 and refers to an available head of 50 Pa.

A7 Ambient temperature 7°C D.B./ 6°C W.B., Extracted air temperature 20°C D.B./ 13.7°C W.B.

A-5 Ambient temperature -5°C D.B./ -5.4°C W.B., Extracted air temperature 20°C D.B./ 13.7°C W.B.

A30 Ambient temperature 30°C D.B./ 22°C W.B., Extracted air temperature 27°C D.B./ 19°C W.B.

A35 Ambient temperature 35°C D.B./ 24°C W.B., Extracted air temperature 27°C D.B./ 19°C W.B.

1. Available static pressure with clean air filter
2. The sound levels refer to units in nominal test conditions, and refers to an available head of 50 Pa. Average sound pressure level, according to UNIEN ISO 3744, is measured at 1m distance from the unit surface, when installed in false ceiling and connected to ducts.

## Construction

### SIZE 2

<b>Compressor</b>			
Type of compressors	(1)	-	ROT
Refrigerant			R32
No. of compressors		Nr	1
Gradini capacità (ST)		%	20-100
Oil charge		[l]	0,017
Refrigerant charge		[kg]	0,3
Refrigerant circuits		[Nr]	1
<b>Treatment Area Fans (Supply)</b>			
Type of fans	(2)		CFG
No. of fans			1
Fan diameter		[mm]	140
Type of motor	(3)		EC
Airflow		[mc/h]	125-320
<b>Treatment Area Fans (Ripresa)</b>			
Type of fans	(2)		CFG
No. of fans			1
Fan diameter		[mm]	140
Type of motor	(3)		EC
Airflow		[mc/h]	125-400
<b>Connections</b>			
Condensate drain	(4)	[mm]	32
<b>Electrical data</b>			
F.L.A. Compressor 1	(5)	[A]	4,1
F.L.A. Single supply fan	(5)	[A]	0,62
F.L.A. Single exhaust air fan		[A]	0,62
F.L.A. Total		[A]	5,45
F.L.I. Compressor 1		[kW]	0,91
F.L.I. Single supply fan		[kW]	0,08
F.L.I. Single exhaust air fan		[kW]	0,08
F.L.I. Total		[kW]	1,08

1. ROT = rotary compressor
2. CFG = centrifuge fan
3. EC = EC Electronic switching motor
4. Connessione scarico condensa, diametro esterno
5. Data refer to standard units. Power supply 220-240V~/50Hz Voltage variation: max +/-6%



# General technical data

## Sound levels - Cooling

[m <sup>3</sup> /h]	SOUND POWER LEVEL (DB) Octave band (Hz)								Sound power level	Sound pressure level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
<b>125</b>	27	25	37	40	34	30	29	30	<b>34</b>	<b>47</b>
<b>150</b>	28	26	38	40	35	31	30	31	<b>35</b>	<b>48</b>
<b>210</b>	31	32	38	41	42	36	30	26	<b>37</b>	<b>50</b>
<b>270</b>	32	34	41	42	45	41	37	27	<b>41</b>	<b>54</b>
<b>320</b>	36	38	45	46	49	45	41	31	<b>45</b>	<b>58</b>

Sound levels are referred to unit at nominal condition when installed in false ceiling and connected to ducts. External static pressure 50 Pa.

Cooling: Ambient temperature 35°C D.B./ 24°C W.B., Extracted air temperature 27°C D.B./ 19°C W.B.

Average sound pressure level, according to UNIEN ISO 3744, is measured at 1m distance from the unit surface, when installed in false ceiling and connected to ducts. Power measurements are according to UNI EN ISO 9614-2, with unit connected to ducts and installed in the vicinity of a reflecting surface, allowing 2 dB (A) tolerance. Noise values referred to:

- standard operation with air flow rate from 320mc/h to 125mc/h
- SILET mode with air flow rate from 210mc/h to 125mc/h
- SUPER SILET mode with air flow rate 125mc/h

SILENT and SUPER SILENT modes (setting from remote control) operate a reduction of compressor and fan speed, reducing their noise emission. Please note that noise levels may differ significantly if the unit is installed in different conditions (ex: with surrounding obstacles, walls or similar).

## Sound levels - Heating

[m <sup>3</sup> /h]	SOUND POWER LEVEL (DB) Octave band (Hz)								Sound power level	Sound pressure level
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
<b>125</b>	24	23	33	40	34	27	24	31	<b>33</b>	<b>46</b>
<b>150</b>	25	24	34	40	35	28	25	32	<b>34</b>	<b>47</b>
<b>210</b>	30	32	37	40	38	33	27	26	<b>36</b>	<b>49</b>
<b>270</b>	30	32	39	40	43	39	34	33	<b>39</b>	<b>52</b>
<b>320</b>	34	36	43	43	47	43	38	37	<b>43</b>	<b>56</b>

Sound levels are referred to unit at nominal condition when installed in false ceiling and connected to ducts. External static pressure 50 Pa.

Heating: Ambient temperature 7°C D.B./ 6°C W.B., Extracted air temperature 20°C D.B./ 13.7°C W.B.

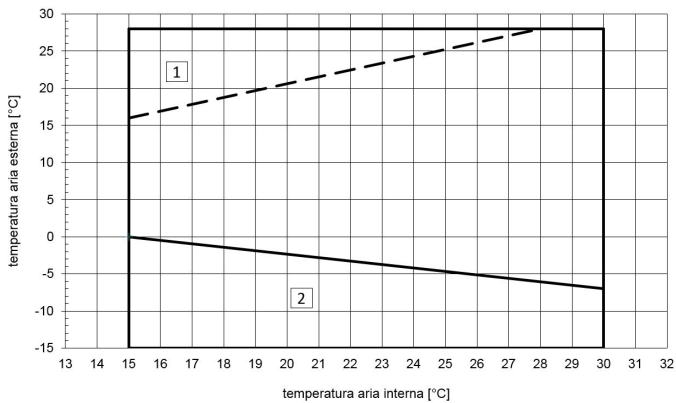
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SILENT and SUPER SILENT modes (setting from remote control) operate a reduction of compressor and fan speed, reducing their noise emission. Please note that noise levels may differ significantly if the unit is installed in different conditions (ex: with surrounding obstacles, walls or similar).

## Operating range

### Heating



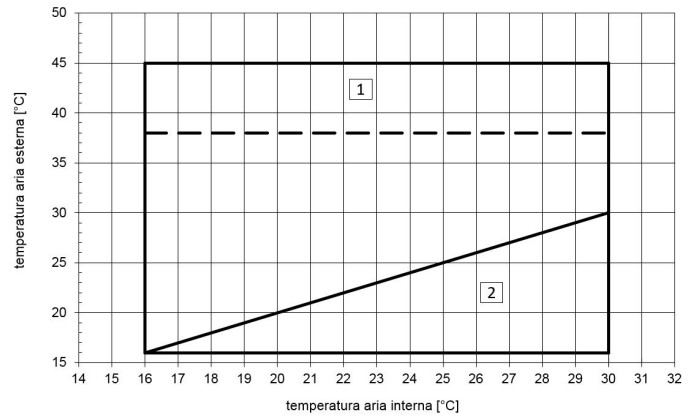
The limits are meant as a guide. Please note that they have been calculated by considering:

- nominal airflow
- exchangers and clean filters
- straightforward unit installation and correct use and maintenance of the unit itself.
- operating range with outdoor relative humidity > 50%

1. Possible FREE-HEATING range
2. Operating range with possible supply air flow modulation; defrosting may occur

The unit can modulate the air flow rate in order to keep operating in the operating range

### Cooling



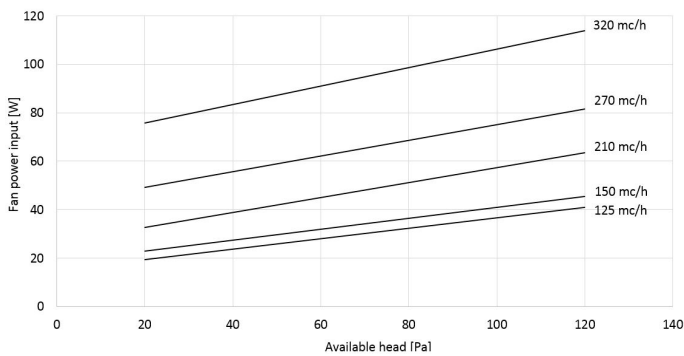
The limits are meant as a guide. Please note that they have been calculated by considering:

- nominal airflow
- exchangers and clean filters
- straightforward unit installation and correct use and maintenance of the unit itself.

1. Operating range with outdoor relative humidity < 40%
2. Possible FREE-COOLING range

The unit can modulate the air flow rate in order to keep operating in the operating range

## Electrical input of the fan



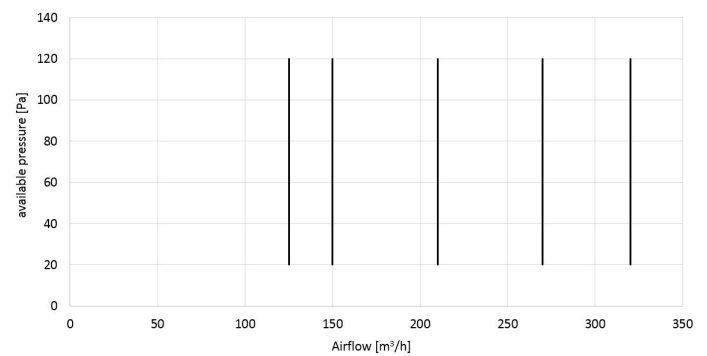
Power input related to the single fan in heating mode at the following conditions:

Ambient temperature 7°C D.B./ 6°C W.B.

Extracted air temperature 20°C D.B./ 13.7°C W.B

Data with unit correct, installation and usage

## Fan available pressure



Performance data take into account all pressure losses internal to the unit (heat exchanger, std filter etc.)

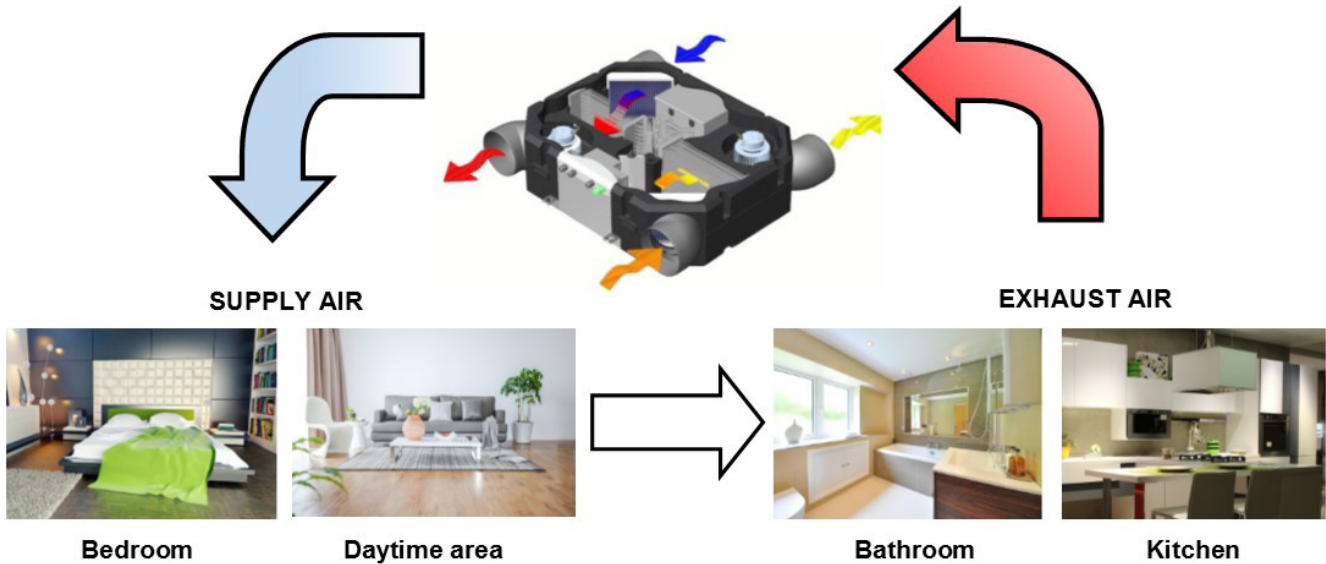
# Performances criteria

## ELFOFresh EVO size selection

ELFOFresh EVO is available in one size only but it can work with the following settable flow rates 125, 150, 210, 270 and 320 m<sup>3</sup>/h. The setting of the air flow rate depends on the volumes of air renewal.

In the framework of “residential” ventilation, the calculation of the necessary air flow rate according to the type of house can be performed through the air renewal method, i.e. the number of times that it is necessary to integrally change the air in the room over a specific period (generally, it is considered as no. of changes/hour or volumes/hour).

As for houses, it is a good habit to perform air renewals of 0.5 volumes/hour, max. 1 volume/hour.



## Example

To illustrate the design criteria of ELFOFresh EVO the following shows a typical application example of a house of 125 m<sup>2</sup> consisting of 9 rooms. The table lists the size of the rooms and the air flow rates of the individual rooms calculated on the basis of the size of the selected ELFOFresh EVO.

Considering 0.5 volumes per hour as air renewal rate, the renewal capacity will be the product of the home volume multiplied by the rate of renewal.

	Room	Surface	Height	Volume	Flow-rate
		m <sup>2</sup>	m	m <sup>3</sup>	m <sup>3</sup> /h
<b>Air supply (noble room)</b>	Livingroom	32	2.7	86.4	79
	1 room	14	2.7	37.8	35
	2 room	15	2.7	40.5	37
	3 room	11	2.7	29.7	27
	4 room	12	2.7	32.4	30
<b>Extraction (technical room)</b>	Kitchen	12	2.7	32.4	96
	1 bathroom	6	2.7	16.2	48
	2 bathroom	5	2.7	12.0	40
	3 bathroom	4	2.7	10.8	32
<b>Other</b>	Hallway and Closet	14	2.4	33.6	0

In our example, it will be  $332\text{m}^3 \times 0,5 = 166 \text{ m}^3/\text{h}$ .

ELFOFresh EVO air flow rate to be selected can be 210 m<sup>3</sup>/h with a renewal rate of 0.62 Vol/h.

It should be noted that the calculated renewal rate refers to the total volume of the house. In fact, since the supply takes place in the noble rooms and the removal from the technical rooms, the actual renewal in the individual rooms is greater than the total renewal rate.

For example, if we choose to use ELFOfresh EVO at the nominal flow rate of 210 m<sup>3</sup>/h, the renewal rate in the noble rooms (total noble room volume = 227 m<sup>3</sup>) is  $210/227 = 0,92 \text{ Vol/h}$  while the rate of renewal in the technical rooms (total technical room volume = 71 m<sup>3</sup>) è  $210/71 = 2,95 \text{ Vol/h}$ .

## Defining airflow rate for each individual room

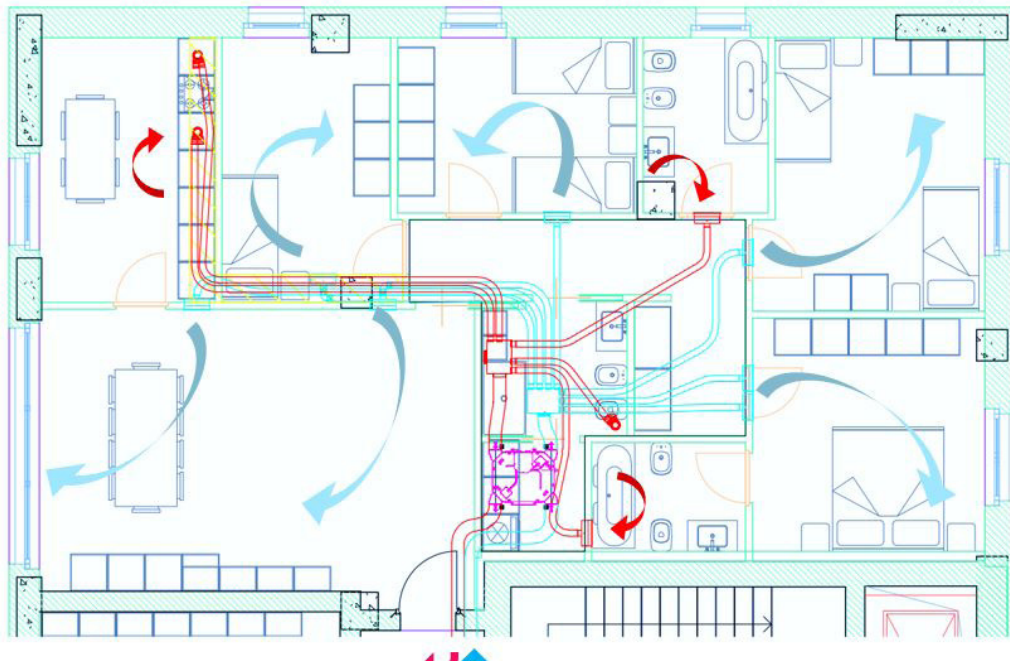
The last column of the table shows the air flow rates necessary for each individual room to ensure proper air renewal. The corridor has no supply or extraction grille because it is an area used by the occupants to move between the various rooms and acts as transit point, assuring that fresh air can move from noble rooms to technical rooms.

Once the air flow rates have been defined for each room, the vent has to be selected. This choice depends on the installation position and on how to achieve the best air distribution in the room.

As you can see in the example, a decision was made to use AIRJET diffusers which, thanks to their characteristics, provide adequate air launch allowing the entire volume of the room to be affected and allow for a simple air distribution system, confined in the corridor false ceiling.

In the living room, due to the conformation of the room and maximum airflow rate of the AIRJET diffuser, a decision was made to split the input flow into two points.

Note: if the system design is performed according to UNI EN 10339, the regulation requires to consider respecting the requested parameters of 11 l/s (40m<sup>3</sup>/h) of air renewal per person and at least 4 volumes per hour of air renewal in the bathroom.



## Overall comfort with ELFOAir

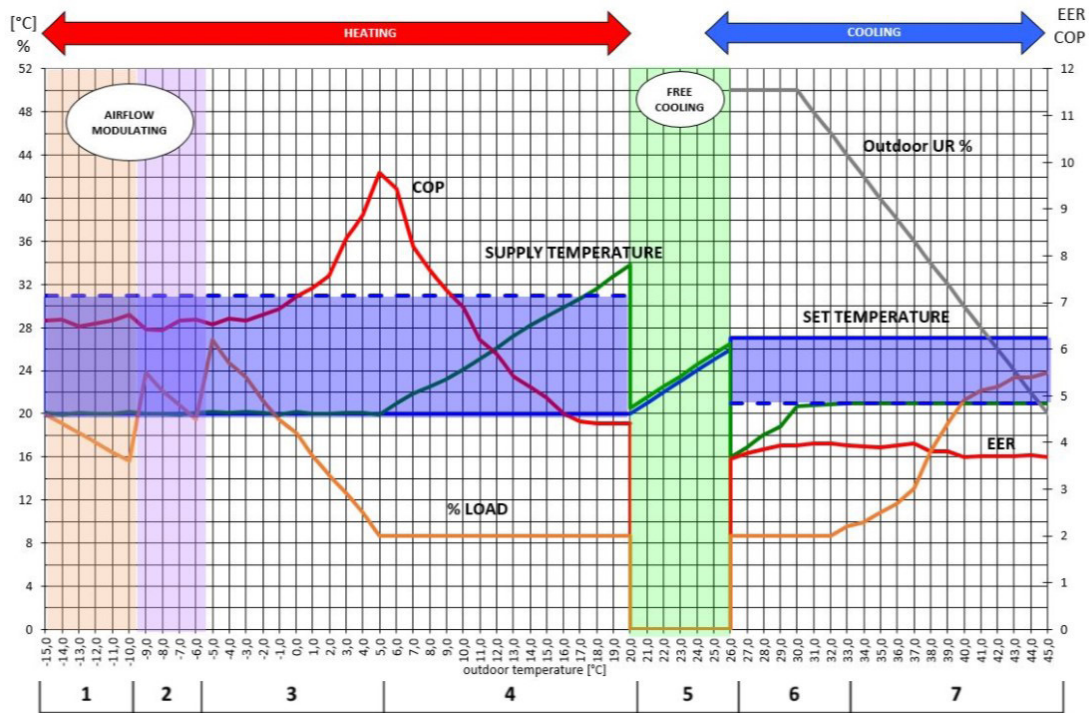
ELFOFresh EVO perfect match is ELFOAir, the air distribution system with flexible design, easy to install and low noise emission. ELFOAir is suitable for new homes and for renovations thanks to isolated flexible ducts, which reduce installation spaces and assure the best design flexibility. The reduced number of elements and the Plug&Play connections simplify and speed up installation, thereby guaranteeing perfect tightness and reliability. The silver ion treated plastic coating of the ducts has excellent antibacterial and antistatic properties for maximum hygiene of the fresh air. The smooth interior ensures low pressure drops, thus reducing consumption for ventilation. The special AIRJET diffusers allow even air distribution and integrate perfectly into any architectural context. The modular ELFOAir system with plug&play connection of the various elements makes the system extremely easy and quick to install.

This complete and integrated system is designed to play a fundamental role in low energy consumption modern homes.

# Performances criteria

## Reading of graphics about ELFOFresh EVO operation and performances criteria

The graph represents operation with set point equal to the internal temperature and this corresponds to operation with maximum efficiency.



Graphic referred to:

- Nominal air flow rate 270mc/h
- heating return air 20°C D.B. / 13.7°C W.B.
- Cooling return air 27°C D.B. / 19°C W.B.
- at typical residential application set-points: 20°C heating; 27°C cooling

The blue area shows the setpoint range in cooling and heating mode

In the graphic the following variables are present:

**SET TEMPERATURE** = Room set-point temperature set on remote control.

**SUPPLY TEMPERATURE** = Supply air temperature from ELFOFresh EVO

**COP/EER** = Heating (COP) and cooling (EER) performance coefficients according to EN14511:2018

**Outdoor UR %** = outdoor air relative humidity [%]

**% LOAD** = Compressor load 20-100% [%]

The curve describing supply air temperature can be useful to understand the unit functioning.

**1) Outdoor air temperature from -15°C to -10°C**

In this range, while operating in heating, supply air temperature is set to a comfortable value (for example 20°C) thanks to supply air flow rate and compressor modulation.

**2) Outdoor air temperature from -10°C a -5°C**

In this range, while operating in heating, supply air temperature is set to a comfortable value (for example 20°C) thanks to supply air flow rate and compressor modulation.

**3) Outdoor air temperature from -5°C to 5°C**

In this range, while operating in heating, supply air temperature is set to a comfortable value (for example 20°C) thanks to compressor modulation at the set air flow rate.

**4) Outdoor air temperature from 5°C to 20°C**

In this range, while operating in heating, compressor operates at minimum regime, so that the supply air temperature increases proportionally to outdoor air temperature.

**5) Outdoor air temperature from 20°C to 26°C**

In this operating range, the compressor is turned off and the unit works with FREE-COOLING, so with ventilation only.

In this operating range, we have the maximum reachable efficiency, increasing with the temp. difference between indoor and outdoor, as the only power input is to the fans

**6) Outdoor air temperature from 26°C to 32°C**

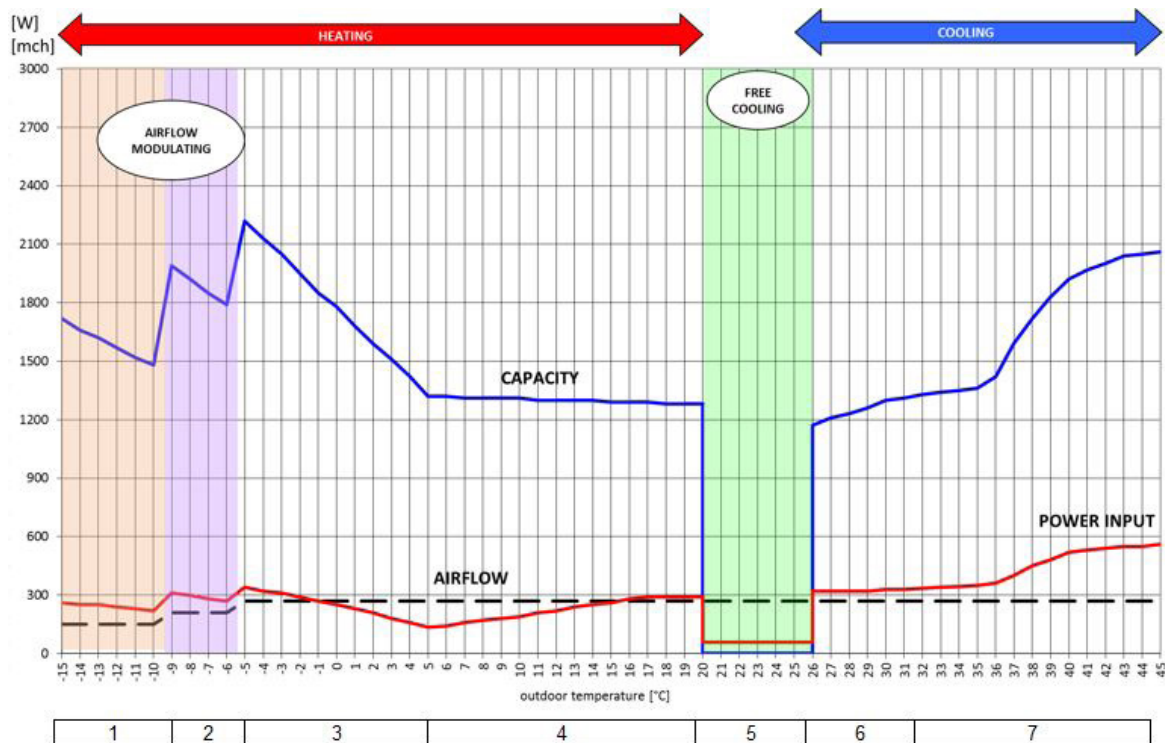
The compressor starts switching to cooling mode, working at minimum regime, allowing supply air temperature in the range 16-21°C.

**7) Outdoor air temperature from 32°C to 45°C**

In this range, while operating in cooling, supply air temperature is set to a comfortable value (example 27°C).

Generally speaking, ELFOFresh EVO will modulate the compressor when a lower humidity level on the supply flow is necessary, according to the setting.

## Explanation of ELFOFresh EVO operating and performance criteria graphs



Graphic referred to:

Nominal air flow rate 270mc/h

heating return air 20°C D.B. / 13.7°C W.B.

Cooling return air 27°C D.B. / 19°C W.B.

at typical residential application set-points: 20°C heating; 27°C cooling

In the graph are represented the following variables:

**CAPACITY** = heating / cooling capacity according to EN14511: 2018

**POWER INPUT** = Power input according to EN14511:2018

**AIRFLOW** = Room air flow rate supply [mc/h]

As in the graphic in the previous page, we can identify 7 operating ranges:

**1) Outdoor air temperature from -15°C to -10°C**

In this range, while operating in heating, the performance depends on the supply air flow rate and the compressor, in order to allow a comfortable supply air temperature (for example 20°C)

**2) Outdoor air temperature from -10°C to -5°C**

In this range, while operating in heating, the performance depends on the supply air flow rate and the compressor, in order to allow a comfortable supply air temperature (for example 20°C)

**3) Outdoor air temperature from -5°C to 5°C**

In this range, while operating in heating, the performance depends on the compressor modulation, in order to achieve the pre-set constant air flow rate value at a comfortable supply air temperature (for example 20°C).

This is highlighted by the increasing value COP.

**4) Outdoor air temperature from 5°C to 20°C**

In this range, while operating in heating, the compressor operates at minimum regime, so that the capacity is almost constant and independent from the outdoor air temperature.

**5) Outdoor air temperature from 20°C to 26°C**

In this operating range, the compressor is turned off and the unit works with FREE-COOLING, so with ventilation only.

In this operating range, we have the maximum reachable efficiency, increasing with the temp. difference between indoor and outdoor, as the only power input is to the fans

**6) Outdoor air temperature from 26°C to 32°C**

The compressor starts switching to cooling mode, working at minimum regime, allowing supply air temperature in the range 16-21°C. Consequently, the capacity is almost constant.

**7) Outdoor air temperature from 32°C to 45°C**

In this range, while operating in cooling, in order to keep the supply air temperature to a comfortable value (example 27°C), the capacity increases proportionally to the outdoor air temperature.

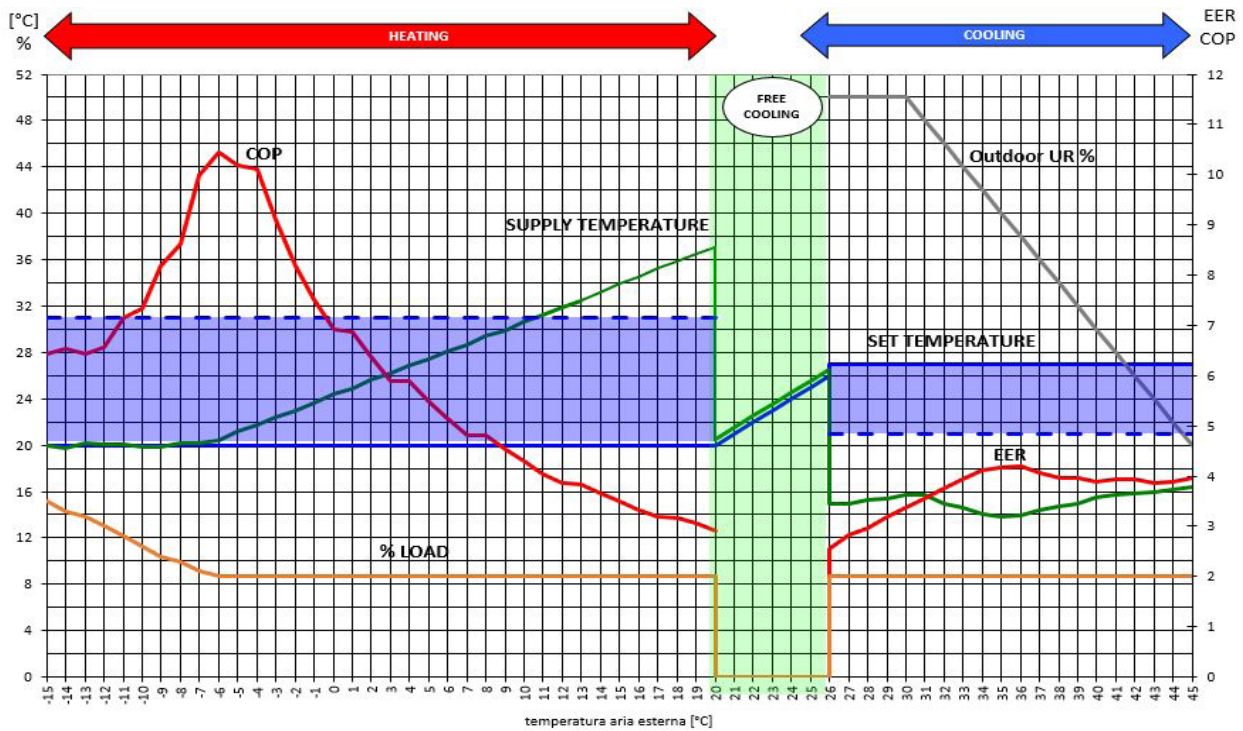
If necessary, in this range, the unit can operate with air flow rate modulation in order to stay in the operating field.

Thanks to the supply of controlled, clean air in the building and, at the same time, the extraction from high humidity rooms (bathroom, kitchen) the unit avoids the increase of humidity level in the building.



# Operating criteria

Airflow 125 m<sup>3</sup>/h



In the graphic the following variables are present:

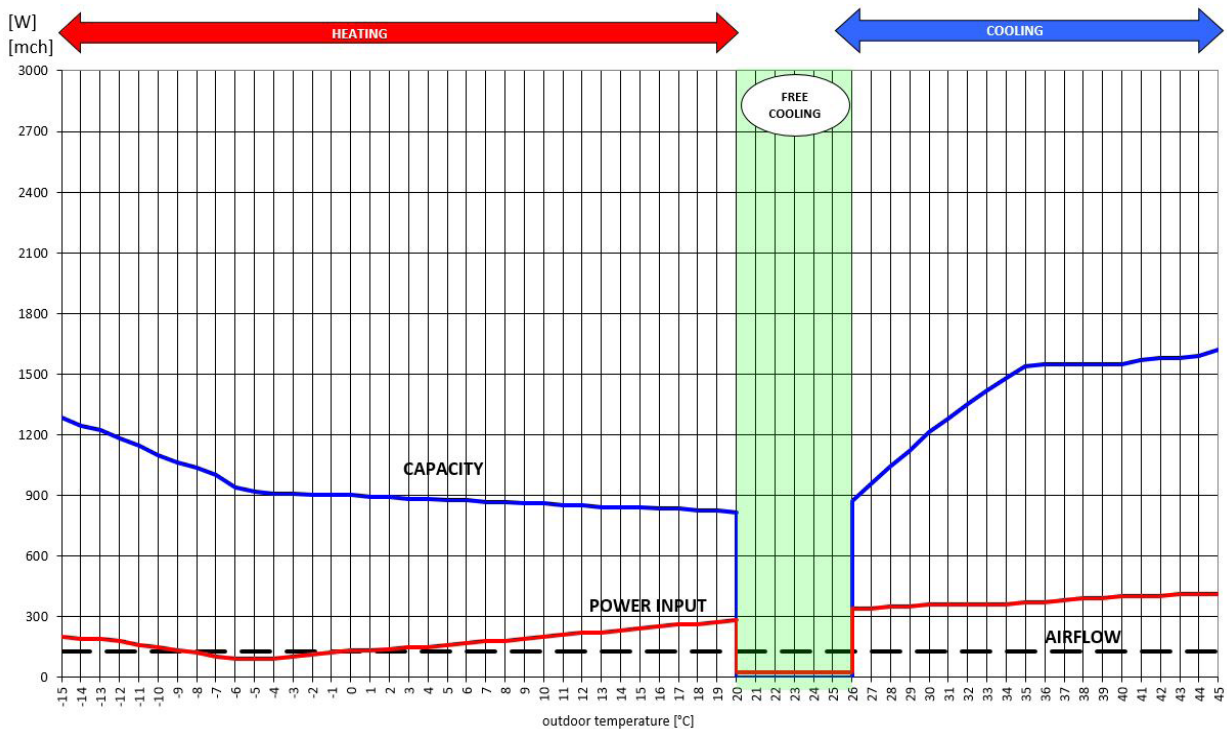
**SET TEMPERATURE** = Room set-point temperature set on remote control.

**SUPPLY TEMPERATURE** = Supply air temperature from ELFOFresh EVO

**COP/EER** = Heating (COP) and cooling (EER) performance coefficients according to EN14511:2018

**Outdoor UR %** = outdoor air relative humidity [%]

**% LOAD** = Compressor load 20-100% [%]



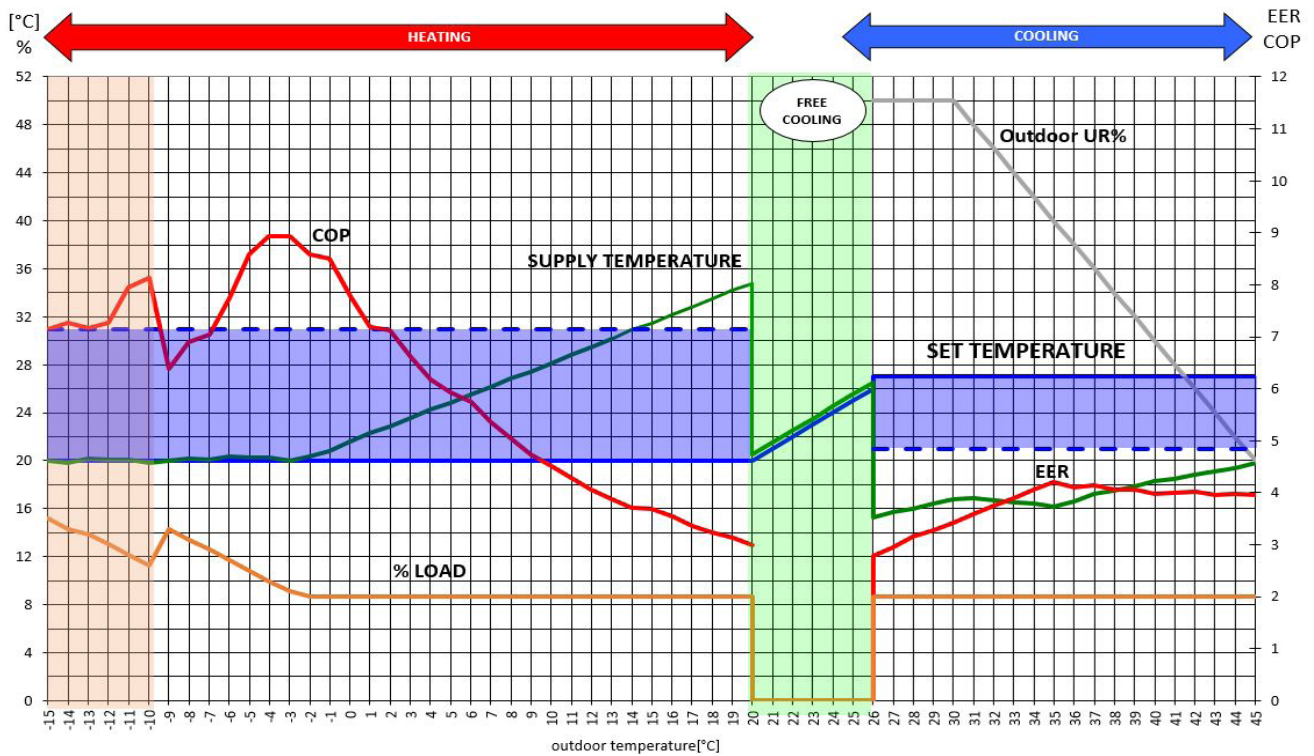
In the graph are represented the following variables:

**CAPACITY** = heating / cooling capacity according to EN14511: 2018

**POWER INPUT** = Power input according to EN14511:2018

**AIRFLOW** = Room air flow rate supply [mc/h]

## Airflow 150 m<sup>3</sup>/h



In the graphic the following variables are present:

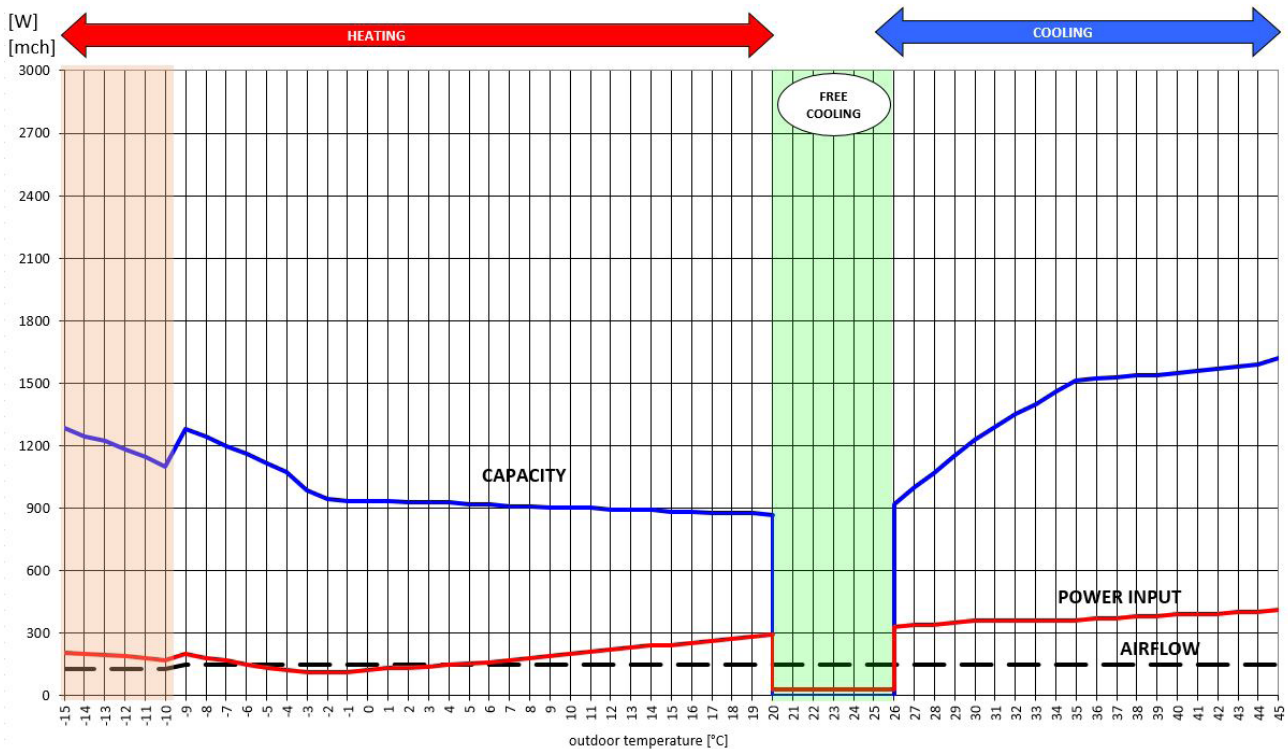
**SET TEMPERATURE** = Room set-point temperature set on remote control.

**SUPPLY TEMPERATURE** = Supply air temperature from ELFOFresh EVO

**COP/EER** = Heating (COP) and cooling (EER) performance coefficients according to EN14511:2018

**Outdoor UR %** = outdoor air relative humidity [%]

**% LOAD** = Compressor load 20-100% [%]



In the graph are represented the following variables:

**CAPACITY** = heating / cooling capacity according to EN14511: 2018

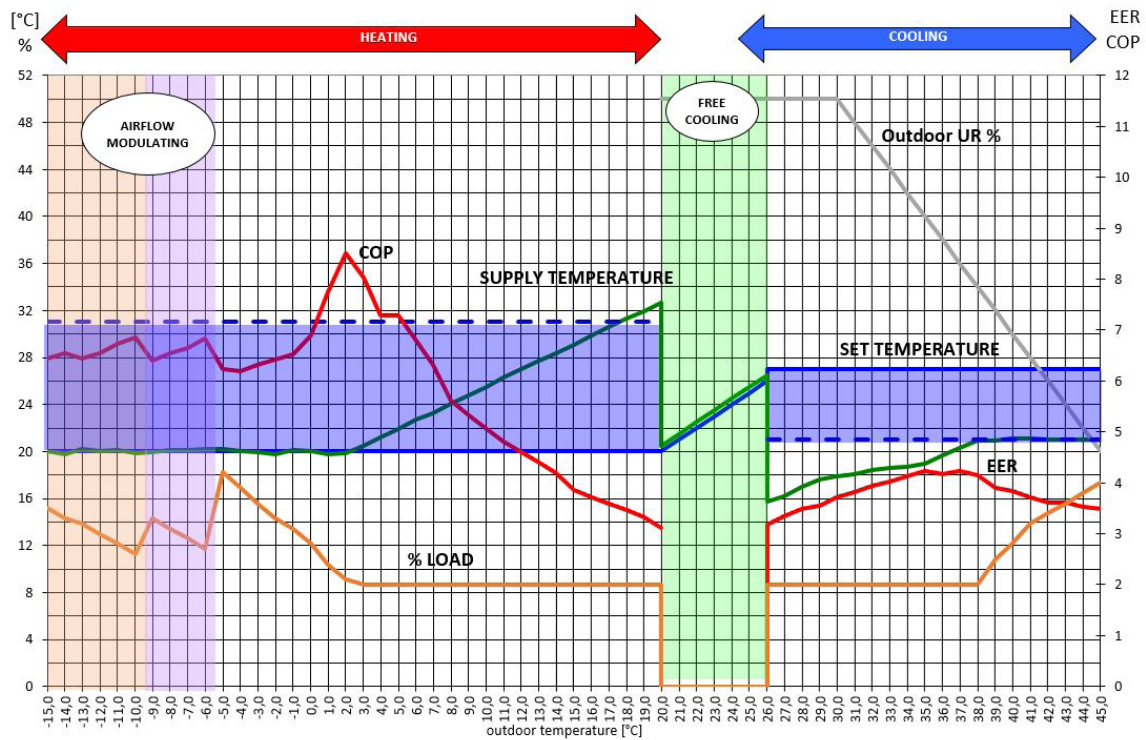
**POWER INPUT** = Power input according to EN14511:2018

**AIRFLOW** = Room air flow rate supply [mch/h]



# Operating criteria

Airflow 210m<sup>3</sup>/h



In the graphic the following variables are present:

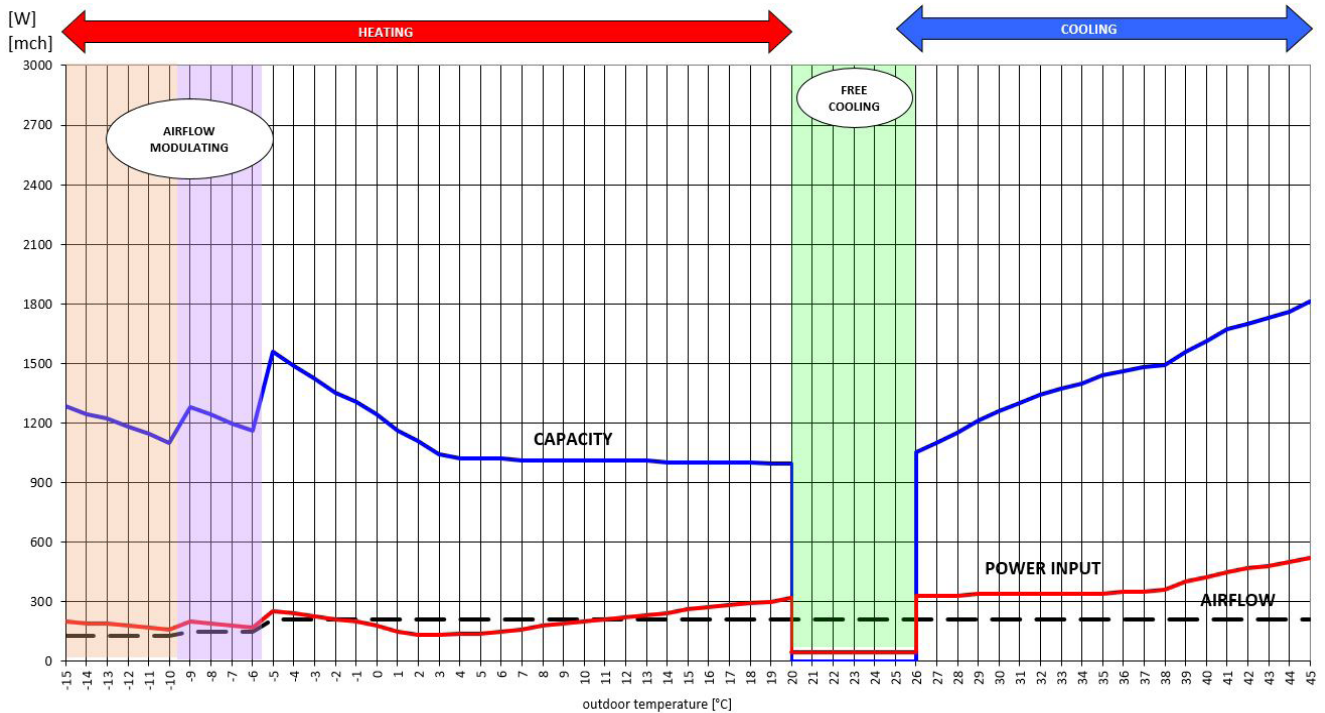
**SET TEMPERATURE** = Room set-point temperature set on remote control.

**SUPPLY TEMPERATURE** = Supply air temperature from ELFOFresh EVO

**COP/EER** = Heating (COP) and cooling (EER) performance coefficients according to EN14511:2018

**Outdoor UR %** = outdoor air relative humidity [%]

**% LOAD** = Compressor load 20-100% [%]



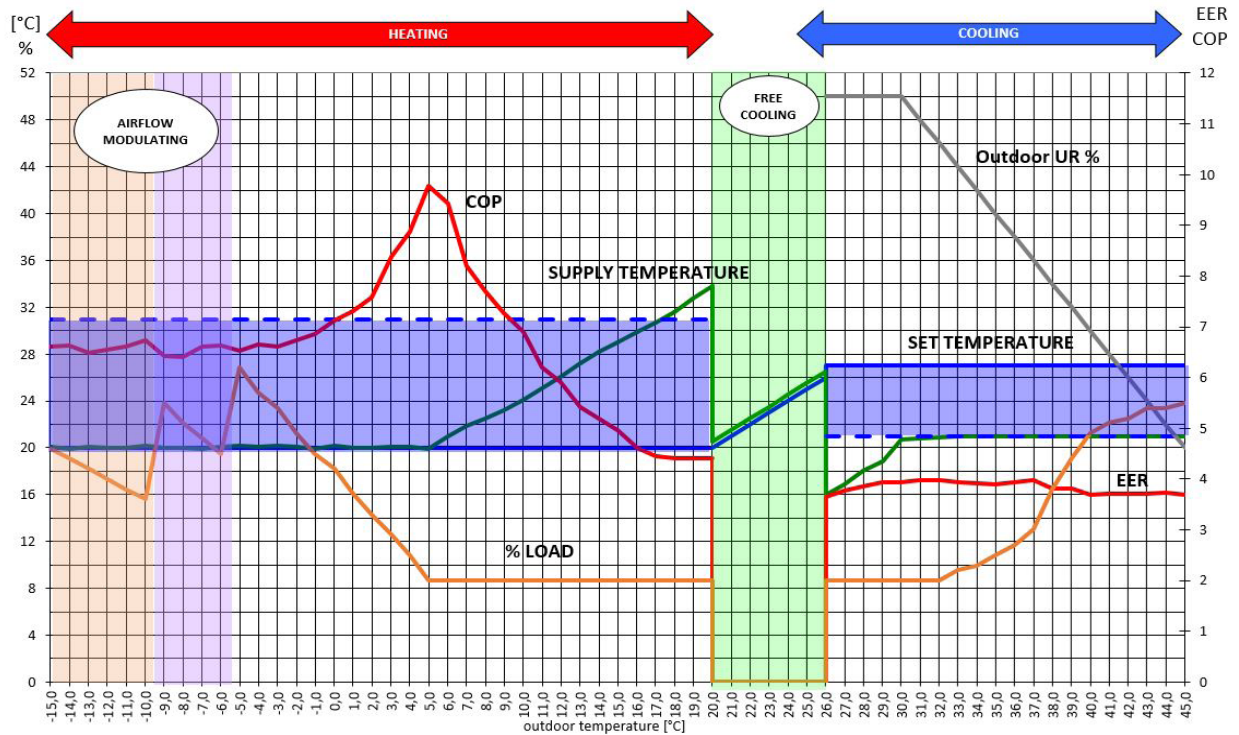
In the graph are represented the following variables:

**CAPACITY** = heating / cooling capacity according to EN14511: 2018

**POWER INPUT** = Power input according to EN14511:2018

**AIRFLOW** = Room air flow rate supply [mc/h]

## Airflow 270 m<sup>3</sup>/h



In the graphic the following variables are present:

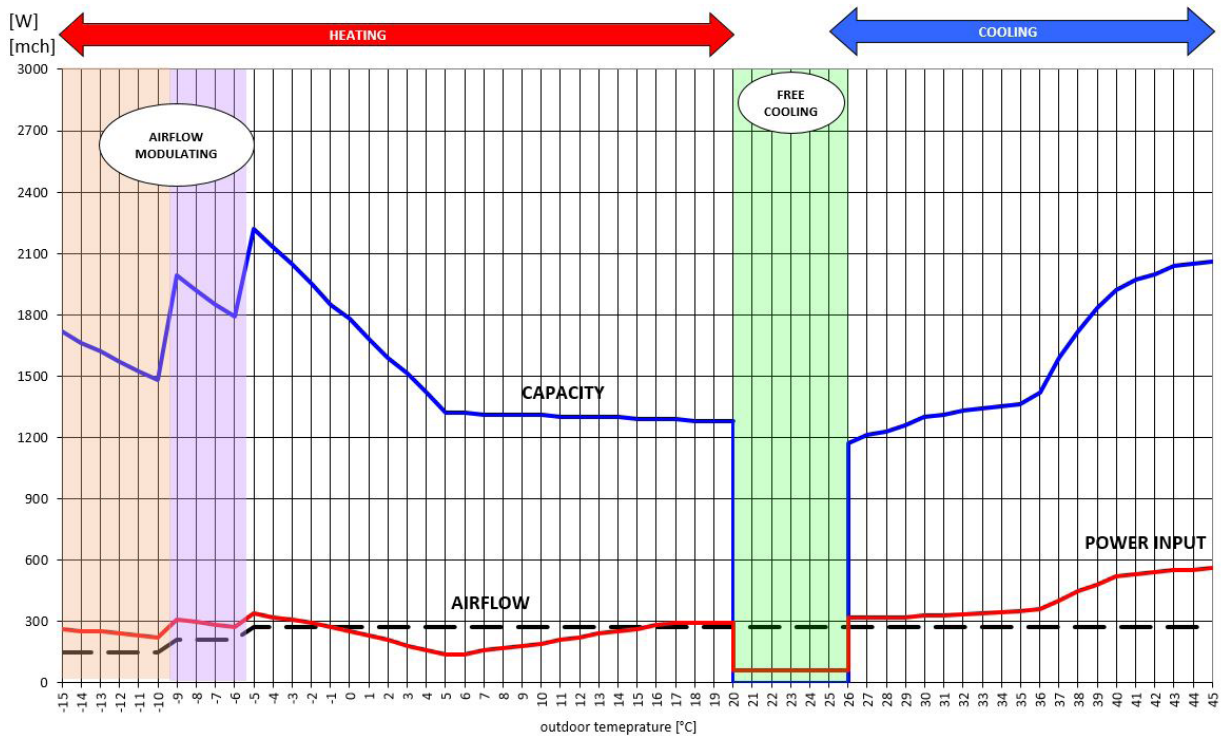
**SET TEMPERATURE** = Room set-point temperature set on remote control.

**SUPPLY TEMPERATURE** = Supply air temperature from ELFOFresh EVO

**COP/EER** = Heating (COP) and cooling (EER) performance coefficients according to EN14511:2018

**Outdoor UR %** = outdoor air relative humidity [%]

**% LOAD** = Compressor load 20-100% [%]



In the graph are represented the following variables:

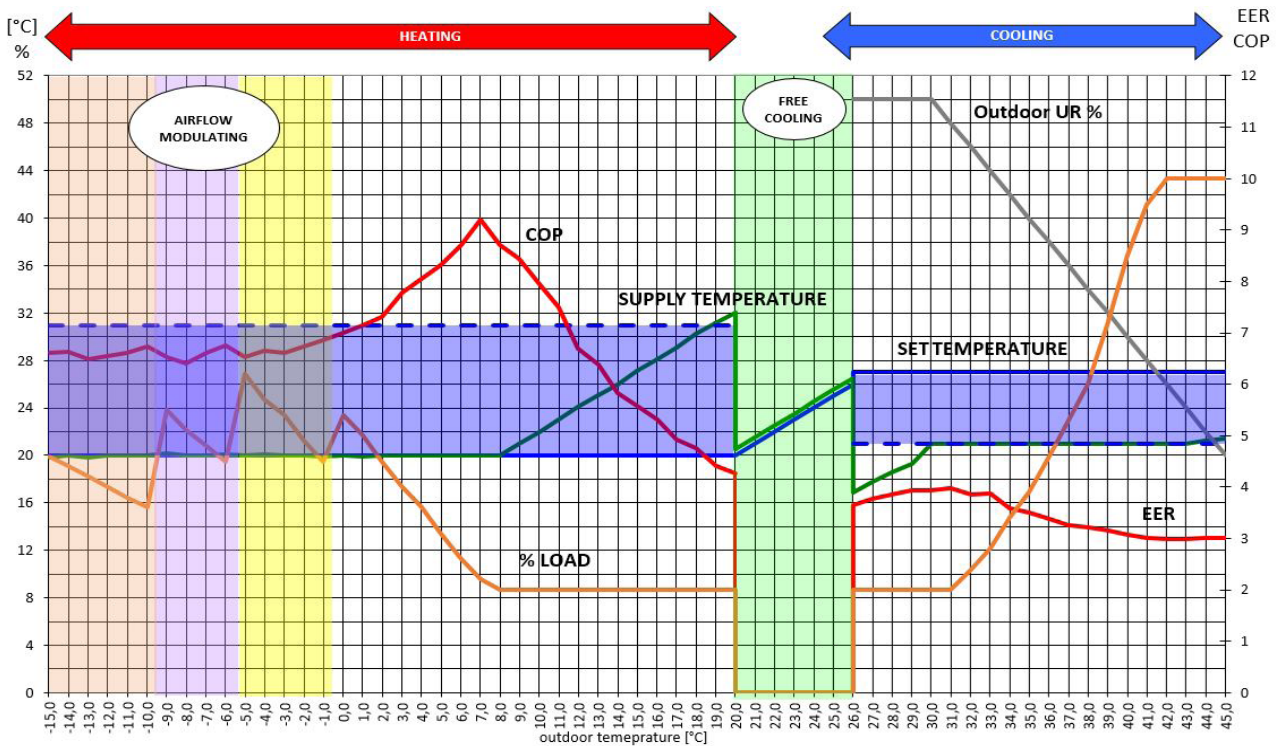
**CAPACITY** = heating / cooling capacity according to EN14511: 2018

**POWER INPUT** = Power input according to EN14511:2018

**AIRFLOW** = Room air flow rate supply [mc/h]

# Operating criteria

## Airflow 320 m<sup>3</sup>/h



In the graphic the following variables are present:

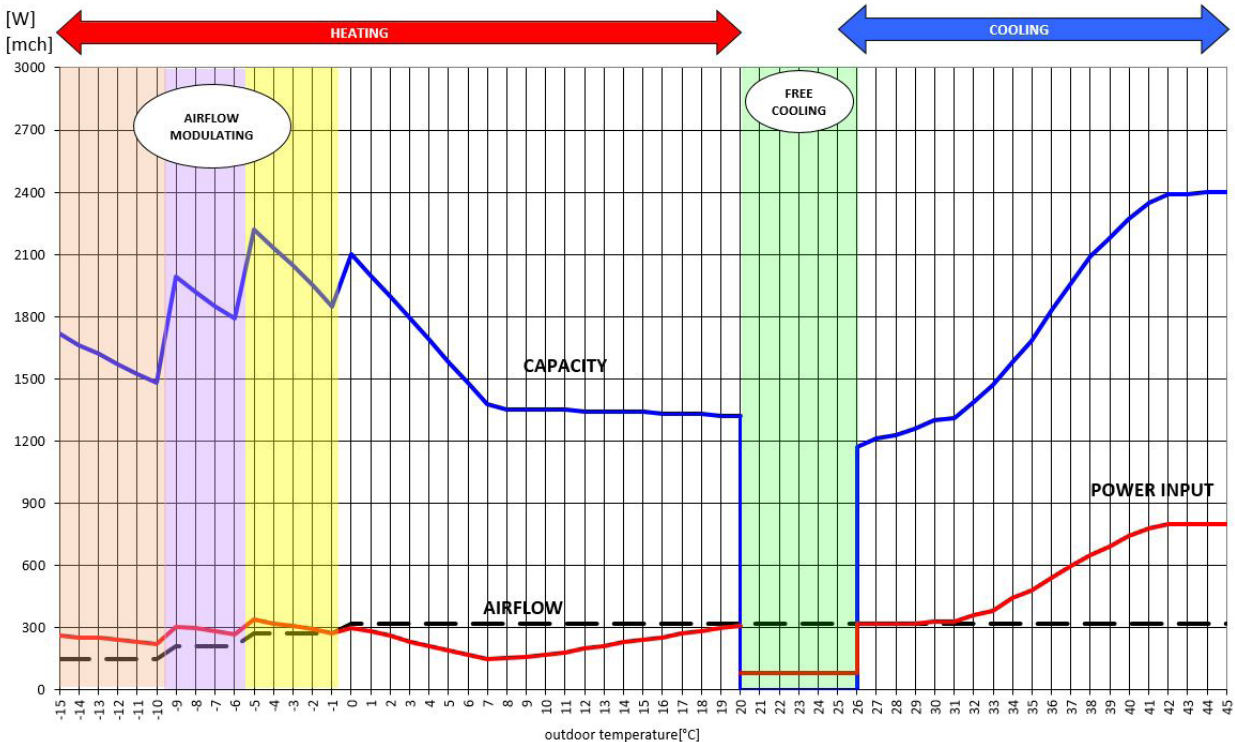
**SET TEMPERATURE** = Room set-point temperature set on remote control.

**SUPPLY TEMPERATURE** = Supply air temperature from ELFOFresh EVO

**COP/EER** = Heating (COP) and cooling (EER) performance coefficients according to EN14511:2018

**Outdoor UR %** = outdoor air relative humidity [%]

**% LOAD** = Compressor load 20-100% [%]



In the graph are represented the following variables:

**CAPACITY** = heating / cooling capacity according to EN14511: 2018

**POWER INPUT** = Power input according to EN14511:2018

**AIRFLOW** = Room air flow rate supply [mc/h]

## UNI/TS 11300-4 - COPpl

### ELFOFRESH EVO - CPAN YIN Size 2 - 125 mc/h

	Tdesignh	A	B	C	D
Te	-10	-7	2	7	12
PLR		0,88	0,54	0,35	0,15
DC		1,95	1,86	1,42	1,23
CR		1,00	0,64	0,54	0,28
P	2,2	2,0	1,2	0,8	0,3
COP (part load)		4,64	4,80	5,16	3,87
COP (full load)		4,64	3,88	3,09	3,97
fCOP		1,00	1,24	1,67	0,98

### Power data and COP data under full load

	Heating capacity ΦH,HP out (kW)	COP
-7	2,0	4,6
2	1,9	3,9
7	1,4	3,1
12	1,2	4,0

### ELFOFRESH EVO - CPAN YIN Size 2 - 150 mc/h

	Tdesignh	A	B	C	D
Te	-10	-7	2	7	12
PLR		0,88	0,54	0,35	0,15
DC		2,06	1,92	1,55	1,46
CR		1,00	0,65	0,52	0,25
P	2,3	2,1	1,3	0,8	0,4
COP (part load)		4,79	5,20	6,05	3,77
COP (full load)		4,79	4,47	3,73	3,65
fCOP		1,00	1,16	1,62	1,03

### Power data and COP data under full load

	Heating capacity ΦH,HP out (kW)	COP
-7	2,1	4,8
2	1,9	4,5
7	1,6	3,7
12	1,5	3,7

#### Terms and definitions:

T mandata = temperatura del pozzo caldo

Tdesignh = A - Average design climate temperature (pursuant to UNI EN 14825).

Te = Outdoors air temperature.

A, B, C, D = Names of the four conditions with which different outdoors air temperatures are associated (Te).

PLR = part load ratio

DC = Power under full load referred to the specified temperatures.

CR = Heat pump load factor.

COP' (full load) = COP under full load referred to the indicated outdoors air temperatures.

COP' (partial load) = COP a carico CR e riferito alle condizioni di temperatura dell'aria esterna indicate

fCOP = COP correction factor, as follows: COP' (full load) / COP (partial load)HP= heat pump.

PdC = Heat pump

DHW = Domestic Hot Water

# Data for the UNI/TS 11300 calculation

## UNI/TS 11300-4 - COPpl

### ELFOFRESH EVO - CPAN YIN Size 2 - 210 mc/h

	Tdesignh	A	B	C	D
Te	-10	-7	2	7	12
PLR		0,88	0,54	0,35	0,15
DC		2,13	2,04	1,86	1,61
CR		1,00	0,64	0,45	0,23
P	2,4	2,1	1,3	0,8	0,4
COP (part load)		5,76	8,67	6,30	4,21
COP (full load)		5,76	4,53	4,13	4,35
fCOP		1,00	1,91	1,52	0,97

### Power data and COP data under full load

	Heating capacity ΦH,HP out (kW)	COP
-7	2,1	5,8
2	2,0	4,5
7	1,9	4,1
12	1,6	4,4

### ELFOFRESH EVO - CPAN YIN Size 2 - 270 mc/h

	Tdesignh	A	B	C	D
Te	-10	-7	2	7	12
PLR		0,88	0,54	0,35	0,15
DC		2,37	2,20	2,05	1,88
CR		1,00	0,66	0,45	0,22
P	2,7	2,4	1,4	0,9	0,4
COP (part load)		6,58	9,93	6,72	4,30
COP (full load)		6,58	5,50	4,93	4,59
fCOP		1,00	1,81	1,36	0,94

### Power data and COP data under full load

	Heating capacity ΦH,HP out (kW)	COP
-7	2,4	6,6
2	2,2	5,5
7	2,1	4,9
12	1,9	4,6

#### Terms and definitions:

T mandata = temperatura del pozzo caldo

Tdesignh = A - Average design climate temperature (pursuant to UNI EN 14825).

Te = Outdoors air temperature.

A, B, C, D = Names of the four conditions with which different outdoors air temperatures are associated (Te).

PLR = part load ratio

DC = Power under full load referred to the specified temperatures.

CR = Heat pump load factor.

COP' (full load) = COP under full load referred to the indicated outdoors air temperatures.

COP' (partial load) = COP a carico CR e riferito alle condizioni di temperatura dell'aria esterna indicate

fCOP = COP correction factor, as follows: COP' (full load) / COP (partial load)HP= heat pump.

PdC = Heat pump

DHW = Domestic Hot Water

## UNI/TS 11300-4 - COPpl

### ELFOFRESH EVO - CPAN YIN Size 2 - 320 mc/h

	Tdesignh	A	B	C	D
Te	-10	-7	2	7	12
PLR		0,88	0,54	0,35	0,15
DC		2,68	2,63	2,49	2,20
CR		1,00	0,62	0,42	0,21
P	3,0	2,7	1,6	1,0	0,5
COP (part load)		6,09	8,00	6,86	5,50
COP (full load)		6,09	4,96	4,61	5,12
fCOP		1,00	1,61	1,49	1,08

### Power data and COP data under full load

	Heating capacity ΦH,HP out (kW)	COP
-7	2,7	6,1
2	2,6	5,0
7	2,5	4,6
12	2,2	5,1

#### Terms and definitions:

T mandata = temperatura del pozzo caldo

Tdesignh = A - Average design climate temperature (pursuant to UNI EN 14825).

Te = Outdoors air temperature.

A, B, C, D = Names of the four conditions with which different outdoors air temperatures are associated (Te).

PLR = part load ratio

DC = Power under full load referred to the specified temperatures.

CR = Heat pump load factor.

COP' (full load) = COP under full load referred to the indicated outdoors air temperatures.

COP' (partial load) = COP a carico CR e riferito alle condizioni di temperatura dell'aria esterna indicate

fCOP = COP correction factor, as follows: COP' (full load) / COP (partial load)HP= heat pump.

PdC = Heat pump

DHW = Domestic Hot Water



# Dati per il calcolo UNI/TS 11300

## UNI/TS 11300-3 - EER

Size	Conditions			
	External temperature	Internal temperature	Load	EERi
	DB/WB [°C]	DB/WB [°C]	%	
CPAN-YIN - SIZE2 125 mc/h	35/24	27/19	100	4,34
	30/22	27/19	75	3,03
	25/19	27/19	50	2,14
	20/12	27/19	25	2,00

Size	Conditions			
	External temperature	Internal temperature	Load	EERi
	DB/WB [°C]	DB/WB [°C]	%	
CPAN-YIN - SIZE2 150 mc/h	35/24	27/19	100	3,15
	30/22	27/19	75	3,17
	25/19	27/19	50	2,56
	20/12	27/19	25	2,16

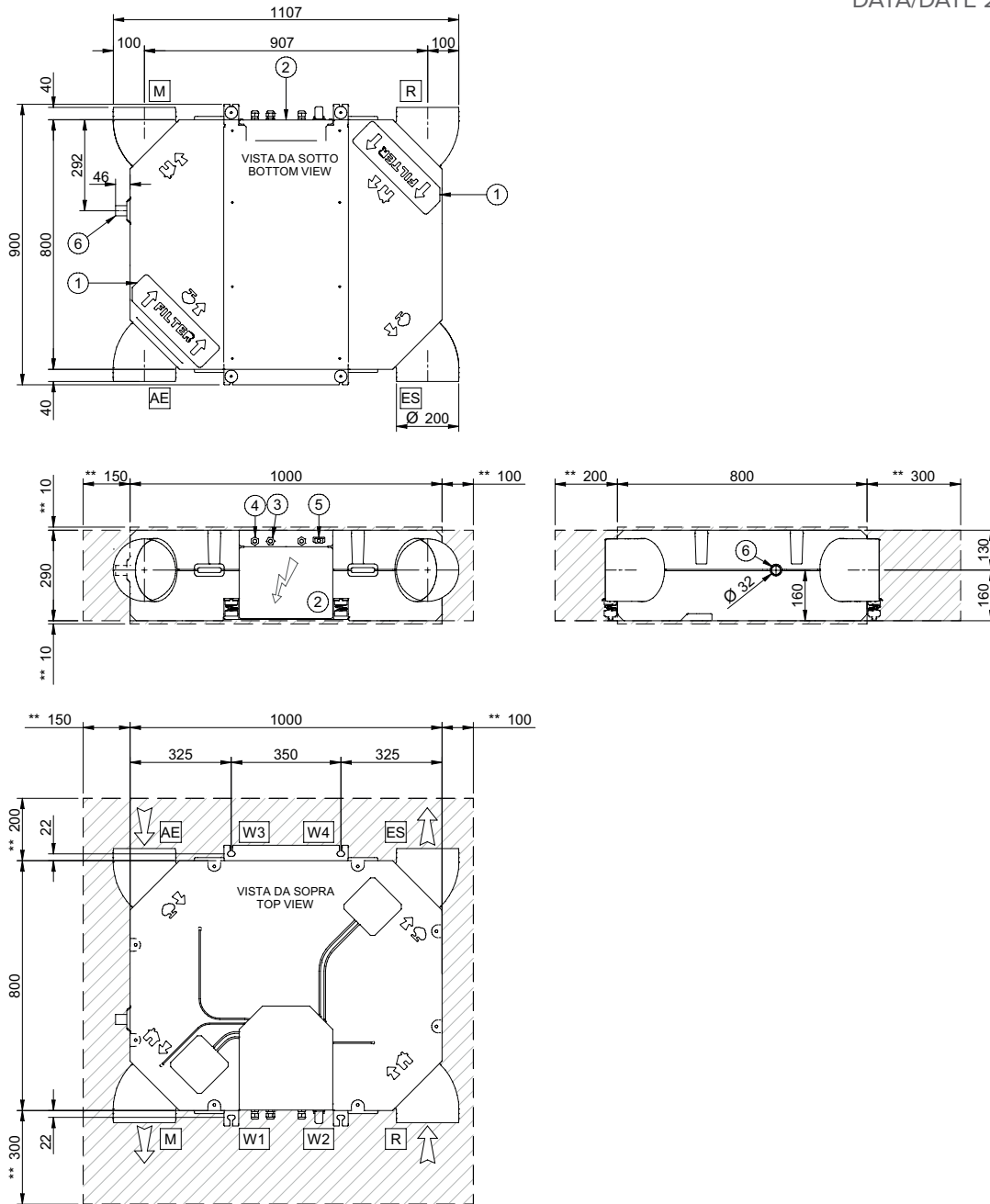
Size	Conditions			
	External temperature	Internal temperature	Load	EERi
	DB/WB [°C]	DB/WB [°C]	%	
CPAN-YIN - SIZE2 210 mc/h	35/24	27/19	100	3,26
	30/22	27/19	75	3,33
	25/19	27/19	50	2,79
	20/12	27/19	25	2,49

Size	Conditions			
	External temperature	Internal temperature	Load	EERi
	DB/WB [°C]	DB/WB [°C]	%	
CPAN-YIN - SIZE2 270 mc/h	35/24	27/19	100	3,49
	30/22	27/19	75	3,69
	25/19	27/19	50	3,52
	20/12	27/19	25	2,88

Size	Conditions			
	External temperature	Internal temperature	Load	EERi
	DB/WB [°C]	DB/WB [°C]	%	
CPAN-YIN - SIZE2 320 mc/h	35/24	27/19	100	2,77
	30/22	27/19	75	3,05
	25/19	27/19	50	3,50
	20/12	27/19	25	2,76

## Size - SIZE 2

DAA5Q0001\_02 REV02  
DATA/DATE 28/08/2019



1. Removable panel for bottom access to the air filter
2. Electrical panel
3. Power input
4. Keyboard connection
5. Auxiliary connection
6. Condensate drain connection
7. Emergency drain

- W1-W2-W3-W4 - Hanging brackets  
 AE - Outdoor air  
 ES - Exhaust air  
 M - Supply air  
 R - Return air

SIZE		SIZE 2
A - Operating length	[mm]	1107
B - Operating depth	[mm]	900
C - Operating height	[mm]	290
Shipping length	[mm]	1200
Shipping depth	[mm]	1000
Shipping height	[mm]	320
Operating weight	[kg]	44
Shipping weight	[kg]	73

Weight distribution		
Unit configuration	Shipping weight	Operating weight
IFC	73	44
EI	89	60

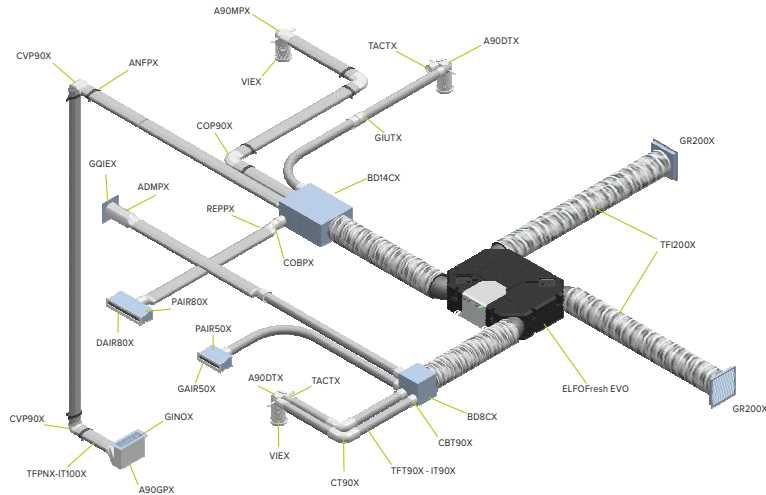
IFC = False ceiling installation  
 EI = Cased installation



## Clivet's modular solution

ELFOAir is a modular solution for air distribution, which prevents issues related to selection, design and installation typical of traditional air systems. A clever mix of functionality and reliability, ELFOAir is the exclusive system that is perfectly combined with ELFOFresh EVO to provide fresh air in domestic settings.

- ▶ Suited to all needs
- ▶ Simple to install
- ▶ Minimum Size
- ▶ Antistatic and Antibacterial



## Underfloor, false-ceiling and wall installation

In new buildings and renovation of existing buildings ELFOAir is the best solution to fully enjoy the benefits of the ELFOFresh EVO ventilation system thanks to its insulated flexible ducts, which do not break or warp even when stepped on.. These are ideal for underfloor applications, as well as for installations in attics and false ceilings. Specially designed vents and outlets can be perfectly integrated in any kind of architectural context.

## Simple to install

ELFOAir is the plug&play distribution system that reduces installation times by 50%. The simple and user-friendly connection between its elements guarantees a perfect seal and reliability of the distribution system.

## Antistatic and Antibacterial

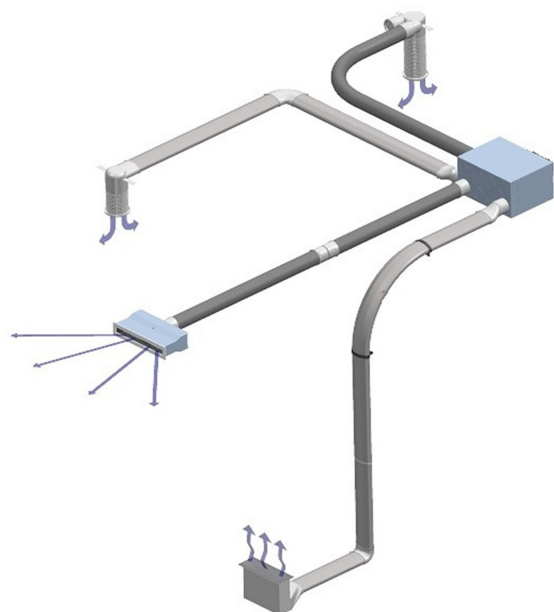
The piping is antibacterial and antistatic ensuring hygiene, sterility and health safety.

## Air renewal in the room

The correct distribution of air in domestic environments.

ELFOAir is the modular air distribution system with manifolds that consists of an air distribution box, flat flexible ducts, horizontal and vertical moulded curves, seal and joint rings, diffusers and accessories made with plastic material and is ideal to guarantee the correct distribution of air in different environments.

- ▶ The manifold distribution ensures the self-balancing of the system and therefore guarantees maximum flexibility in positioning the supply/return vents and outlets and the correct air speed inside the ducts.
- ▶ The flexible duct is easy to install and can be connected to all the other components of the system without the need for special equipment. The insulation of the ducts prevents condensation forming on the external surfaces.
- ▶ The ELFOAir Air system includes a comprehensive series of accessories that are essential to ensure the installation and the perfect operation of the air distribution of ELFOFresh EVO.



## ELFOAir Configurator

Thanks to ELFOAir Configurator, the selection and dimensioning software, ELFOAir solution can be designed in no time and preventing errors.

A simple and powerful tool, available from [www.clivet.com](http://www.clivet.com), that provides an essential support for designers and installers looking for a quick and efficient air distribution solution.

## ELFOFresh EVO ducts

ELFOFresh EVO's air distribution with ELFOAir is performed with flexible insulated ducts, which reduce heat losses and allow for a very low noise emission.

The antibacterial treatment of the inner surfaces ensures the quality of the fresh air. The reduced pitch of the spiral ensures a greater mechanical strength compared to traditional solutions and, even in case of tight bend, the duct maintains its original cross section.

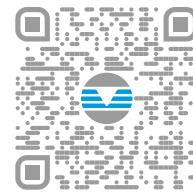


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**CLIVET S.p.A.**

Via Camp Lonc 25, Z.I. Villapaiera  
32032 Feltre (BL) - Italy  
Tel. +39 0439 3131 - [info@clivet.it](mailto:info@clivet.it)

**CLIVET GMBH**

Hummelsbütteler Steindamm 84,  
22851 Norderstedt, Germany  
Tel. +49 40 325957-0 - [info.de@clivet.com](mailto:info.de@clivet.com)

**Clivet Group UK LTD**

Units F5 & F6 Railway Triangle,  
Portsmouth, Hampshire PO6 1TG  
Tel. +44 02392 381235 -  
[Enquiries@Clivetgroup.co.uk](mailto:Enquiries@Clivetgroup.co.uk)

**CLIVET LLC**

Office 508-511, Elektroavodskaya st. 24,  
Moscow, Russian Federation, 107023  
Tel. +7495 6462009 - [info.ru@clivet.com](mailto:info.ru@clivet.com)

**CLIVET MIDEAST FZCO**

Dubai Silicon Oasis (DSO) Headquarter  
Building, Office EG-05, P.O Box-342009,  
Dubai, UAE  
Tel. +9714 3208499 - [info@clivet.ae](mailto:info@clivet.ae)

**Clivet South East Europe**

Jarušćica 9b  
10000, Zagreb, Croatia  
Tel. +385916065691 - [info.see@clivet.com](mailto:info.see@clivet.com)

**Clivet Airconditioning Systems Pvt Ltd**

Office No.501 & 502,5th Floor, Commercial -I,  
Kohinoor City, Old Premier Compound, Off  
LBS Marg, Kiroli Road, Kurla West, Mumbai  
Maharashtra 400070, India  
Tel. +91 22 30930200 - [sales.india@clivet.com](mailto:sales.india@clivet.com)

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