Technical Bulletin

ELFOFresh²

MAKE UP AND PURIFICATION UNIT WITH ACTIVE THERMODYNAMIC RECOVERY FOR INDOOR INSTALLATION

Series CPAN-U 70-120 (R134A) and CPAN-U 200-650 (R410A)

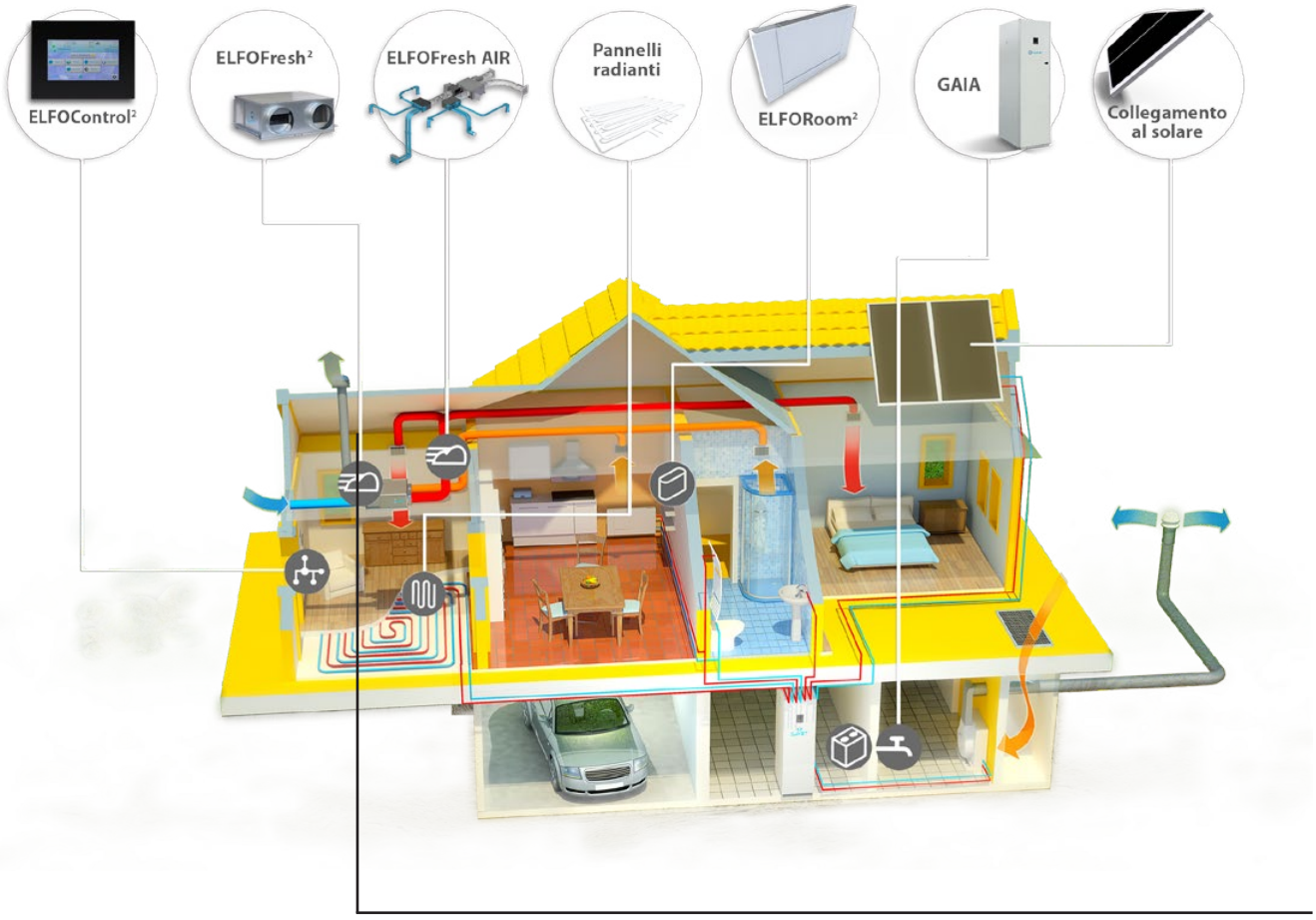
- **SUMMER AND WINTER ACTIVE THERMODYNAMIC RECOVERY**
  Thanks to heat pump technology, all year-round the active thermodynamic recovery multiplies the energy contained in the exhaust air and gets rid of high pressure drops common of traditional systems.
- **ELFOFRESH² FULFILLS UP TO 80% OF THE BUILDING THERMAL REQUIREMENT**
  The produced heating or cooling capacity reduces the capacity requested to the integrated air conditioning system,increasing the seasonal efficiency.
- **ELECTRONIC FILTERING: PM10, BACTERIA, POLLEN**
  The electrostatic filter at high efficiency is able to get rid of fumes, fine dust, viruses and bacteria. Its characteristics allow to reduce the ventilation electric consumptions.
- **SUMMER DEHUMIDIFICATION IDEAL FOR THE COUPLING WITH THE RADIANT COOLING**
  Is the ideal solution to complete radiant systems, thanks to its outstanding ability to control ambient humidity.
- **FREE-COOLING**
  Allows to automatically draw fresh air from outside and supply it in the rooms, at no cost, just by operating the fans.

ELFOFresh² 70 -120 with air flow from **70** to **120** m³/h

ELFOFresh² 200 -650 with air flow from **200** to **650** m³/h

ELFOSystem GAIA Edition

ELFOFresh² is the device for the air renewal of ElfoSystem that Clivet has thought for residential installations and offices



System with an eye to the future

- It does not use fossil fuels
- It uses renewable energy from 75 up to 100%
- Substantially contributes toward reaching the European targets of 20-20-20 by 2020 (reduction of CO^2 emissions, primary energy and use of renewable energy).

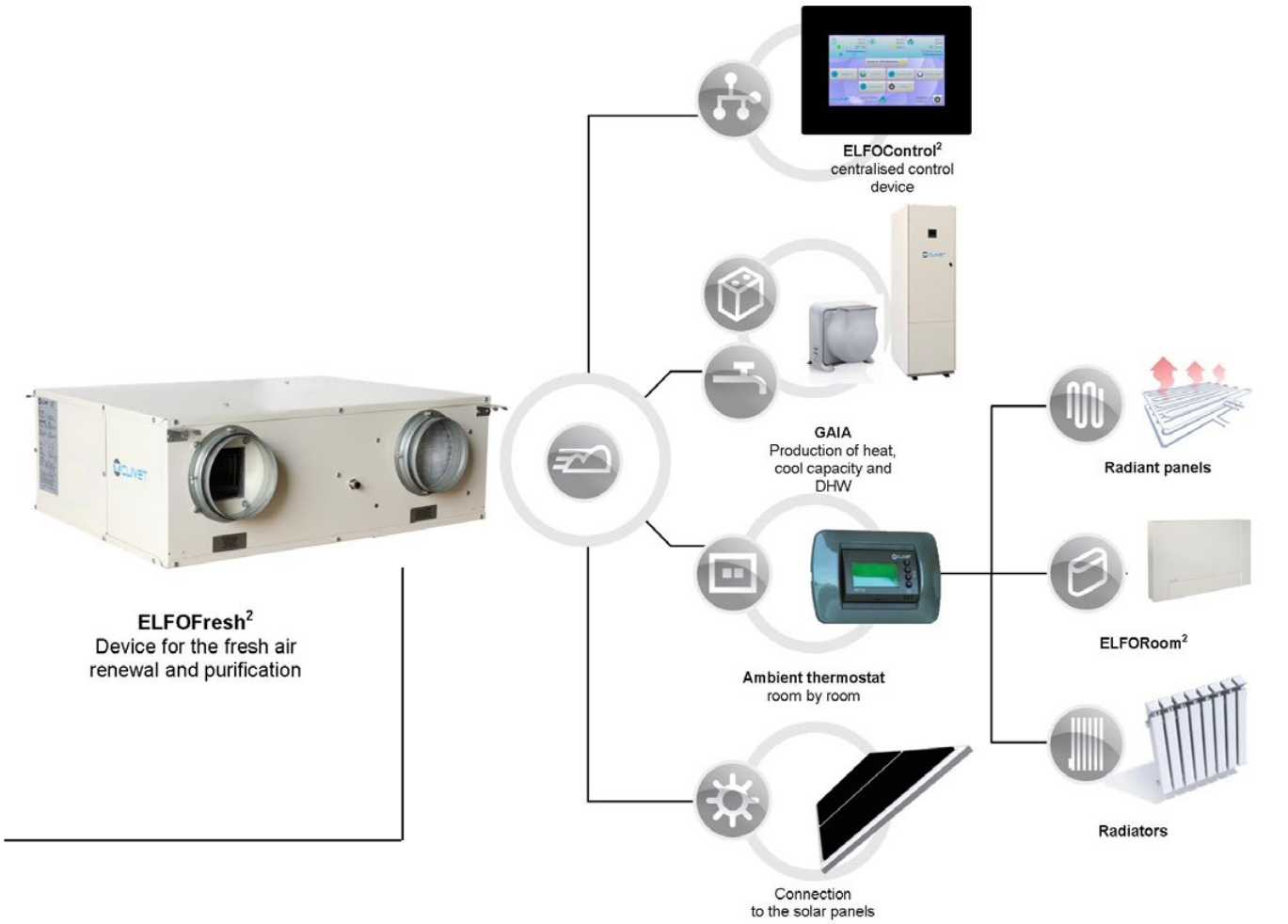
Qualifying proposal

- Specialized solution with high value added
- Single annual cycle system for total comfort
- Increases the building's energy efficiency by at least 2 classes

A single smart system

A single smart system with all the elements that generate year-round comfort:

- Heating
- Cooling
- Domestic hot water
- Fresh air renewal and purification
- Humidity control



Simple to install

- Industrialized solution that permits a quick and high quality installation
- Excludes installation and adjustment errors
- Wirings and connections are clear and preconfigured

Economically convenient

- Thanks to the high energy efficiency levels it increases the value of the property. The investment pays back for itself in 3-4 years on average
- 60% reduction of the space in the heating room
- Complies with the minimum requirements for existing financial incentives.

ELFOSystem components

Production

High efficiency heat pump for the heat/cool and domestic hot water production

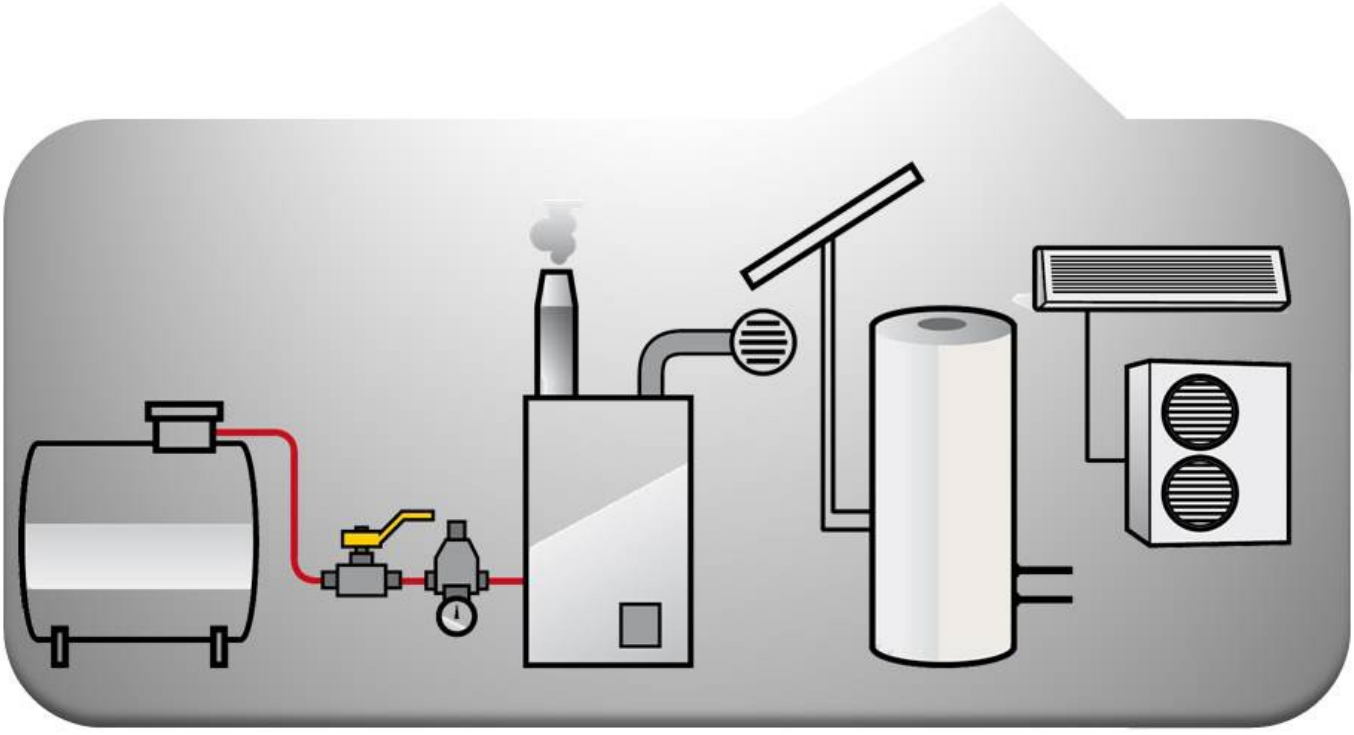
- Packaged unit for the comfort by using renewable energy
- Integrated system to recover solar energy from thermal manifolds
- Integrated domestic hot water production
- System with the best seasonal efficiency on the market
- Water production up to 60°C, operating with outdoor air temperature down to –22°C
- Air and water version

Pre-assembled control unit

Compared with a traditional combustion system, GAIA offers three key benefits:

- It does not require a gas feed, flues and explosion security systems
- Encloses all of the system elements
- In a single unit it includes heating, cooling and solar thermal store

TRADITIONAL SYSTEM

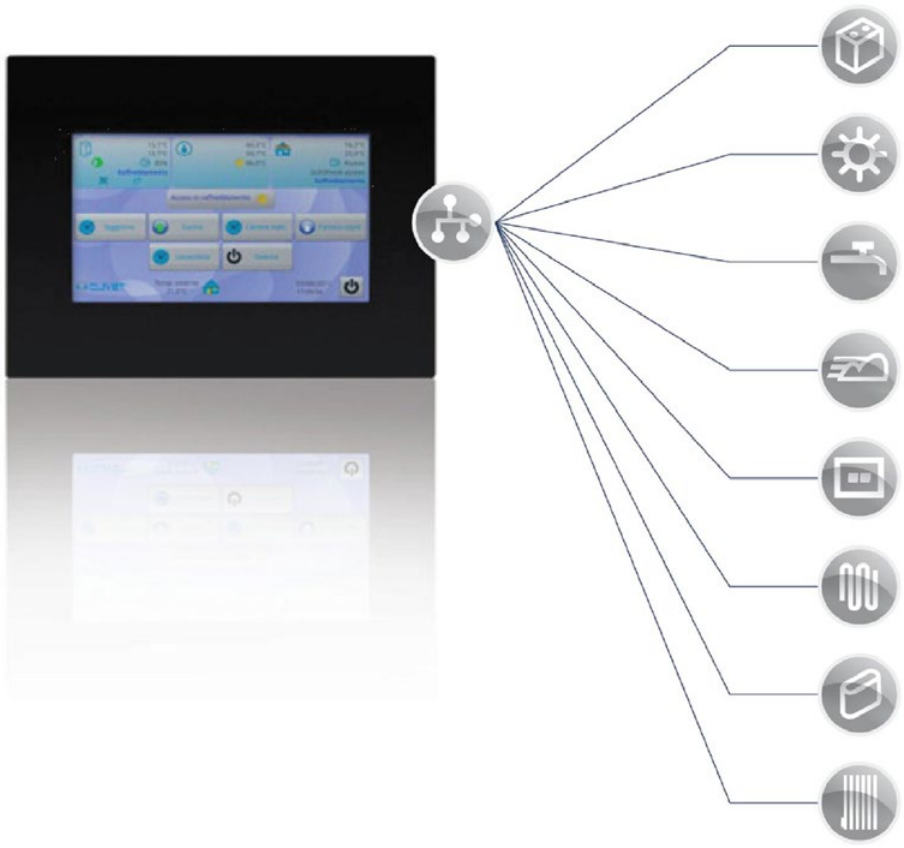


The installation time is DRASTICALLY REDUCED to the best advantage of a QUALITY AND SAFETY result.

ELFOControl² control

Advanced control system to manage the operation of the entire system

- Complete management of the system
- Intelligent consumption
- Customised comfort levels
- A wealth of functions that are easy to manage
- Android platform



It optimises heating and cooling with GAIA

It uses the contribution of thermal solar sources to produce DHW

It guarantees the availability of domestic hot water

It freshens and purifies air with ELFOFresh²

Communication with the room thermostat for temperature and humidity control.

It manages the radiant panels

It manages the room terminals

It manages radiators and heating furniture

Complete control over comfort

ELFOControl² is the brain behind your system that communicates with all the components installed. It checks the operating conditions of each individual device and allows to adjust the operation of the entire system from a single control centre, on which the setting of all desired parameters to ensure top comfort levels depends.

ELFOControl² adjusts the temperature of each room, controls the humidity levels, ensures the quality of the air and the production of domestic hot water. It checks every aspect of the system in order to ensure the perfect comfort for any kind of need.

Air renewal ELFOFresh²

Energy-recovery based room ventilation and purification

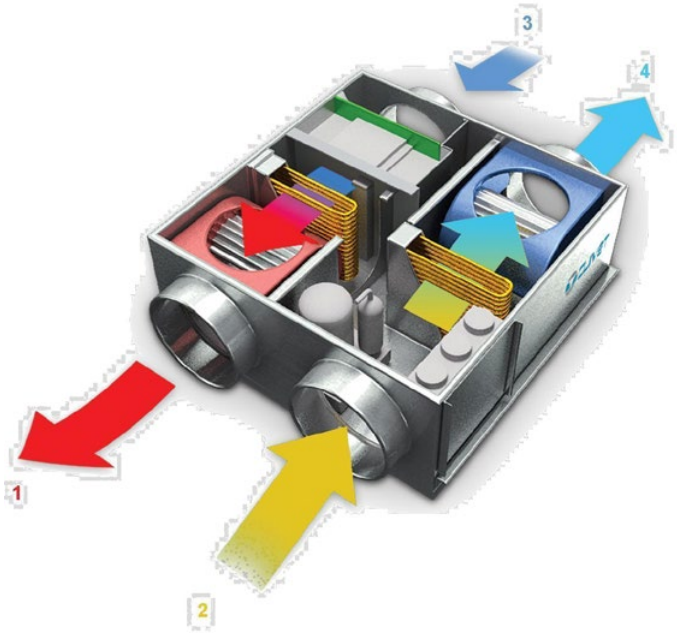
- **Active thermodynamic summer and winter recovery**
  Thanks to the heat pump technology, it multiplies the energy contained in the air ejected all year round and eliminates the considerable pressure drops of traditional systems.

- **Fulfill up to 80% of the building thermal load**
  It reduces the power required from the additional air-conditioning system and increases its seasonal efficiency.

- **Electronic filtering**
  For an effective protection also against the most hazardous polluting agents (PM10, bacteria, pollen).

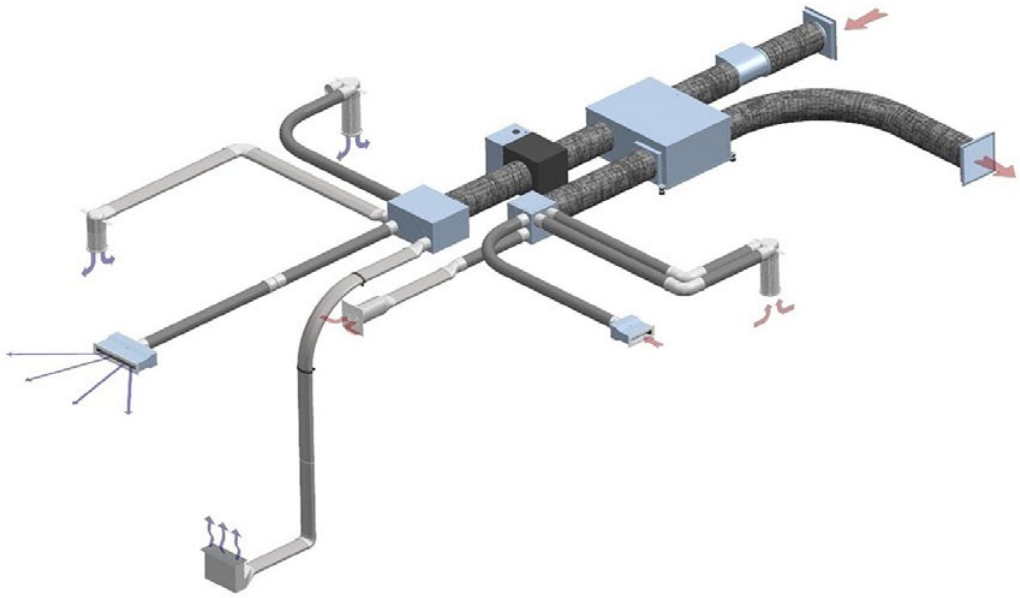
- **Summer dehumidification**
  Ideal in combination with Radiant cooling.

- **FREE-COOLING**
  It allows to draw fresh air from outside and introduce it into the rooms, at no additional cost, just by operating the fans.



1. Clean air supplied into the rooms
2. Stale air drawn from the rooms
3. Outdoor air intake
4. air exhaust

Aria ELFOAir distribution



The exclusive air distribution system of ELFOFresh²

- Versatile installation thanks to the use of walkable flexible ducts
- The components are easy to select and install
- Quality of the air guaranteed by antistatic and antibacterial ducts
- Guaranteed result

ELFORoom² distribution

Cased or uncased water terminal unit for vertical and horizontal installation

- **Homogenous temperatures at all times**
  Eliminates air temperature stratifications thanks to the continuous modulation of the fan speed

- **Reduced consumptions**
  The exclusive motor enables strong reductions in consumption

- **100% silent operation**
  The continuous operation of the fan allows the appliance to always operate at very low speeds, which means the noise it produces is basically imperceptible.

- **Purifies the air while conditioning**
  The continuous fan operating allows the unit to operate always privileging automatically the lower fan speeds in favour of the silence

- **Satisfies all installations**
  Available in both the vertical and horizontal uncased and built-in version

Heat distribution systems

ELFODistribution

Heat diffusion systems with "room by room" temperature control

- 100% guaranteed comfort

  The use temperature and humidity thermostats for environment guarantees optimal comfort conditions for each single room.

- Radiant system management

  From the control of the heads to the control of the dew temperature, every aspect of the system is constantly monitored and controlled.

- Managing systems with radiators

ELFOFresh²

Requirement: air quality and energy recovery

Building design is changing

New building rules and regulations are changing the traditional concept of house

These aspects ensure a considerable improvement in the energy performance of the building envelope in new and renovated buildings, though they lead to increasingly airtight buildings.

Moreover, the sharp decrease in the required heat load transferred by transmission leads to a reduction in the building's energy demand.

In this kind of environment ventilation acquires un ever increasing importance in order to ensure ideal comfort, indeed:

- indoor pollutants may be trapped inside homes
- much more dangerous outdoor pollutants introduced without any kind of filtering and purifying treatment can be even more harmful
- the energy transferred outside during air renewal is always the main factor in terms of the building's energy demand

Fresh and clean air with efficient energy recovery

There is not real comfort with out a proper air renewal rate as odours and harmful substances accumulate inside the house, too.

Therefore, the new building trend illustrated above, which focuses on a considerable improvement of building envelopes, requires a controlled mechanical renewal system for ambient air to ensure the desired renewal values.

However, introducing fresh air directly is not always a healthy option and involves high energy costs.

Indeed, usually the air we eject has a high energy content that needs to be recovered, though without affecting the systems' overall efficiency.

Indoor pollutants affect our health and buildings

Outdoor air contains pollutants that are more dangerous, such as particulates and fine dust, pollen, bacteria and so on.

These affect our health in many ways, including coughs, respiratory diseases, often chronic, increase in susceptibility to infections, problems to the cardio-circulatory system.

Outdoor pollutants are more dangerous than indoor ones

Indoor activities generate many pollutants, only some of which are evident as they are imm
smoke).
In actual fact there are many more sources of pollution that we often do not notice straight away, such as construction materials, furnishings, dispersed dust, mould and micro-organisms, cleaning products, carbon dioxide to name but a few.

The Clivet solution for residential

Compact unit

Fresh air purification and conditioning using the recovery on exhaust air

1. The active thermodynamic system uses heat pump technology to recuperate energy from extract air
2. It operates with 100% outdoor air
3. Extracts and expels the stale air from the space and recovers its thermal energy
4. It supplies Primary Air purified and air-conditioned

Advantages

H10 Equivalent filtering efficiency

Removes pollutants from the rooms we live in

It expels unhealthy air and, at the same time, introduces purified and air-conditioned outdoor air.

With the electronic filters on outdoor air, acting as high-efficiency electrostatic purifier, it minimises suspended pollutants such as smoke, fine dust, viruses and bacteria.

At the same time it reduces electric consumption associated with higher pressure drops common to traditional filters and it also gets rid of the need to change periodically traditional filters because electronic filters can be regenerated by washing.

COP 5.9 at -5°C outside

Is a high efficiency active thermodynamic recovery unit

Unlike traditional systems, the active thermodynamic circuit recovers all year-round the energy contained in the flow of exhaust air, it multiplies it thanks to heat pump technology and then provides it to the served areas of the building. In this way it minimises load for conditioning fresh air and provides additional capacity to maintain comfort conditions.

-40% primary energy in heating

Simplifies the system and increases its efficiency

Thanks to the packaged system construction, the system components and their installation are already included inside the unit.

In addition, the energy generated by the active thermodynamic recovery reduces the power and therefore the cost of the additional air-conditioning system. This comprehensive high-efficiency reduces the user's primary energy consumption even up to 40%.

The Clivet solution

ELFOFresh² 70-120

A compact air renewal and purification unit for houses from 50 to 90 m²

Thanks to the **new automatic speed control in relation to the pressure drops of the system**, the centrifugal fans, which are directly coupled to a **DC motor**, ensure a constant air flow rate.

The benefits deriving from this design solution are featured along the three development and management stages of the system, indeed:

- It simplifies the **design** of the air distribution system, as it is not necessary to take into account extremely small tolerances when calculating the pressure drops of the system itself.
- It makes it **easier to install and activate** the unit in the event of system configurations carried out during installation that differ from the ones reported on the project.
- In the event of **soiled filters** or **incorrect cleaning** of the system, it prevents the machine from going in stand-by or from less than optimal operation due to a drop in the flow rate.

A. Air intake filter
It purifies external renewal air before it is introduced in rooms with a standard filter (G3). It can be fitted with an optional high efficiency electrostatic filter (H10).

B. "Standard" exhaust air filter
These units with reduced power are fitted with the internal G2 filter as standard.

C. Supply fan
The new control allows to maintain a constant rotation speed as the system's pressure drops vary, with 60% less power absorbed compared to traditional fans.

D. Compressor
R134a airtight rotary compressor chosen to optimise the reduced power unit with higher performance levels.

E. Exhaust fan
The new control allows to maintain a constant rotation speed as the system's pressure drops vary, with 60% less power absorbed.

F. Electrical panel
Easy to access in order to conduct maintenance and take it out through the openings.

G. White prepainted aluminium unit

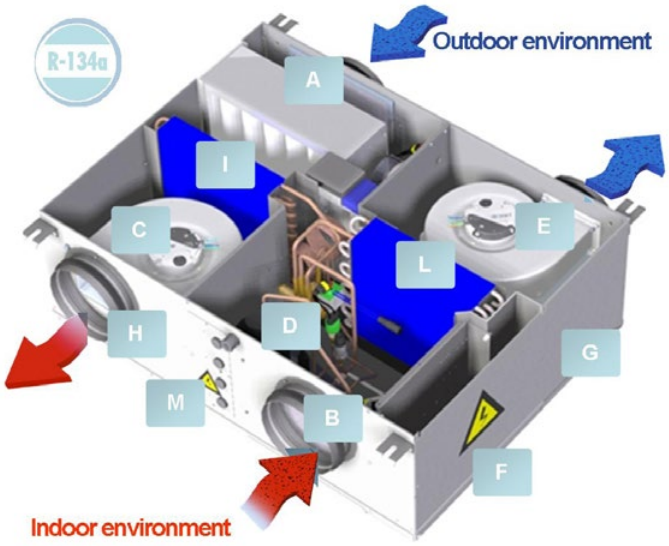
H. DN150 air ducts
Air distribution system size designed in relation to the unit size.

I. Internal exchanger
Finned direct expansion exchanger with copper tubes and aluminium fins

Reduced pressure drops compared to passive recovery units.

L. External exchanger
Finned direct expansion exchanger with copper tubes and aluminium fins

Reduced pressure drops compared to passive recovery units.



Air renewal in relation to the surface of the house:

Model	ELFOFresh² 70					ELFOFresh² 120						
Room surface [m²]	40	50	60	70	80	80	90	100	110	120	140	150
Volume of a room with h=2,7m [m³]	108	135	162	189	216	216	243	270	297	324	378	405
Nominal air flow rate [m³/h]	70	70	70	70	70	120	120	120	120	120	120	120
Renewal rate [vol/h]	0,65	5,2	0,43	0,37	0,32	0,56	0,49	0,44	0,4	0,37	0,32	0,3

ELFOFresh² 200-650

A compact air renewal and purification unit for houses from 150 to 800 m²

- The heat pump components:compressor, thermostatic valve, fans and coils – are perfectly integrated into the unit and can be easily accessed for routine maintenance.
- The electrical panel can be easily controlled remotely.
- The intake section and the air extraction and exhaust section are clearly separated by a steel panel that prevents contamination between the flows.

A. Air intake filter
It purifies external renewal air before it is introduced in rooms with a standard filter (G3). It can be fitted with an optional high efficiency electrostatic filter (H10).

B. "Optional" exhaust air filter
When purchasing the unit, it can be fitted with an external return air filter.

C. Supply fan
It introduces treated air into the room: centrifugal DC electric fan coupled directly to an electric motor.

D. Compressor
It allows to "transfer" heat from exhaust air to renewal air. Airtight rotary compressor R410A.

E. Exhaust fan
It ejects stale air outdoors: centrifugal DC electric fan coupled directly to an electric motor.

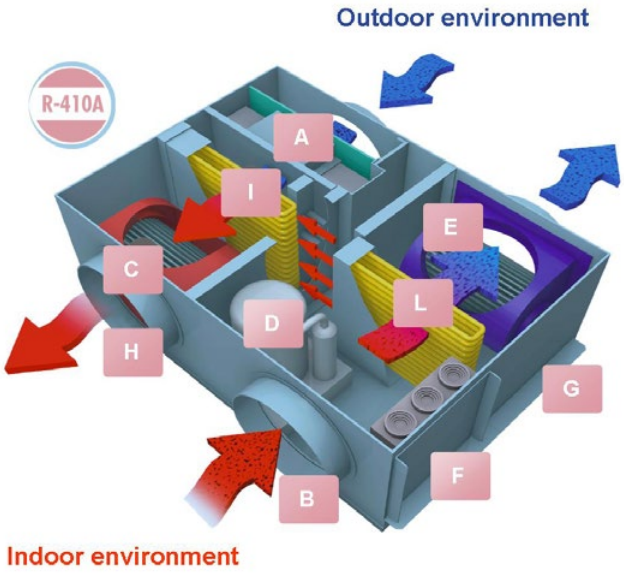
F. Remote electric panel
The electrical panel can be controlled remotely to make installation easier.

G. Aluzink unit

H. DN200-250 air ducts
Air distribution system size designed in relation to the unit size.

I. Internal exchanger
Direct expansion finned coil exchanger with copper pipes and aluminium fins. Reduced pressure drops compared to passive recovery units.

L. External exchanger
Direct expansion finned coil exchanger with copper pipes and aluminium fins. Reduced pressure drops compared to passive recovery units.



Model	ELFOFresh² 200			ELFOFresh² 300			ELFOFresh² 500			ELFOFresh² 650		
Room surface [m²]	150	200	250	250	300	350	350	500	600	600	700	800
Volume of a room with h=2,7m [m³]	405	540	675	675	810	945	945	1350	1620	1620	1890	2160
Nominal air flow rate [m³/h]	200	200	200	300	300	300	500	500	500	650	650	650
Renewal rate [vol/h]	0,49	0,37	0,3	0,44	0,37	0,32	0,53	0,37	0,31	0,4	0,34	0,3

The principle of cooling and heating operation

Recovery that does not penalize ventilation

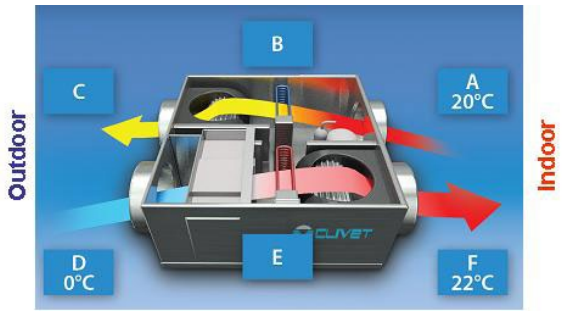
The mechanical, controlled-ventilation system with active recovery involves a unit, with an extremely efficient refrigeration circuit with reduced air-side pressure drops and significant energy cost reductions for ventilation compared with traditional static systems.

Active thermodynamic recovery exchangers have high-efficiency fin batteries that guarantee extremely modest pressure drops during the entire operating cycle.

Winter operation

The indoor air (A), at a temperature of 20°C, before being released outside (C) becomes the thermal source of the heat pump passing through the evaporation coil (B) so that the heat can be recovered.

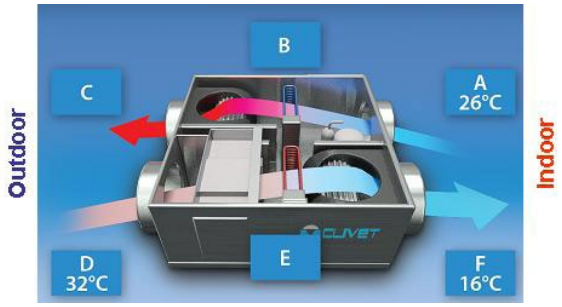
The cooling fluid of the heat pump, after withdrawing the heat from the exhaust air, through evaporation, releases it to the fresh air (D) through the condensation coil (E) before to be released into the rooms (F).



Summer operation

Through the 4-way valve, the cooling cycle is inverted so that the "cold" contained in the exhaust air flow (A), is used in the condensation coil (B) before being exhausted (C).

The fresh air (D), viene filtrata, is filtered, cooled and subsequently dehumidified passing through the evaporator (E) before being released into the rooms (F).



Intermediate season operation (FREE-COOLING/FREE HEATING)

The summer fresh air conditions, especially at night, may be more agreeable than the indoor ones, at least in terms of temperature.

Houses, in fact, accumulate the heat during the central hours of the day and then let it during the night. In similar conditions, the ELFOFresh² technology allows the air supply in the room at cost zero, **"FREE-COOLING"**, only with the fan operating.

The contrary phenomenon, the **"FREE-HEATING"**, occurs in particular climatic conditions, e.g. in the South of Italy.

Thanks to modulating fans, is possible to introduce in the room an air flow higher than the one strectly necessary to the normal renewal.

ELFOFresh² improves comfort

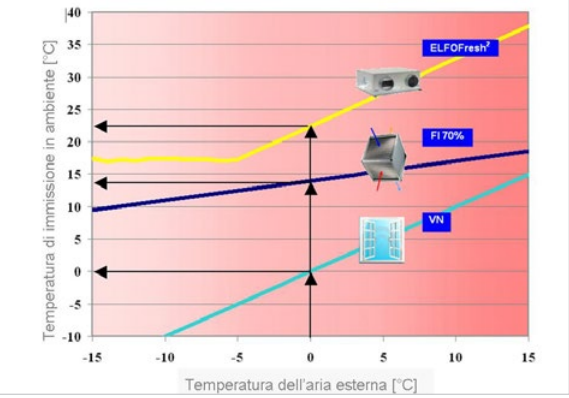
It renews air, which increases well-being

The necessity of fresh air in the rooms where we live is a question of hygiene as well as well-being. Air renewal must take place in controlled conditions so that the air coming from outside is filtered and suited to the desired conditions of temperature and humidity.

Heating temperature

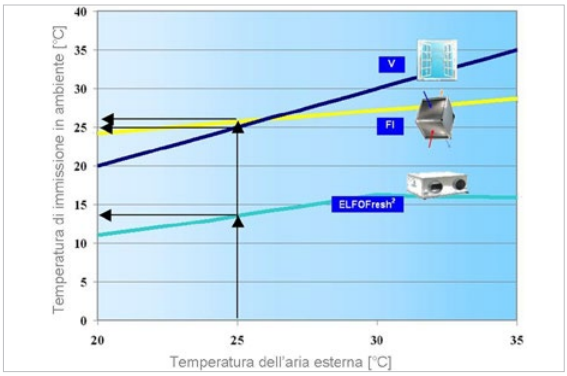
ELFOFresh² allows the intake of fresh air into the rooms at a temperature always higher than any other system; particularly in extreme climate conditions, this avoid for the air intake the low temperatures to compromise the comfort.

- Through the natural ventilation, the air intake temperature corresponds to the outside air temperature.
- By using a passive recovery, the intake temperature is always lower than 20°C and decreases as the outside temperature decreases.
- ELFOFresh², guarantees the comfort down to a temperature of –5°C; at lower temperatures, however, the intake temperature is maintained at around 17°C.



Cooling temperature

- The natural ventilation has the air intake temperature corresponding to the outside temperature.
- By using a passive recovery during specific hours, the risk is that the intake air has higher temperature than the outside one.
- By using an active recovery, the comfort is always guaranteed: at outdoor temperature higher than 30°C, the intake temperature is maintained at 16°C.



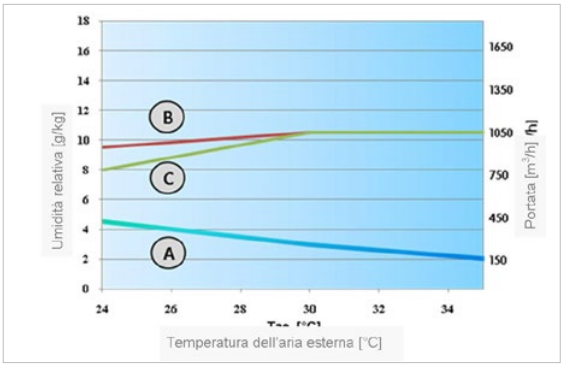
Humidity control

During summer operations, the active thermodynamic recovery cools and dehumidifies the fresh air.

ELFOFresh² can be used combined with cooling systems that use radiant panels (wall, floor, or ceiling), with no need of other dehumidifiers installed in the rooms.

The passive recovery do not perform the fresh air dehumidification, while the enthalpy rotating recovery are only able to perform a partial dehumidification.

The automatic adjustment of the air flow rate (A) of the direct current fans, controls the delivery air humidity (C) and the internal room humidity (B).



Air quality

ELFOFresh² rejects the unhealthy air from bathrooms and kitchen, or from rooms with the higher concentration of pollutants. It also pre-treats the fresh air, released into the living rooms and the bedrooms, by filtering, humidifying or dehumidifying it and taking it at the correct temperature. The fresh and healthy air can be always guaranteed in our houses.

All this, with minimum electrical consumption.

ELFOFresh² riduces consumptions and increases the value of your home.

Maximum seasonal efficiency

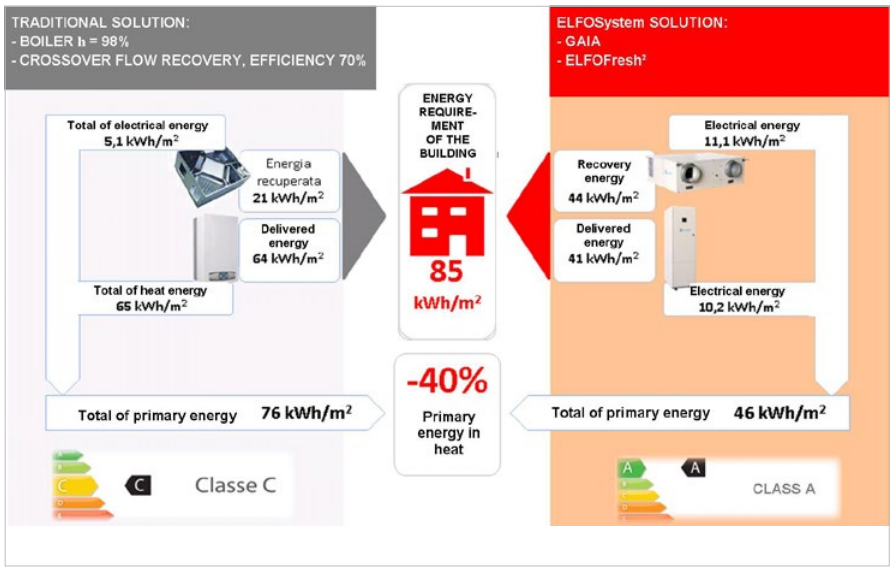
Unlike **traditional systems,** the ELFOFresh² active thermodynamic circuit **recovers the energy contained in the flow of exhaust** air, it multiplies it using heat pump technology and then provides it to the served building with high efficiency.

Heating

The ELFOFresh² energy efficiency is very high because the heat source, with which such heat pump operates, is the exhaust air, having favourable conditions.

During winter operation, for example, with fresh air temperature –5°C and extracted air at 20°C, the ELFOFresh² COP is higher than 5.5.

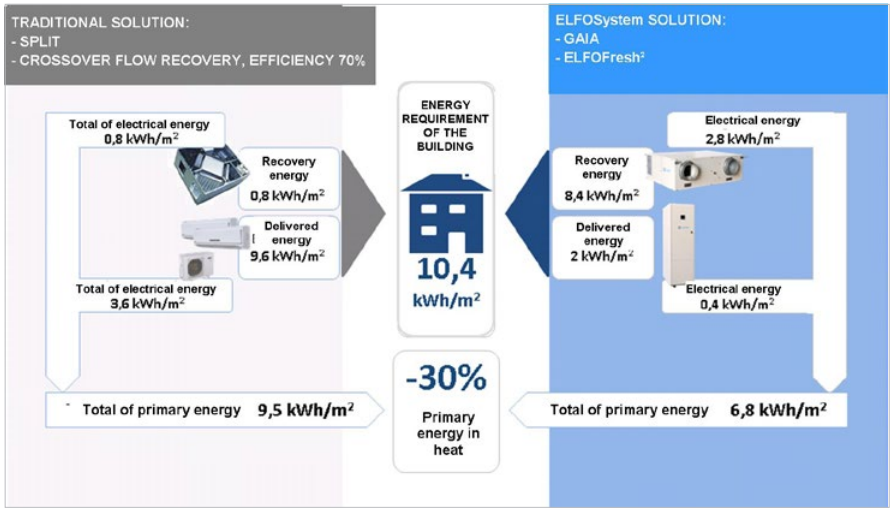
The heating capacity minimizes the fresh air load, providing further power to maintain the comfort conditions. The result for users is a reduction up to 40% of the heat primary energy consumption than a traditional system.



Cooling

Besides recovering the exhaust air heat that, unlike the traditional system also takes place during summer operation, the active recovery generates a quantity of energy supplied to the building also during summer. In this way, the active recovery compensate the heat loss through walls and roof of the building.

Therefore, ELFOFresh² is able to reduce the 30% of cooling primary energy versus a traditional system with a passive recovery and direct expansion system.



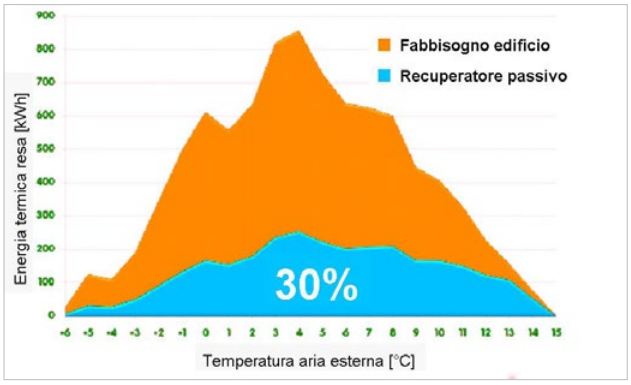
Multiplies the energy recovered from exhaust air

Passive cross-flow recovery unit and 70% efficiency rate

The passive recovery unit is able to supply, by recovering it from exhaust air, only a small percentage of the energy required by the building.

Therefore, the residual demand needs to be provided by a generator, which in the illustrated case is a traditional boiler.

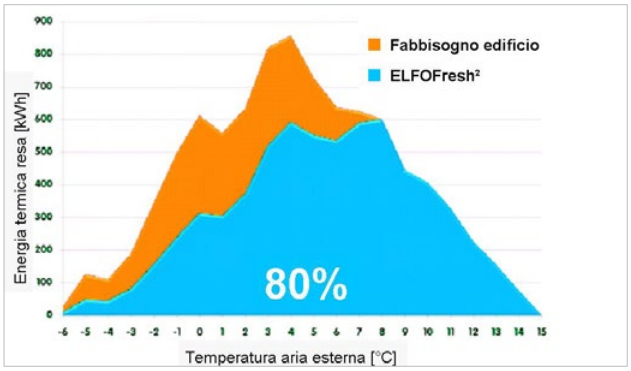
The system's seasonal efficiency drops considerably due to the poor contribution of the recovery unit.



Thermodynamic recovery unit

The graph shows how under the same ambient conditions and in the same building, the part of energy that is recovered and supplied in the room can be as high as 80% of the overall energy demand.

The favourable conditions ELFOFresh² operates in and the important contribution in terms of energy supplied ensure a relevant input to the seasonal efficiency of the whole system.

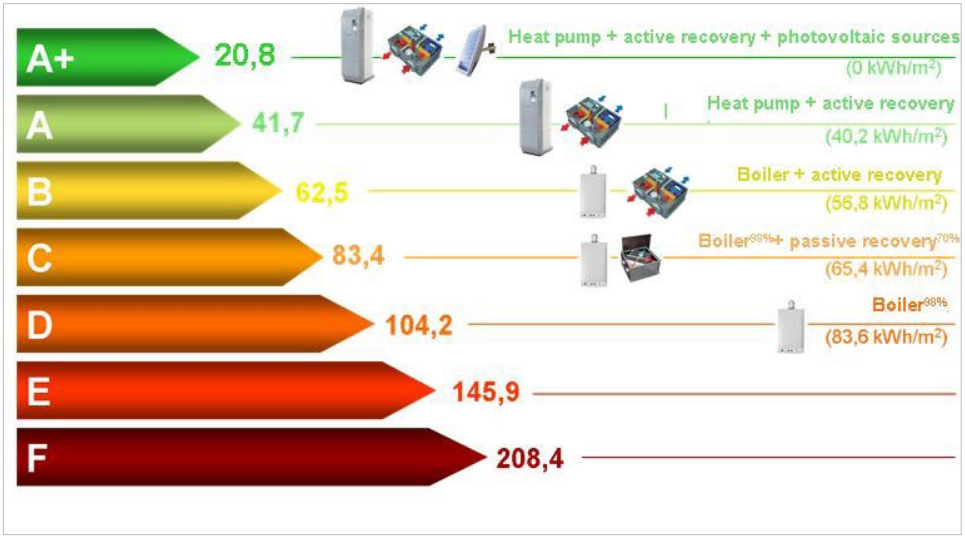


Improved Energy Efficiency Class for the building

ELFOFresh²'s efficiency reduces the absorbed primary energy in comparison to a traditional system.

The example shows that, having the same building features (insulation, doors and windows, etc.), replacing the crossover flows recovery with ELFOFresh² unit, the class of energy efficiency increases from C to B.

Also, considering the use of Gaia as a primary generator, the building energy class becomes "A", thus remarkably increasing the building value.



NOTES: This ex. refers to the energy efficiency classification according to the Italian guidelines, as per Law Decree dated 26 June, 2009, for a single house in Milan, with climate class E, and with the following features: Floor surface: 200m²; heated gross volume: 600m³; dispersing surface: 440m²; S/V ratio: 0.73m-1. Walls and roof insulation: compared to the limit U- value as per law (Uwalls: 0.34; Uroof 0.30; Ubasement 0.33; Uwindows: 2.2 W/m²K).

Flow modulation

The new fans in direct current gave saving 60% for the absorbed capacity

The energetic consumption for the ventilation represents the main cost for the fresh air units.

In order to reduce the operating costs and obtain the highest energy saving, **all units have high-efficiency fans with electric control in direct current: an energy saving 60% than traditional fans is guaranteed.**

The electronic control the automatic modulation of the air flow that, according to the requirements, can increase, in case of FREE-COOLING, or decrease for the dehumidification, extending the functional limits, and limiting the optional use of modular electric heaters from **0,7 or 3 kW** (optional) only for exceptional situations.

The unit is configurated for 40 Pa available head; by changing some parameters it is possible to reach up to **120 Pa**.

The air flow reduction guarantees the comfort during winter operation

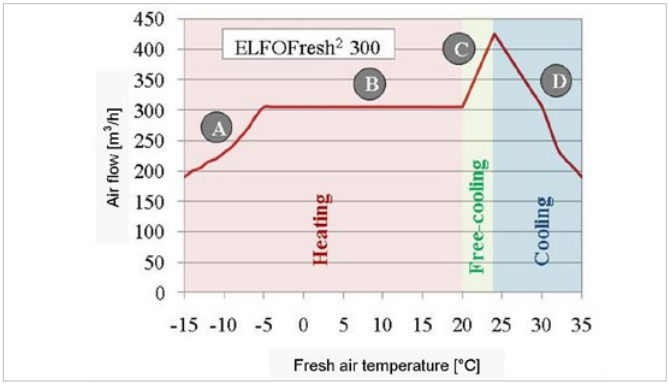
In correspondence to the low temperature values of the fresh air (lower than – 5°C), the intake temperature is fixed (I), approximately equal to the indoor air (20°C) using the air flow reduction (A).

This reduction is performed in order to avoid the intake of fresh air in the rooms that might cause the risk of uncomfortable cold draughts.

In this conditions, the active thermodynamic recovery can completely satisfy the ventilation load.

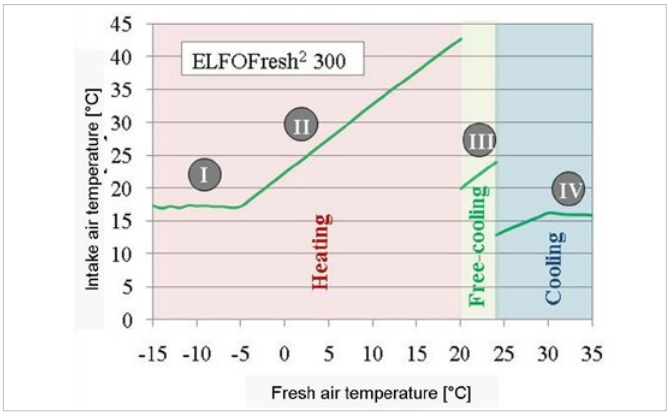
Nominal air flow operating: fulfill of the building load in addition of the ventilation

In the range of fresh air temperature between – 5 °C and + 20 °C, the fresh air flow rate keeps constant (B): the intake temperature in the room (II) increases as the fresh air temperature increases; ELFOFresh², besides compensating the ventilation dispersions, is able to fulfil, either completely or partially, the building load for heating of building.



Increase of air flow rate for cooling the rooms in middle season

In the range between + 20 °C and + 25 °C the building might need being cooled, though without relevant need, it is also possible to perform the free-cooling, by simply allowing a higher air flow rate into the rooms and leaving the compressor deactivated (C). In this case, the efficiency is defined as the ratio between the cooling capacity delivered to the room by the fresh air (directly proportional to the temperature difference between outdoor and indoor, according to the fresh air flow rate) and the absorbed electric capacity (in such case, only by the fans). Due to the reduced absorption of the fans, it is possible to reach a very high efficiency in this operating condition. The intake temperature in the room is exactly equal to the outside one (III).



Reducing the air flow rate to dehumidify

For a more efficient dehumidification of the fresh air, ELFOFresh² reduces the flow rate by modulating the fan speed (D); in this way, it is possible to cool the rooms by using radiant panels with a subsequent efficient dehumidification.

Pure air with the new H10 electronic filters

Increase of the filtration efficiency and decrease of the operating costs

Simply introducing untreated outdoor air to dilute indoor pollutants is not a solution, because of additional polluting agents present in outdoor air.

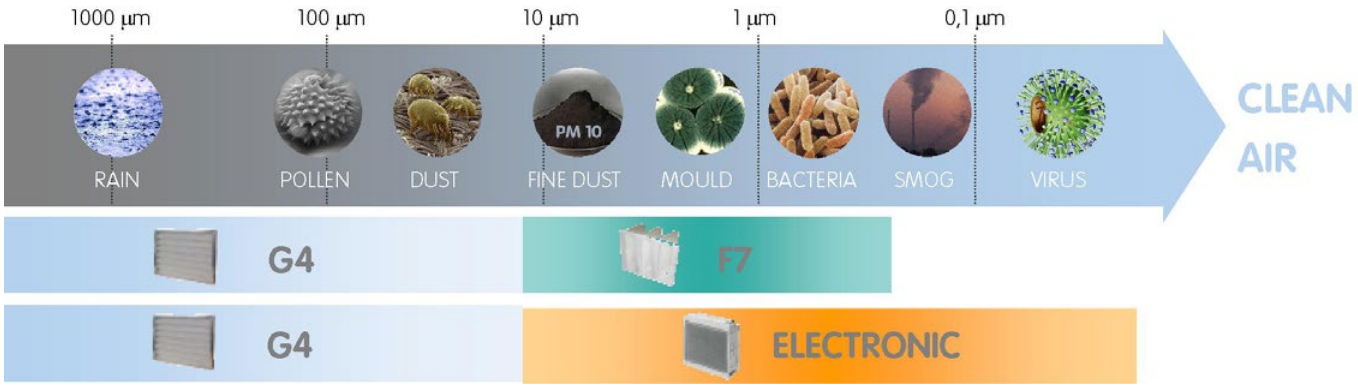
The new **electronic filters** available for ELFOFresh² make fresh air even more efficient and at the same time they reduce costs for ventilation and maintenance compared with traditional systems.

High efficiency filters (F7 category) of a traditional system increase the energy spent on ventilation, because of greater loss of pressure. And also require more frequent maintenance, with a significant cost at the end of each year to replace the filters.

The efficiency of electronic filter on ELFOFresh² is **equivalent to classification H10** used in traditional filters, that is the category indicated as "absolute filter".

These are effective even against:

- Smoke
- Fine dust
- Particulates PM10, PM2,5, PM1
- Bacteria
- Germs and viruses
- Nano-particle



The ventilation energy is reduced

The highest filtration efficiency is obtained **with practically no pressure drops.**

Indeed mechanical filtering is replaced by electronic filtering, which does not prevent air from passing through and ensures negligible pressure drops.

Air quality always under control

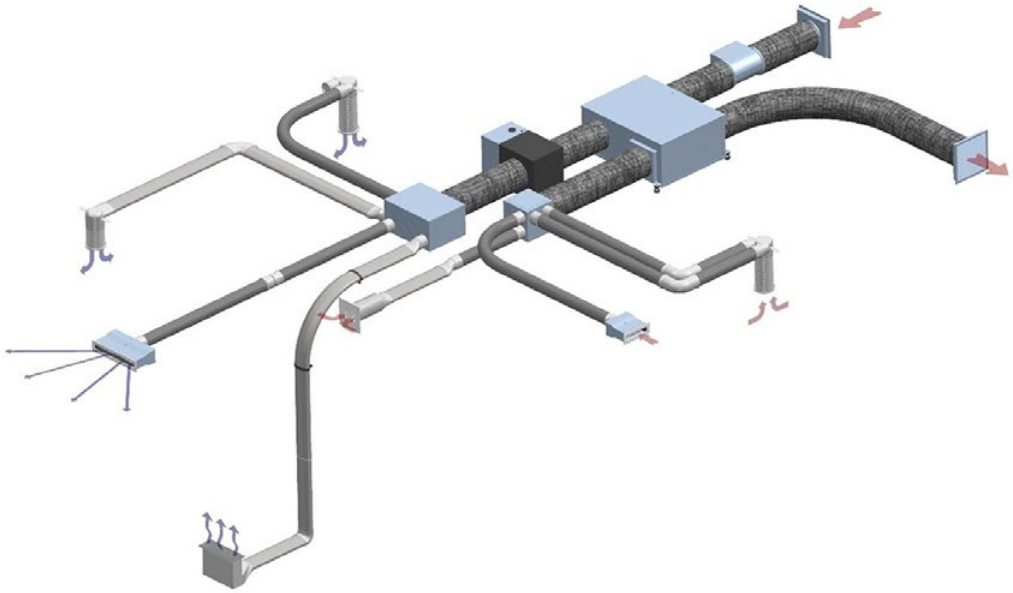
Air filtering is an essential function for ensure proper wellbeing and hygiene conditions are maintained in the areas served.

Moreover, ELFOFresh²'s control reports when it is necessary to clean the electronic filter to always ensure it is used correctly.

ELFOAir

Clivet's modular solution

Issues related to the selection, size and installation of the air distribution and the elements fitted on a traditional system are eliminated thanks to ELFOAir, the modular solution to distribute air through manifolds. A clever mix of functionality and reliability, ELFOAir is the exclusive system that is perfectly combined with ELFOFresh² 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 redevelopment works on existing buildings ELFOAir is the best solution to fully enjoy the benefits of the ELFOFresh² ventilation system thanks to its stepped flexible ducts. These are ideal for underfloor applications, as well as for installations in attics and false ceilings. Specially designed grids and outlets can also be fitted and 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.

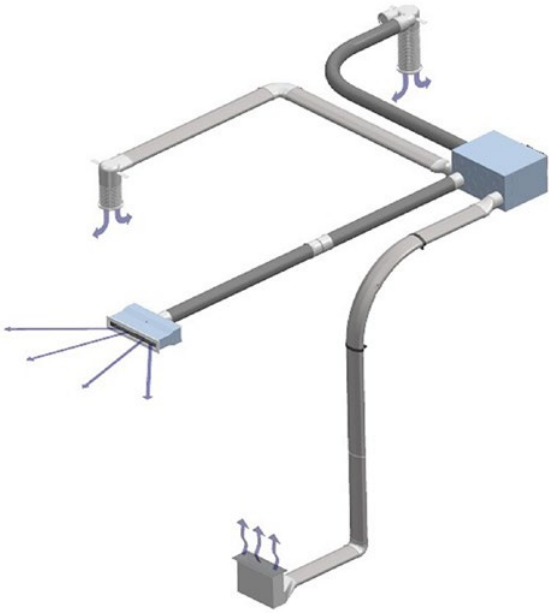
Antistatic and Antibacterial

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 grids and outlets and the correct air speed inside the ducts.
- The distribution to manifolds allows better system balancing and therefore guarantees maximum flexibility in positioning the inlets and supply/return grilles 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 channelling removes the risk of condensation forming on the external surfaces of the ducts themselves.
- The ELFOAir Air system includes a comprehensive series of accessories that are essential to ensure the installation and the perfect operation of the aeraulic distribution of ELFOFresh$^{2.}$

ELFOAir Configurator

Thanks to ELFOAir Configurator, the selection and dimensioning software, the ELFOAir solution is designed in little time and with no errors.

A simple and powerful tool, available from www.clivet.com, that provides an essential support for all professionals to install the ELFOFresh^2 air renewal system.

ELFOFresh^2 ducts

ELFOFresh^2's connection to the distribution system of the internal and external air is conducted by using flexible insulated circular ducts that guarantee the thermal and acoustic insulation of the channels.

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 does not alter the duct's cross-section, even if there is a large radius of curvature.

Standard unit technical specifications

Compressor

Hermetic rotary compressor with gas compression in the crankcase, direct suction, no oil heater. It is mounted on antivibration rubber pads. Includes oil feed.

Fitted on rubber antivibration mounts and complete with oil charge and suction filter.

Structure

Size 70-120:
Supporting structure made with RAL 9001 prepainted sheet aluminium metal that ensures excellent mechanical features and high long-term resilience against corrosion. The entire ventilating area is covered with anti-condensation and sound-proof material.

Size 200-650:
Structure made entirely from "aluzink" plate that guarantees excellent mechanical characteristics and high corrosion strength over time. The ventilating section is completely lined with anti-condensate and soundproofing material.

Internal exchanger

Exchanger for the ambient air pre-treatment

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.

The surface of the 70-120 fins of the coils has been subjected to an hydrophilic treatment to make it easier to discharge condensation and reduce frost.

External exchanger

Exchanger for the energy recovery of the extract air

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.

The surface of the 70-120 fins of the coils has been subjected to an hydrophilic treatment to make it easier to discharge condensation and reduce frost.

Refrigeration circuit

Refrigeration circuit with:

- refrigerant charge
- High pressure safety pressure switch
- suction pressure transducer
- 4-way reverse cycle valve
- capillary as a laminating device (size 70-120)
- thermostatic valve like expansion device (size 200-650)

Drain pan

Size 70-120:
Thermoformed ABS condensate collection tray fitted with drain pipe.

Size 200-650:
Condensate collecting tray in aluminium alloy 1050 H24 with anti-condensate insulation, welded and equipped with discharge coupling.

Fan

Size 70-120:
Brushless centrifugal fan in supplì and expulsion at high energy efficiency with single intake directly coupled to the electric motor with scroll and pallets of metal.

Size 200-650:
Supply and exhaust brushless centrifugal electric fan at high energy efficiency with double intake directly coupled to the electric motor with plastic scroll diam 146 mm and metal pallets.

Filtration

Pleated filter, made up of a galvanized plate frame with galvanized and electric-welded protective mesh and 100% regenerable polyester filtering media with PVC resin. G3 efficiency according to CEN-EN 779 standard (Eurovent class EU3 - average efficiency 84% ASHRAE 52 - 76 Atm). Self-extinguishing (resistance to fire class 1 - DIN 53438). (size 70-650)

Flat filter used for the return of fresh air and ambient air, consisting of a galvanized sheet metal frame with galvanized electrowelded protective meshes and 100% polyester renewable filtering septum with G2 efficiency level in accordance with the CEN-EN 779 standard (size 70-120).

Together with the filter is provided the differential pressure switch in order to signal its cleaning.

Electrical panel

Size 70-120:
Electrical panel located inside the unit and can be easily accessed from the bottom or sides via the removable panels.

Size 200-650:
The electrical panel assembled outside the unit is connected to it by a fast- connect cable (2 m) its remotization in positions where the maintenance/control of the parameters is easier.

Size 70-650:
The capacity section includes:

- compressor and fan fuses
- fan control contactors
- compressor control contactor

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.
- Probe to measure the temperature and supply air humidity of the room
- Temperature probe of the air return from the ambient (thermostat)
- Remote On-Off

Thermostat

The HID-P1 local room control allows:

- to control just one ELFOFresh² unit
- Setting the desired temperature and humidity
- ON/OFF
- change Summer/Winter
- Setting the ventilation-only mode
- Diagnostics management with specific code according to the type of error
- Dimensions: 184x82x27 mm

The thermostat is connected to the unit via a shielded twisted-pair cable at a maximum distance of 15m.

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.

Antivibration

Ceiling and floor spring antivibration mounts kit

The anti-vibration kit consists of 4 base spring vibration isolators, 4 M8 nuts, 4 M8 screws

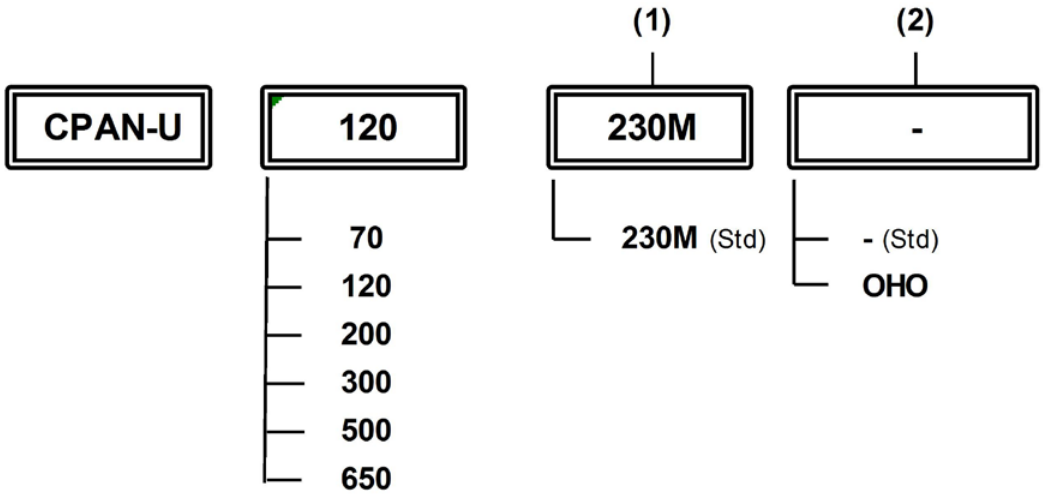
Accessories separately supplied

- CDPX: condensate discharge pump (size 70-650)
- EHPCX: electric heaters 0,7 kW in duct (size 70-120)
  electric heaters 1,5/3 kW in duct (size 200-650)
- FESX: Electronic filter (size 70-650)
- HSE3LX: Immersed electrode humidifier DN200 (size 200-300)
- HSE3MX: Immersed electrode humidifier DN250 (size 500-650)
- FAEX: Exhaust air filter (size 200-650)
- CMMBX - Serial communication module to supervisor (MODBUS)

ELFOAir distribution

ELFOAir Option list at page 44

Configuration Code



1 Supply voltage 230/1/50
Standard power supply

2 Operating mode
- cooling and heating operation (Standard)
OHO Heating-only operation
(size 70 excluding)

Sound levels

Size	Sound power level (dB)								Sound power level	Sound pressure level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
70	60	65	53	42	37	31	25	24	51	37
120	57	57	58	48	38	32	31	22	52	38
200	59	56	52	49	49	40	33	32	52	39
300	60	57	53	51	51	41	34	33	54	41
500	64	61	57	54	54	45	38	37	58	44
650	66	63	59	56	56	47	40	39	60	46

Sound levels refer to the unit at full load installed on the ceiling, ducted, with nominal fan air flow rate. Available static pressure 40 Pa.

In accordance with the UNI-EN ISO 3744 regulation, the average sound pressure level refers to a distance of 1 m from the outer surface of a ducted unit installed on the ceiling.

Measurements are made in accordance to the UNI EN ISO 9614-2, with units installed over two sound reflective surfaces.

If the unit is installed in conditions other than the nominal ones(for instance, near walls or obstacles in generally) the sound levels may undergo substantial variations.

General technical data

Size			70	120	200	300	500	650
Cooling AE 30°C								
Cooling capacity	1	kW	0,43	0.81	1.57	2.10	3.01	4.03
Compressor power input	1	kW	0,16	0,28	0.50	0.64	0.92	1.29
Total power input	1	kW	0,19	0.31	0.54	0.70	1.04	1.48
EER	1		2,27	2.58	2.90	3.00	2.91	2.72
Cooling AE 35°C								
Cooling capacity	2	kW	0.45	0.85	1.63	2.17	3.13	4.23
Compressor power input	2	kW	0.17	0.30	0.52	0.67	0.98	1.33
Total power input	2	kW	0.20	0.33	0.57	0.73	1.10	1.60
EER	2	kW	2.24	2.54	2.87	2.96	2.86	2.78
Heating AE 7°C								
Heating capacity	3	kW	0.52	0.98	1.81	2.33	3.58	5.00
Compressor power input	3	kW	0.14	0.23	0.40	0.54	0.75	1.12
Total power input	3	kW	0.15	0.25	0.44	0.59	0.84	1.27
COP	3		3.38	3.90	4.10	3.93	4.27	3.94
Heating AE -5°C								
Heating capacity	4	kW	0.52	0.97	1.86	2.35	3.74	5.10
Compressor power input	4	kW	0.11	0.189	0.32	0.38	0.58	0.85
Total power input	4	kW	0.12	0.21	0.36	0.43	0.67	1.00
COP	4		4.17	4.74	5.17	5.45	5.57	5.12
Compressor								
Type of compressors			ROT	ROT	ROT	ROT	ROT	ROT
No. of compressors		No	1	1	1	1	1	1
Type of refrigerant			R-134a	R-134a	R-410A	R-410A	R-410A	R-410A
Refrigerant charge		Kg	0,32	0,21	0,80	0,75	1,00	1,45
Fans								
Type of fans			CFG	CFG	CFG	CFG	CFG	CFG
Number of fans		No	2	2	2	2	2	2
Airflow		mch	70	120	200	300	480	650
Fan power input	5	kW	0,014	0,017	0,040	0,052	0,090	0,150
Available nominal pressure		Pa	40	40	40	40	40	40
Max external static pressure		Pa	120	120	120	120	120	120
Connections								
Condensate drain		mm	16	16	26	26	26	26
Power supply								
Standard power supply		V	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
Noise Levels								
Sound pressure level (1 m)	6	dB(A)	37	38	39	41	44	46

1 - AE 30°C: Data referred to the following conditions:
outdoor air temperature 30°C DB/22°C WB
internal air temperature 27°C DB/19°C WB
Nominal air flow

2 - AE 35°C: Data referred to the following conditions:
fresh air temperature: 35°C BS/ 24.0°C BU
internal air temperature 27°C DB/19°C WB
Nominal air flow

3 - AE 7 °C:Data referred to the following conditions:
outdoor air temperature 7°C DB/6°C WB
internal air temperature 20°C DB/15°C WB
Nominal air flow

4 - AE –5°C:Data referred to the following conditions:
fresh air temperature: -5°C BS/ -5.4°C BU
internal air temperature 20°C DB/15°C WB
Nominal air flow

5 - the fan absorptions refer to the air flows of the heating operation (conditions as indicated in note (3)) and 40Pa of available pressure

6 - Sound levels refer to units with full load under nominal test conditions.
The sound pressure level refers to a distance of 1 meter from the outer surface of the unit operating in open field.

Electrical data

Size			70	120	200	300	500	650
F.L.A. - Full load current at max admissible conditions								
F.L.A. - Compressor 1		A	0,87	1,62	2.20	3.10	5.13	6.80
F.L.A. - Single supply fan		A	0,30	0,90	1.20	1.20	1.20	1.20
F.L.A. - Single exhaust air fan		A	0,30	0,90	1.20	1.20	1.20	1.20
F.L.A. - Total		A	1,47	3,42	5.60	6.50	8.53	10.2
L.R.A. - Locked rotor amperes								
L.R.A. - Compressor 1		A	4,35	8,10	12.0	16.5	25.2	37.0
F.L.I. - Full load power input at max admissible conditions								
F.L.I. - Compressor 1		kW	0,19	0,34	0.47	0.69	1.10	1.52
F.L.I. - Single External Fan		kW	0,037	0,115	0.165	0.165	0.165	0.165
F.L.I. – Single exhaust air fan		kW	0,037	0,115	0.165	0.165	0.165	0.165
F.L.I. - Total		kW	0,264	0,57	1.03	1.25	1.66	2.08
M.I.C. Maximum inrush current								
M.I.C. - Value		A	4,95	9,9	14.4	18.9	23.4	39.4

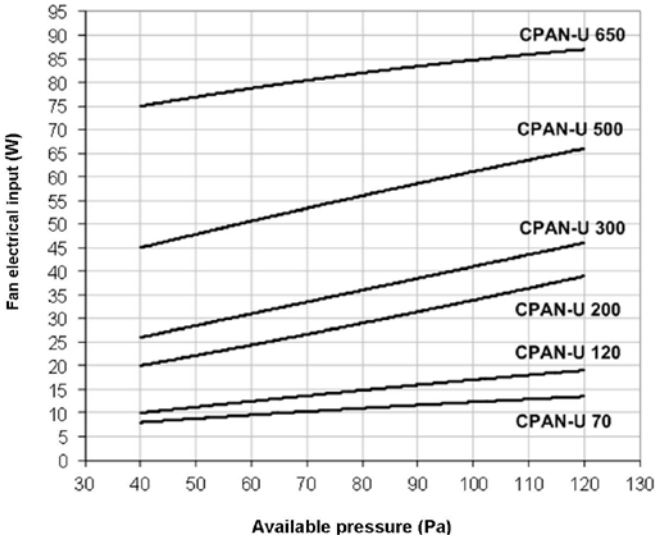
power supply 230/1/50 Hz +/-10%

Electrical input of optional components

To obtain the electrical input of the unit including accessories, add the standard data in Electrical Data table to those for the selected accessories.

Size			70	120	200	300	500	650
F.L.A. - Full load current at max admissible conditions								
F.L.A. EHPCX - Preheating electric heaters from 0.7 kW		A	3,04	3,04	-	-	-	-
F.L.A. EHPCX - Preheating electric heaters from 1.5 kW		A	-	-	6,5	6,5	-	-
F.L.A. EHPCX - Preheating electric heaters from 3 kW		A	-	-	-	-	13	13
F.L.A. HSE3MX/HSE3LX - Electrode boiler steam humidifier from 3 kg/h		A	-	-	9,8	9,8	9,8	9,8
F.L.A. FES/FESX - Electronic filter		A	0,1	0,1	0,1	0,1	0,1	0,1
F.L.A. CDP - Condensate discharge pump		A	0,07	0,07	0,07	0,07	0,07	0,07
F.L.I. Power consumption								
F.L.I. EHPCX - Preheating electric heaters from 0.7 kW		kW	0,7	0,7	-	-	-	-
F.L.I. EHPCX - Preheating electric heaters from 1.5 kW		kW	-	-	1,5	1,5	-	-
F.L.I. EHPCX - Preheating electric heaters from 3 kW		kW	-	-	-	-	3	3
F.L.I. HSE3MX/HSE3LX - Electrode boiler steam humidifier from 3 kg/h		kW	-	-	2,25	2,25	2,25	2,25
F.L.I. FES/FESX - Electronic filter		kW	0,025	0,025	0,025	0,025	0,025	0,025
F.L.I. CDP - Condensate discharge pump		kW	0,016	0,016	0,016	0,016	0,016	0,016

Electrical input of the fan



Electrical input of the single fan in conditions of standard flow in heating.

- outdoor air 7° C
- return 20°C 50%

Pressure drops of optional components

The value of static pressure available on the supply and return duct is obtained by subtracting from the available net maximum pressure (see general table of technical data) the pressure drops of any accessories.

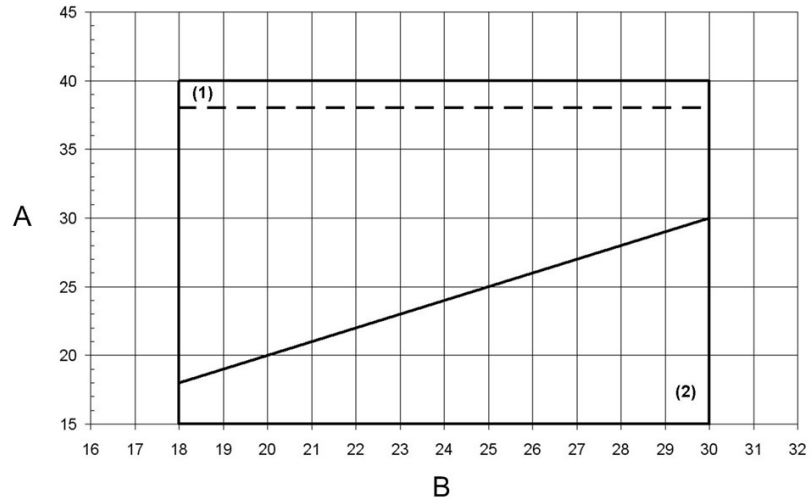
Size			70	120	200	300	500	650
EHPCX - Preheating electric heaters from 0.7 kW		Pa	7	9	-	-	-	-
EHPCX - Preheating electric heaters from 1.5 kW		Pa	-	-	3	5	7	9
EHPCX - Preheating electric heaters from 3 kW		Pa	-	-	3	5	7	9
HSE3MX/HSE3LX - Electrode boiler steam humidifier from 3 kg/h		Pa	-	-	-	-	-	-
FES/FESX - Electronic filter	1	Pa	-8	-12	-7	-11	-6	-10
FAEX - Exaust air filter	2	Pa	-	-	9	15	11	18

The values shown are to be considered approximate for units operating power in normal use with standard air flow rate.

1. Pressure drop differences compared to standard G3 pleated filters
2. Pressure drops with filters with average dirtiness

Operating limits

Cooling



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

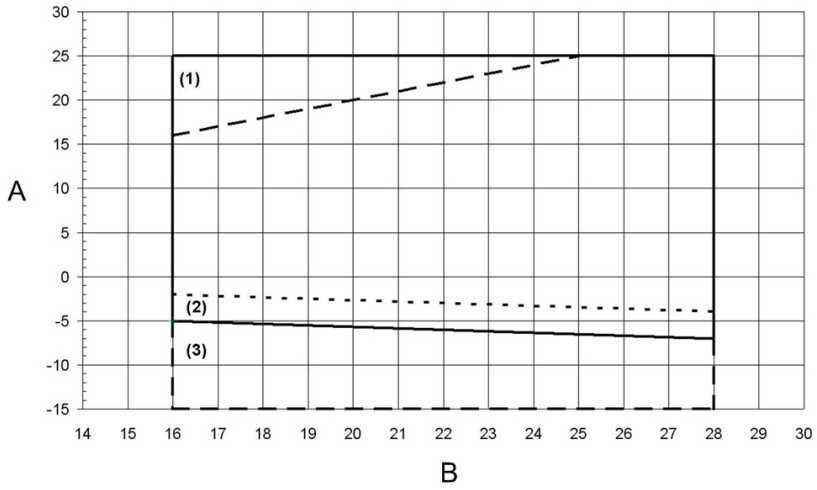
- general and non specific sizes
- clean coils and filters,
- straightforward unit installation and correct use and maintenance of the unit itself.

1. operating range with outdoor relative humidity < 40%
2. Zone of possible operation in FREE-COOLING

A. Outdoor air temperature (°C)

B. Indoor Return Air Temperature [°C]

Heating



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

- general and non specific sizes
- clean coils and filters,
- straightforward unit installation and correct use and maintenance of the unit itself.
- relative humidity of the return air > 50%

1. zone of possible operation in Free Heating
2. the broken line identifies the operation limit of the standard unit with internal relative humidity < 40%
3. operating range with return air flow modulation. In case of a long permanence in this zone it is recommended the use of the "electrical resistance of modulating pre-heating" accessory.

A. Outdoor air temperature (°C)

B. Indoor Return Air Temperature [°C]

Design criteria

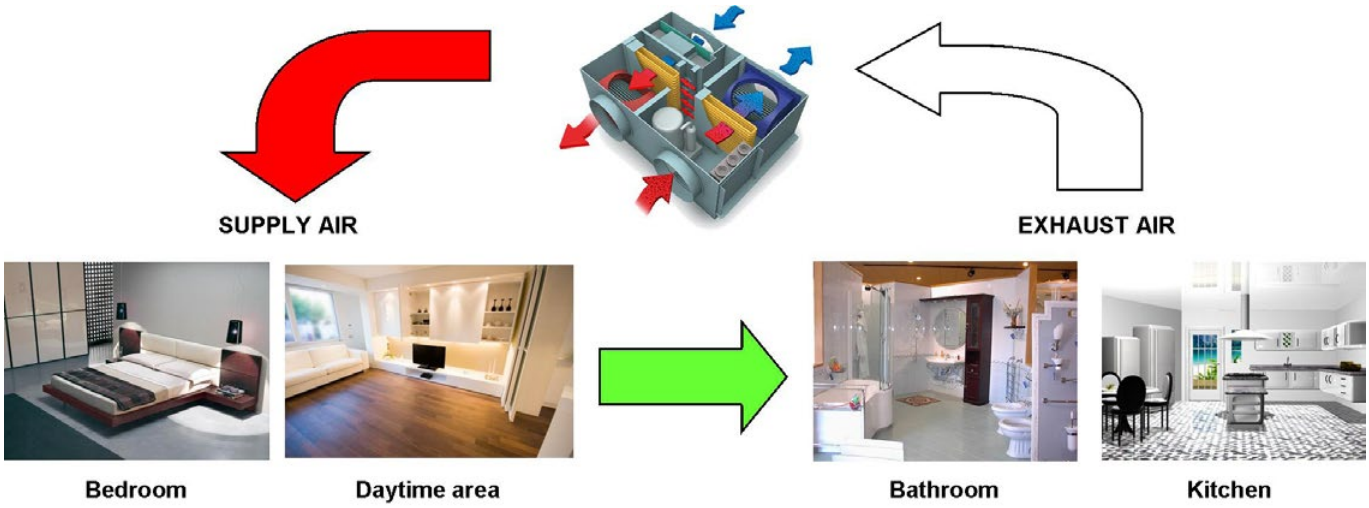
ELFOFresh² size selection

ELFOFresh² is available in the sex sizes, with air flow rate respectively of 70 - 120 - 200 - 300 - 500 - 650 m³/h.

The ELFOFresh² recovery size is selected according to the air exchange volumes.

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 ELFOFresh² the following shows a typical application example that focuses on a house of 180 m² 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 ELFOFresh².

	Room	Surface	Height	Volume	Flow-rate
		m²	m	m³	m³/h
Air supply	Livingroom	50	2.7	135	90
	1 room	12	2.7	32.4	20
	2 room	13	2.7	35.1	20
	3 room	25	2.7	67.5	45
Extraction	Study room	14	2.7	37.8	25
	Kitchen	24	2.7	64.8	100
	1 bathroom	15	2.7	40.5	50
	2 bathroom	14	2.7	37.8	50
Other	Corridor	13	2.7	35.1	0

If during the planning stage one considers choosing a renewal rate of 0.5 Volumes per hour, the renewal capacity will be the product of the home volume multiplied by the rate of renewal.

In our example, it will be 486m³ x 0.5 = 243 m³/h.

The size of ELFOFresh² to be selected may be 200 or 300 depending on the lower or higher rate of air exchange that is required.

ELFOFresh² 200 → renewal rate = 200/486 =0,41 Vol/h
ELFOFresh² 300 → renewal rate = 300/486 =0,61 Vol/h

It should be highlighted 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 the ELFOfresh² 200, the renewal rate in the noble rooms (total noble room volume = 307.8 m³) is 200/307.8 = 0.65 Vol/h while the rate of renewal in the technical rooms (total technical room volume = 143 m³) is 200/143 = 1.39 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 exchange of air. The room designated as corridor has no supply or extraction grille because it is an area used by the occupants to move between the various rooms and where the renewal air is blown into the noble rooms for the corridor in order to be sucked into the technical rooms.

The renewal air airflow for each noble room can be calculated using the rate for noble rooms, i.e. 0.65 Vol/h multiplied by the volume of the individual room.

Example: living room = 135 m³ → air flow = 135 x 0,65 = 88 m³/h rounded to 90 m³/h

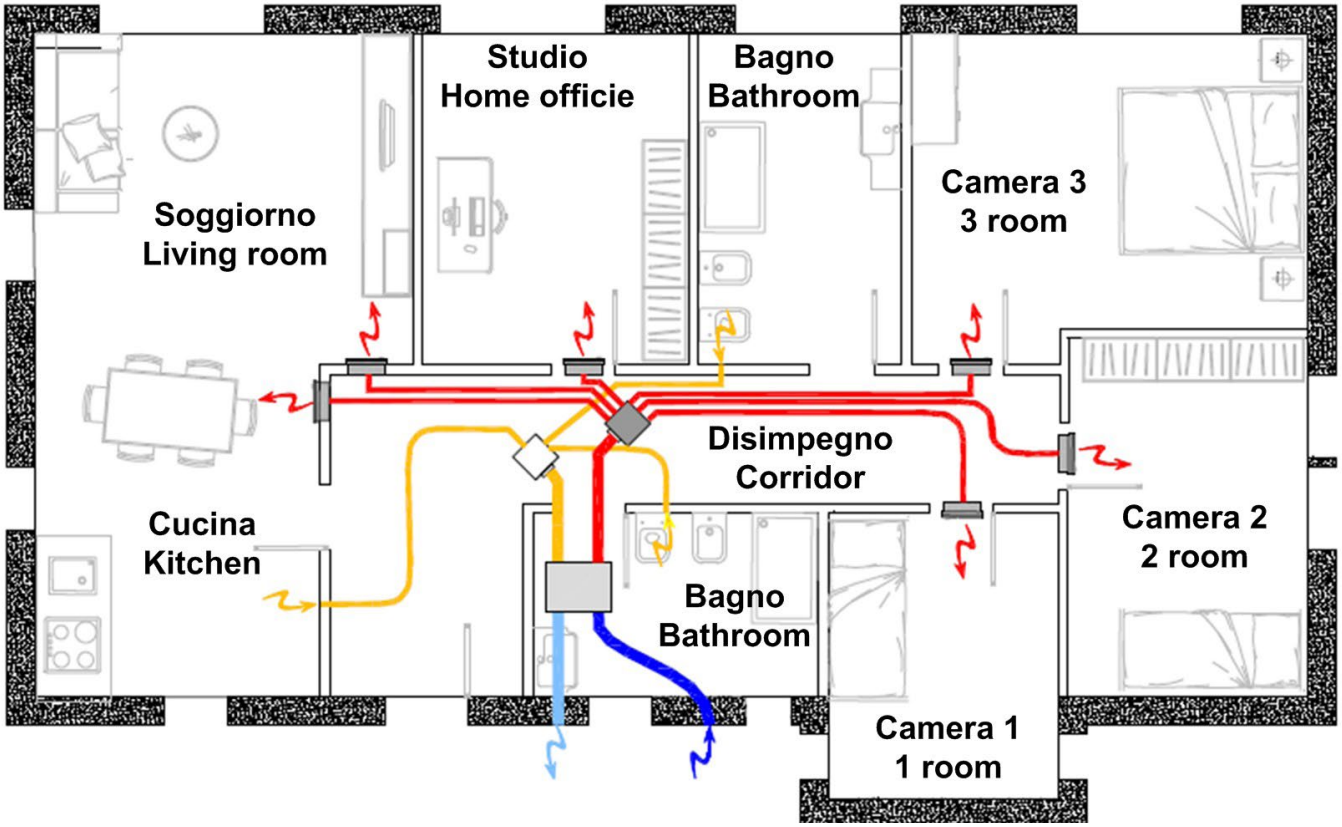
Similarly the return airflow rates for each single room is equal to the rate of renewal in the technical rooms multiplied by the volume of the room.

Example: bathroom = 40,5 m³ → air flow = 40,5 x 1,39 = 56,9 m³/h rounded to 50 m³/h

Once the air flow rates have been defined for each room you need to define the type of grille to be used according to the installation (ceiling, wall, floor) and the best distribution of air in the room.

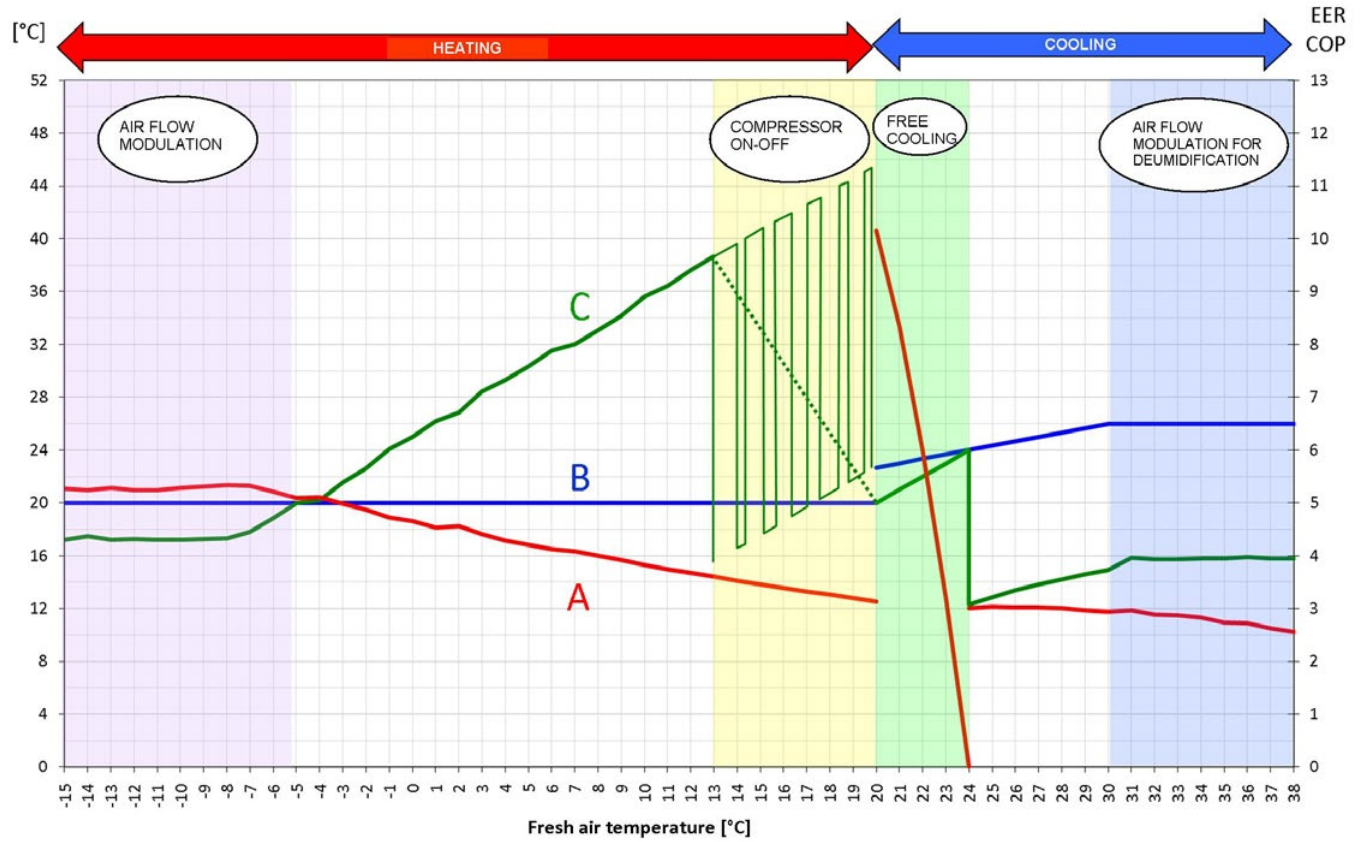
As you can see in the example, a decision was made to use AIRJET diffusers which due to their characteristics, provide adequate air launch which allows the entire volume of the room to be affected and jointly a modest and confined aeraulic distribution in the false ceiling in the corridor.

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: where the designer would follow the UNI EN 10339 technical regulations, he must consider the overcrowding respecting the requested parameters of 11 l/s (40m³/h) of air renewal per person and at least 4 volumes per hour of air renewal in the bathroom.

Reading of graphics about ELFOFresh² operation and performances criteria



The graphic refers to size 300 and to standard set-point for a residential application and represents the trend of three variables at the fresh air temperature changing:

A. COP/EER of the unit

B. Set-point temperature

C. Supply air temperature in the room

The variation of the air supply temperature in the room is usefull to understand the unit operating.

In the first stretch from –15°C to –5°C in heating the return temperature is mainteined to a comfort value (in the example 17°C) by the modulation of the return airflow in the room.

To maintain the nominal air renewal it is possible to use the pre-heating modulating electrical heater option in duct. In the stretch from –5°C to +13°C, where the unit operates with a nominal airflow and with the compressor still operating, the supply air temperature increases at the outside temperatureincreasing.

Typically in the range of temperatures between+13°C and +20°C the compressor operates in an on-off operating (satisfied thermoregulation) and the actual supply temperature is represented by the broken line that is the average between the one that occurs when the compressor is on and the one when the compressor is off that is equal to outdoor temperature(the unit operates automatically in ventilation only).

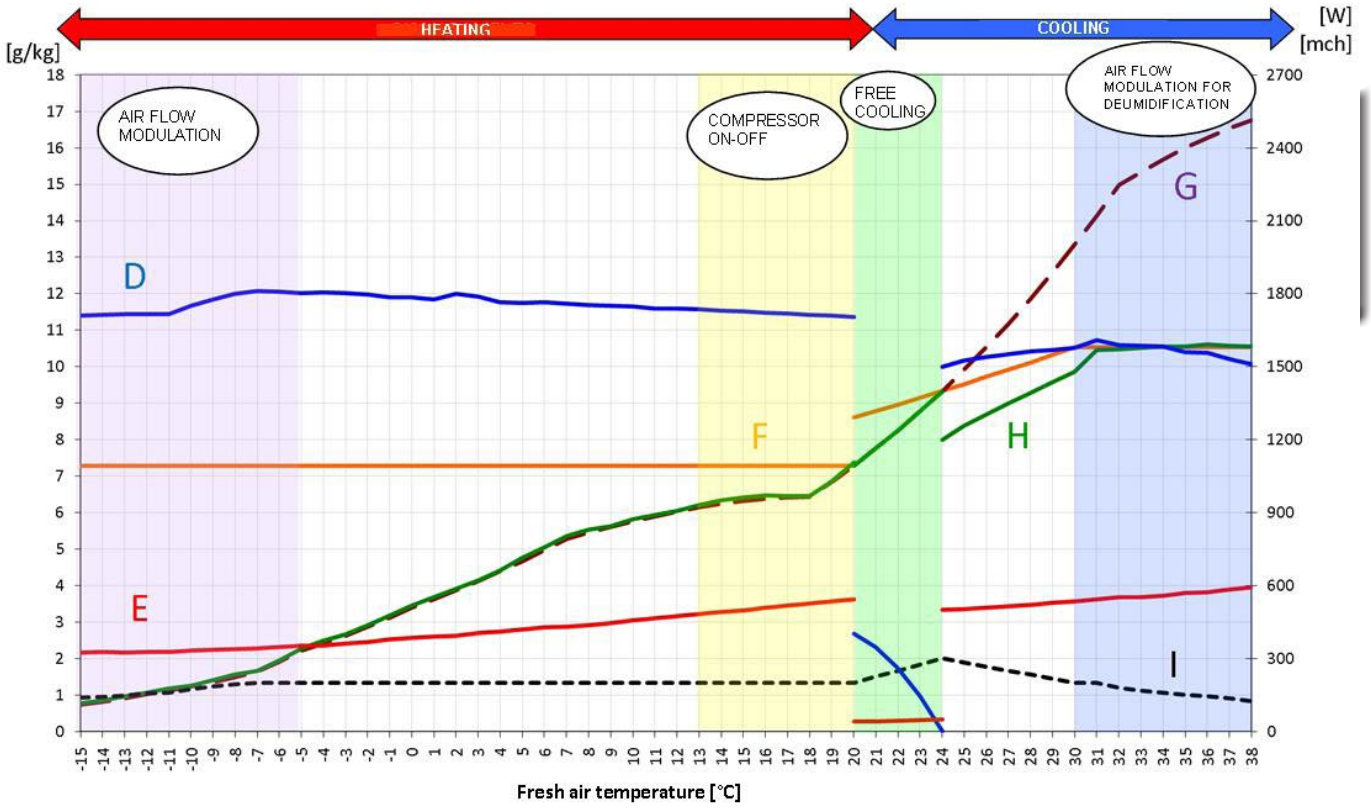
In the stretch from 20°C to 24°C, assuming an ambient set-point higher than the outdoor temperature, the compressor is always off and the unit operates in FREE-COOLING, i.e. in ventilation only.

In this operating mode the "COP" is maximum, in fact the only power input is that of EC fans and the input, although low, increases with the increasing of the temperature difference between outdoor and indoor.

In the next stretch from 24°C to 30°C the compressor is activated in cooling and the supply temperature is around 13-17°C to satisfy the thermoregulation. In general, the ELFOFresh² in cooling will adjust the fan speed whenever is necessary to decrease the humidity level in the room, according to the set value.

This behaviour is shown in the example from 30°C to 38°C with an inner set of 26°C with 50% of humidity. At 38°C outside the ELFOFresh² maintains in supply a specific humidity of 10,5 g/kg with a flow reduction of 50% from nominal 300 mch to 150.

ELFOFresh² operation and performances criteria



In the graph are represented the following variables:

D heating / cooling capacity [W]

E Power input [W]

F specific indoor humidity [g/Kg]

G specific outdoor humidity [g/Kg]

H specific supply humidity [g/Kg]

I supplied air flow [mch]

As indicated in the graph of the previous page hereinafter are highlighted the 6 standard operating range:

Heating with modulation of air flow in the room: the performance decreases due to the reduction of the air flow necessary to maintain to a comfort level the supply temperature (in the example it is supposed 17°C). By the use of the modulating electrical resistances (optional) the comfort remains at the highest levels without penalizing the air renewals in the room.

Heating: the heating performance is constant and independent from the outdoor temperature and therefore, at its decreasing, the colder air temperature on the handling coil decreases the condensation decreasing the compressor power input. This behaviour is highlighted by the COP increasing.

Compressor on-off in heating: depending on the room set satisfaction, compressor on periods will alternate with ventilation only periods, their duration will increase at the outside temperature increasing.

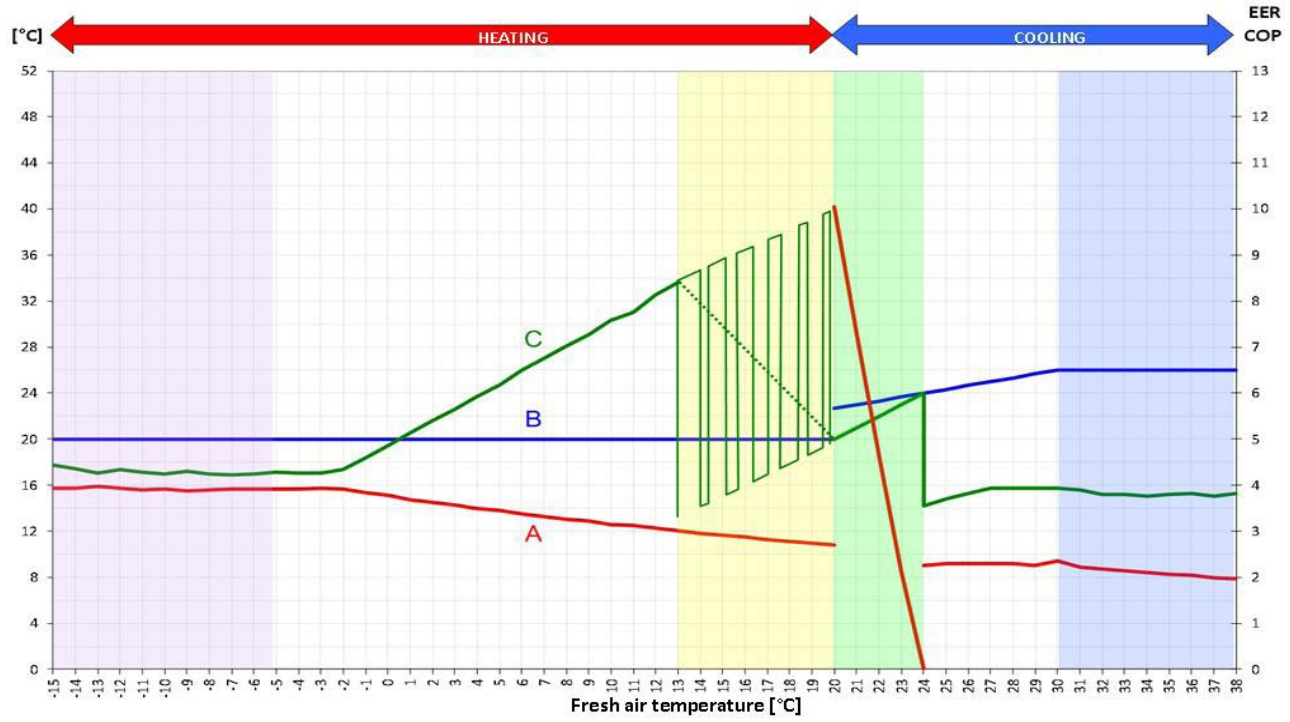
FREE-COOLING: the air flow increases to utilize at maximum the "free" energy of the FREE-COOLING

Cooling: modulating the air flow, the unit tries to keep the input air temperature at optimal comfort levels.

Air flow modulation for dehumidification in cooling: the reduction of the air flow in cooling allows to have an input air with an humidity equal to the humidity set in the room.

Introducing fresh air with controlled humidity in rooms as the daytime area and the bedrooms and rejecting air from rooms that produce humidity (kitchen and bathrooms) means to avoid the increasing of the humidity in the room.

ELFOFresh² 70 operation and performances criteria

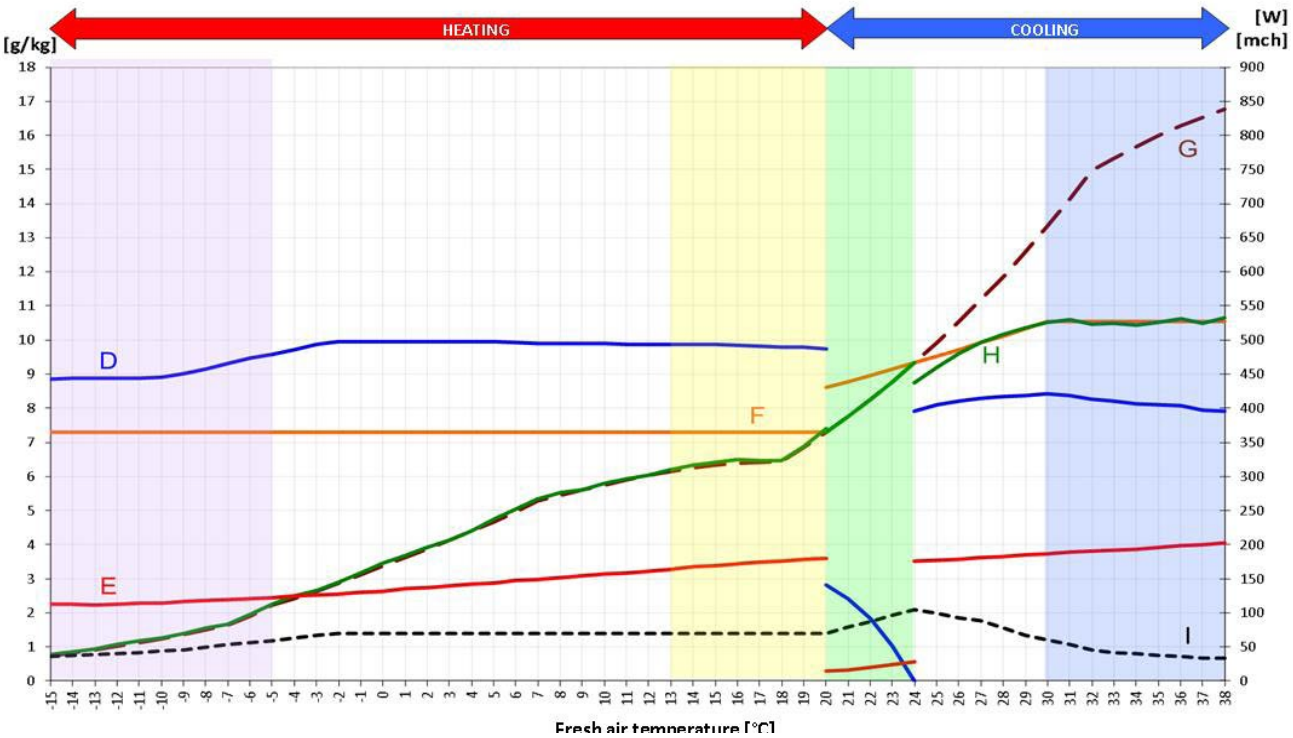


In the graph are represented the following variables:

A. Performance coefficient in heating (COP) and in cooling (EER): it is the ratio between the delivered capacity and the capacity absorbed by the compressor, the auxiliary circuit and from fans considering an available pressure of 50 Pa;

B. Desired temperature in the room

C. ELFOFresh² supply air temperature in the room

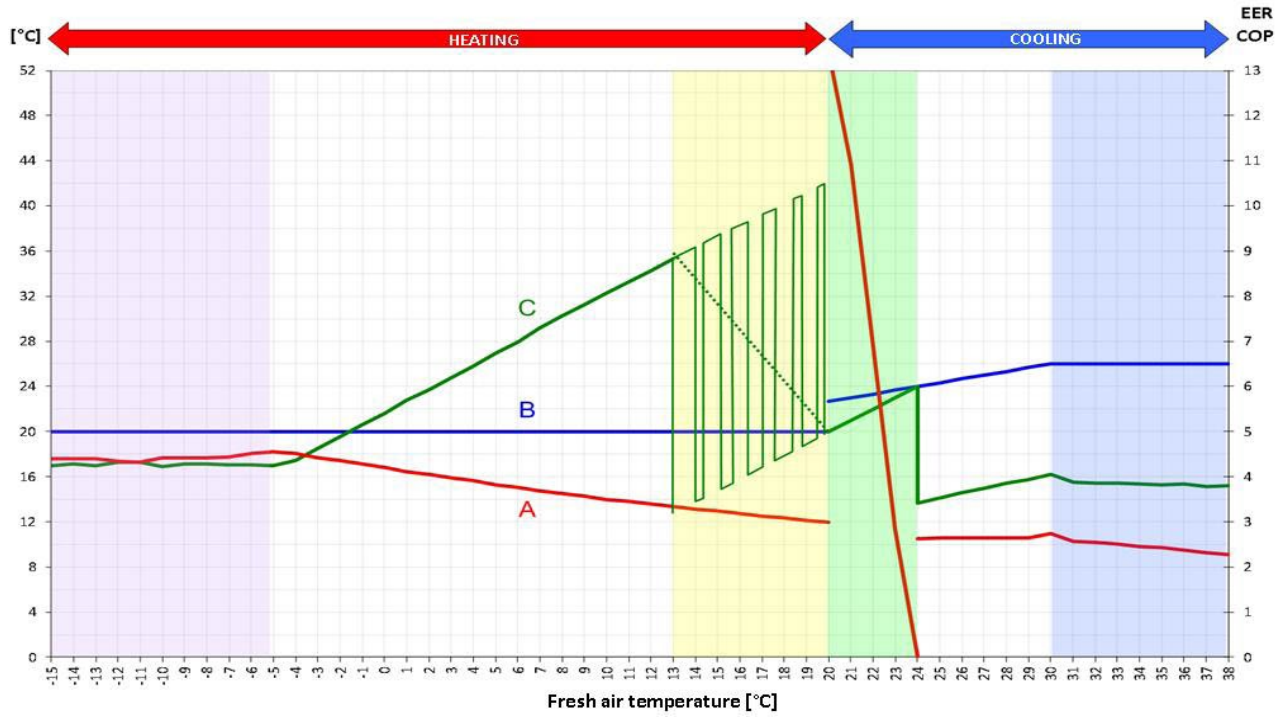


In the graph are represented the following variables:

D	heating / cooling capacity	(W)
E	Power input	(W)
F	specific indoor humidity	(g/kg)
G	specific outdoor humidity	(g/kg)
H	specific supply humidity	(g/kg)
I	supplied air flow	(mch)

In places where the outdoor air temperature falls down -5°C for many hours a year it is recommended to use the EHPCX accessory - heater kit in duct

ELFOFresh² 120 operation and performances criteria

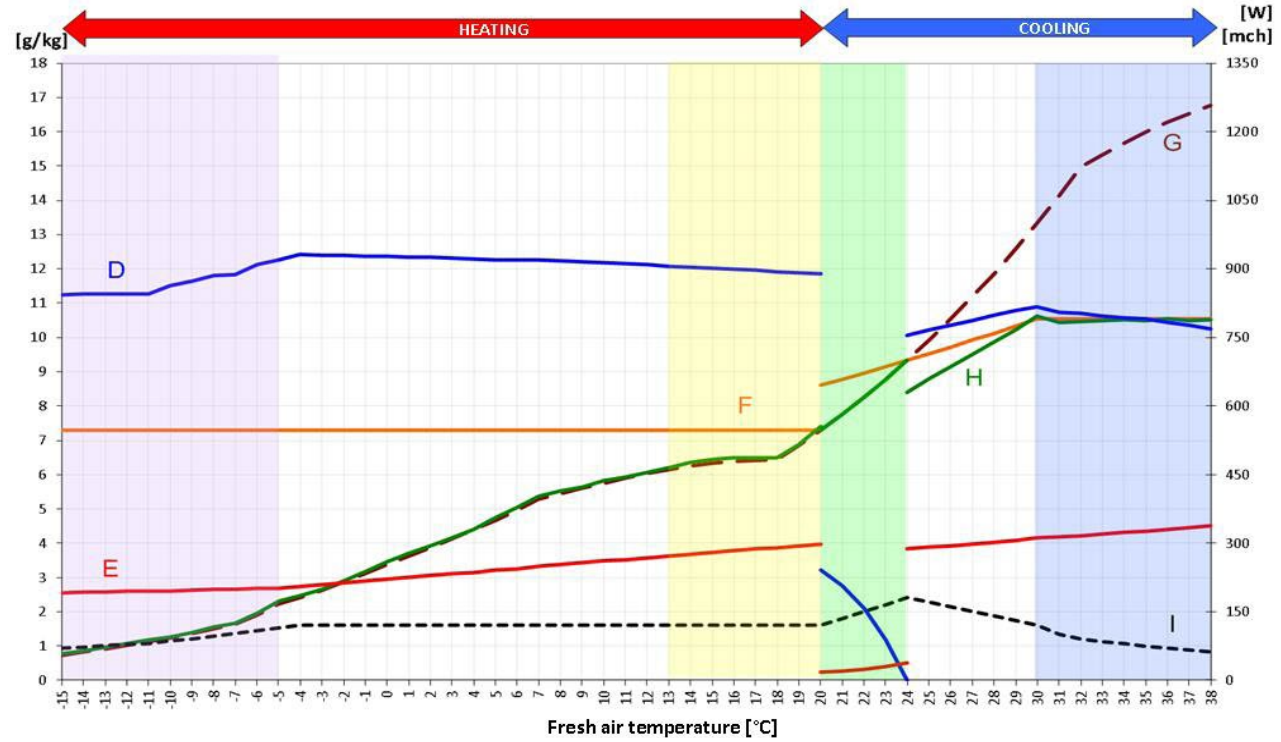


In the graph are represented the following variables:

A. Performance coefficient in heating (COP) and in cooling (EER): it is the ratio between the delivered capacity and the capacity absorbed by the compressor, the auxiliary circuit and from fans considering an available pressure of 50 Pa;

B. Desired temperature in the room

C. ELFOFresh² supply air temperature in the room

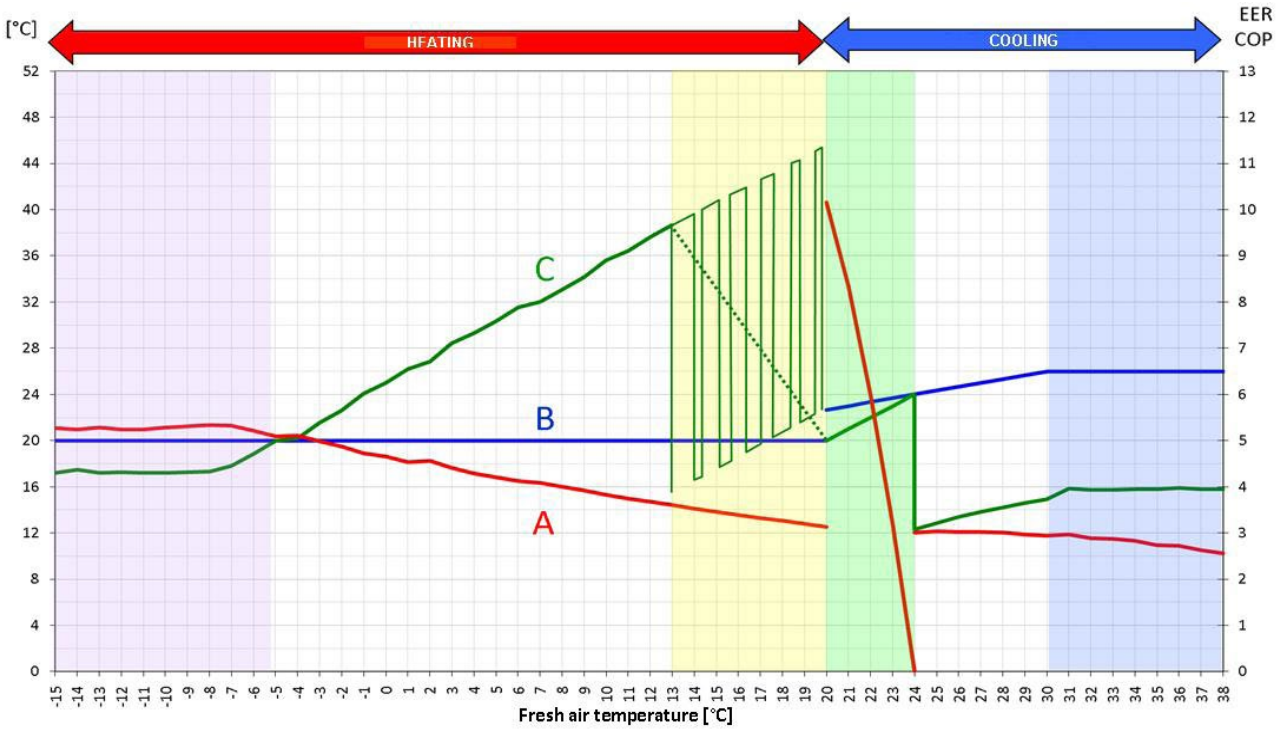


In the graph are represented the following variables:

D	heating / cooling capacity	(W)
E	Power input	(W)
F	specific indoor humidity	(g/kg)
G	specific outdoor humidity	(g/kg)
H	specific supply humidity	(g/kg)
I	supplied air flow	(mch)

In places where the outdoor air temperature falls down -5°C for many hours a year it is recommended to use the EHPCX accessory - heater kit in duct

ELFOFresh² 200 operation and performances criteria

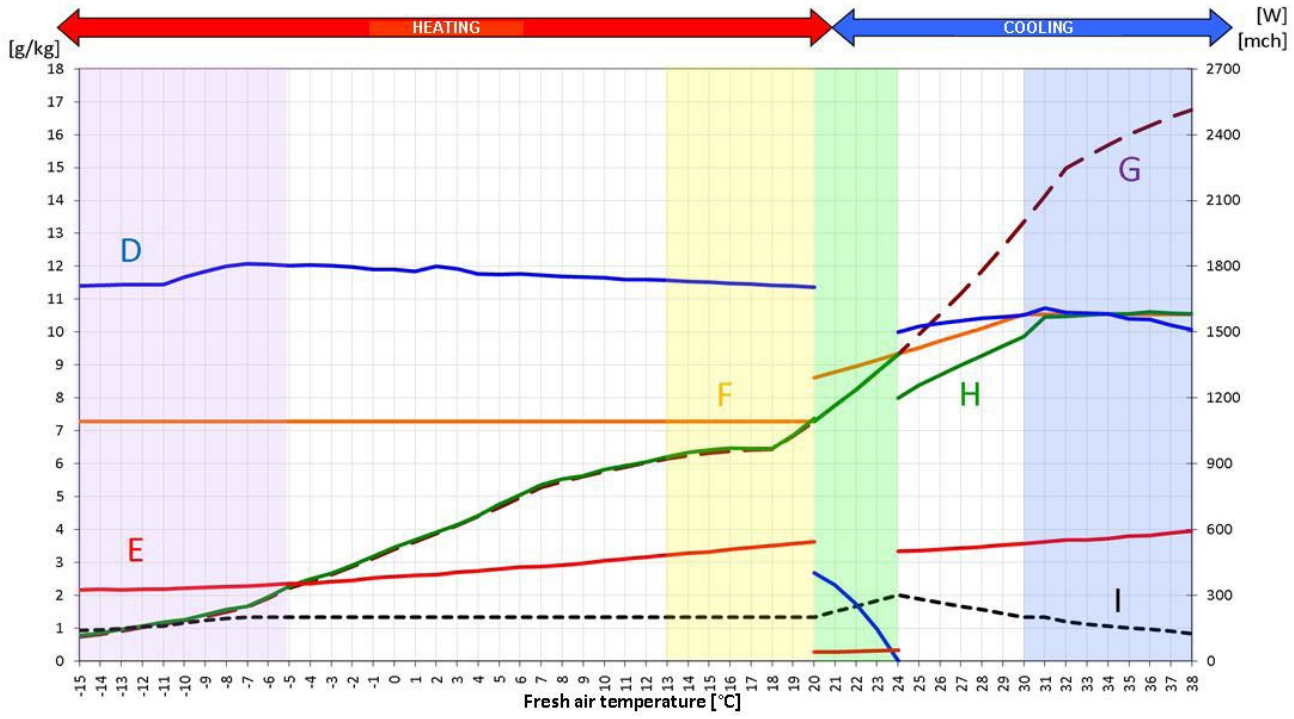


In the graph are represented the following variables:

A. Performance coefficient in heating (COP) and in cooling (EER): it is the ratio between the delivered capacity and the capacity absorbed by the compressor, the auxiliary circuit and from fans considering an available pressure of 50 Pa;

B. Desired temperature in the room

C. ELFOFresh² supply air temperature in the room

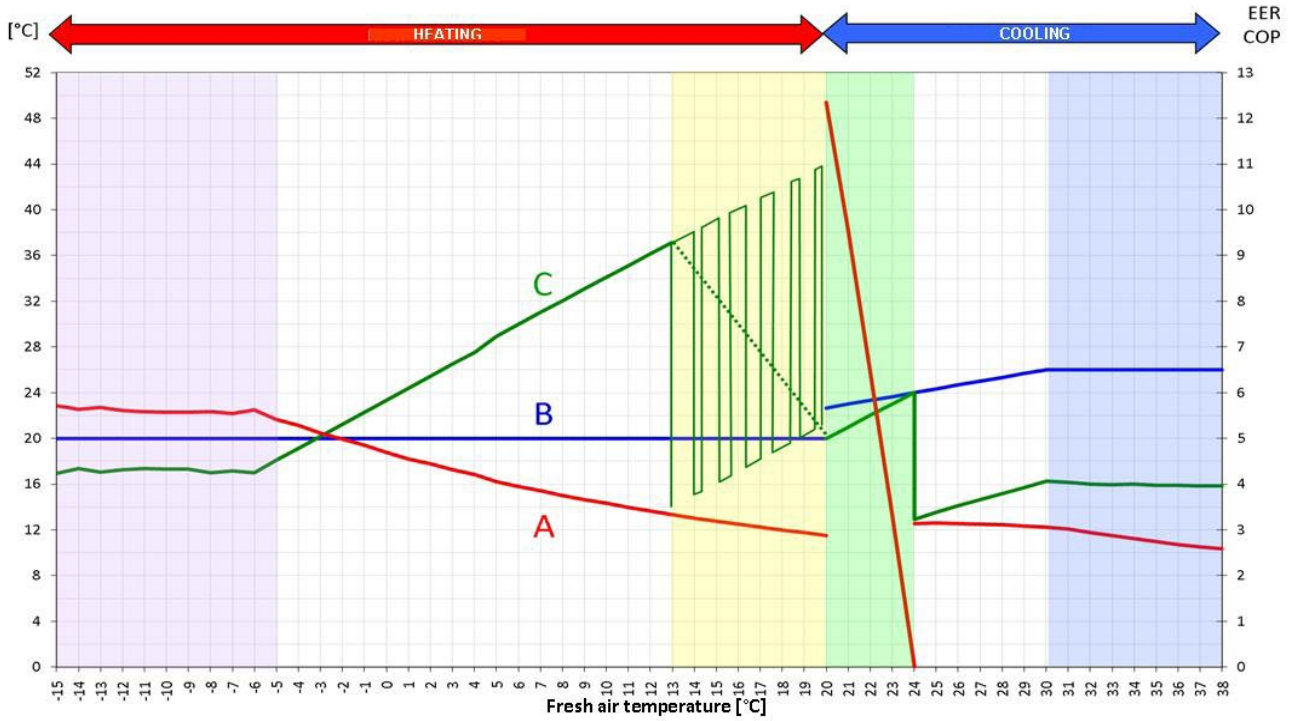


In the graph are represented the following variables:

D	heating / cooling capacity	(W)
E	Power input	(W)
F	specific indoor humidity	(g/kg)
G	specific outdoor humidity	(g/kg)
H	specific supply humidity	(g/kg)
I	supplied air flow	(mch)

In places where the outdoor air temperature falls down -5°C for many hours a year it is recommended to use the EHPCX accessory - heater kit in duct

ELFOFresh² 300 operation and performances criteria

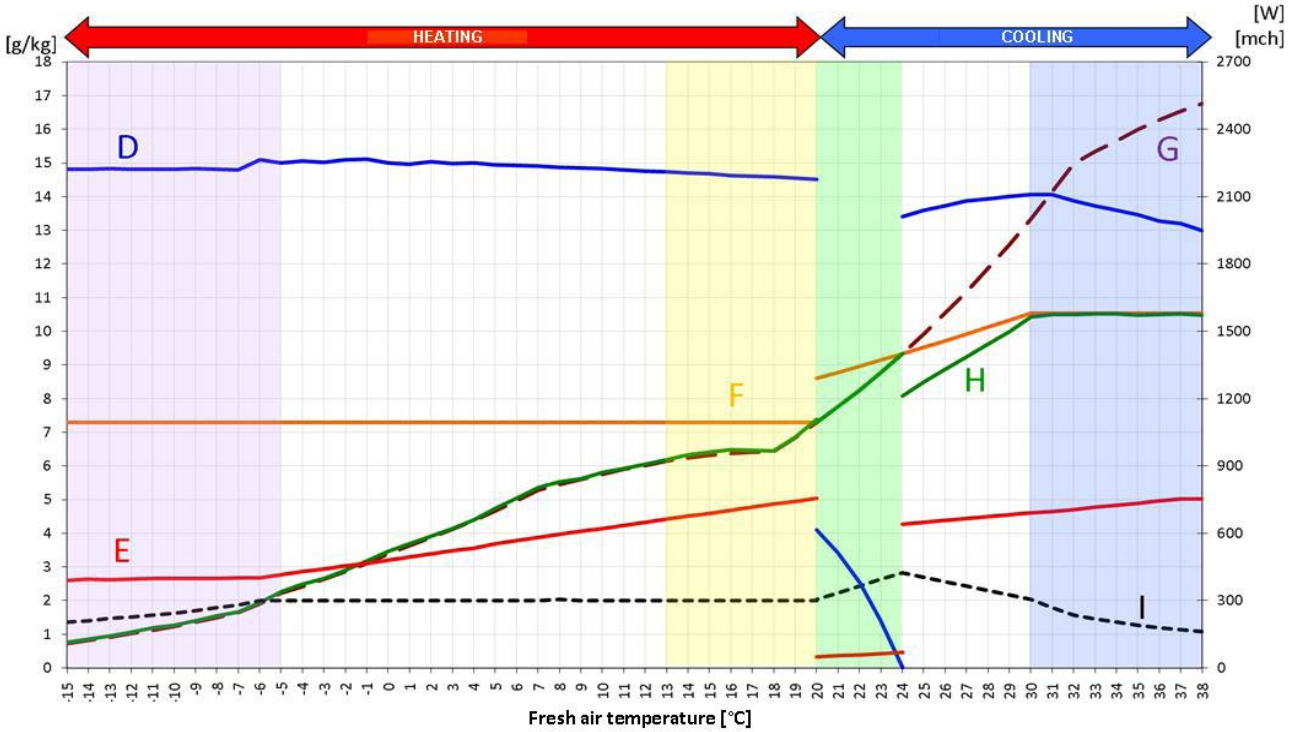


In the graph are represented the following variables:

A. Performance coefficient in heating (COP) and in cooling (EER): it is the ratio between the delivered capacity and the capacity absorbed by the compressor, the auxiliary circuit and from fans considering an available pressure of 50 Pa;

B. Desired temperature in the room

C. ELFOFresh² supply air temperature in the room

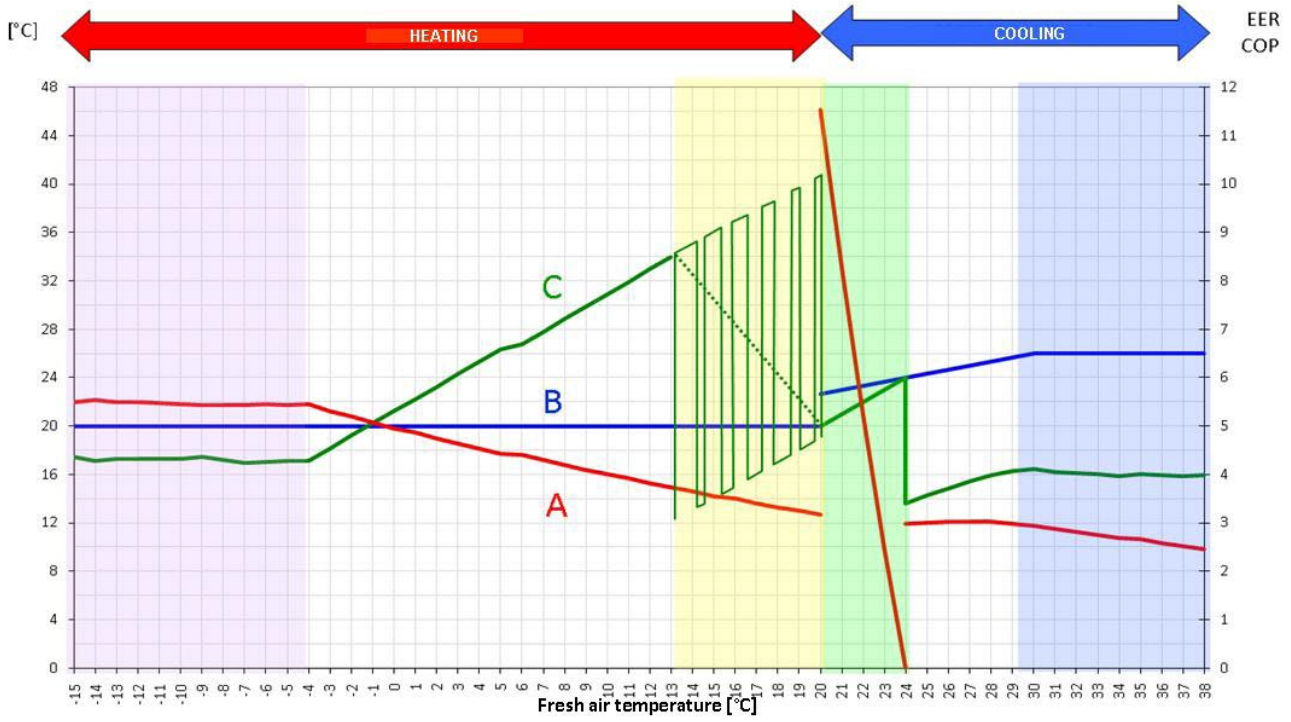


In the graph are represented the following variables:

D	heating / cooling capacity	(W)
E	Power input	(W)
F	specific indoor humidity	(g/kg)
G	specific outdoor humidity	(g/kg)
H	specific supply humidity	(g/kg)
I	supplied air flow	(mch)

In places where the outdoor air temperature falls down -5°C for many hours a year it is recommended to use the EHPCX accessory - heater kit in duct

ELFOFresh² 500 operation and performances criteria

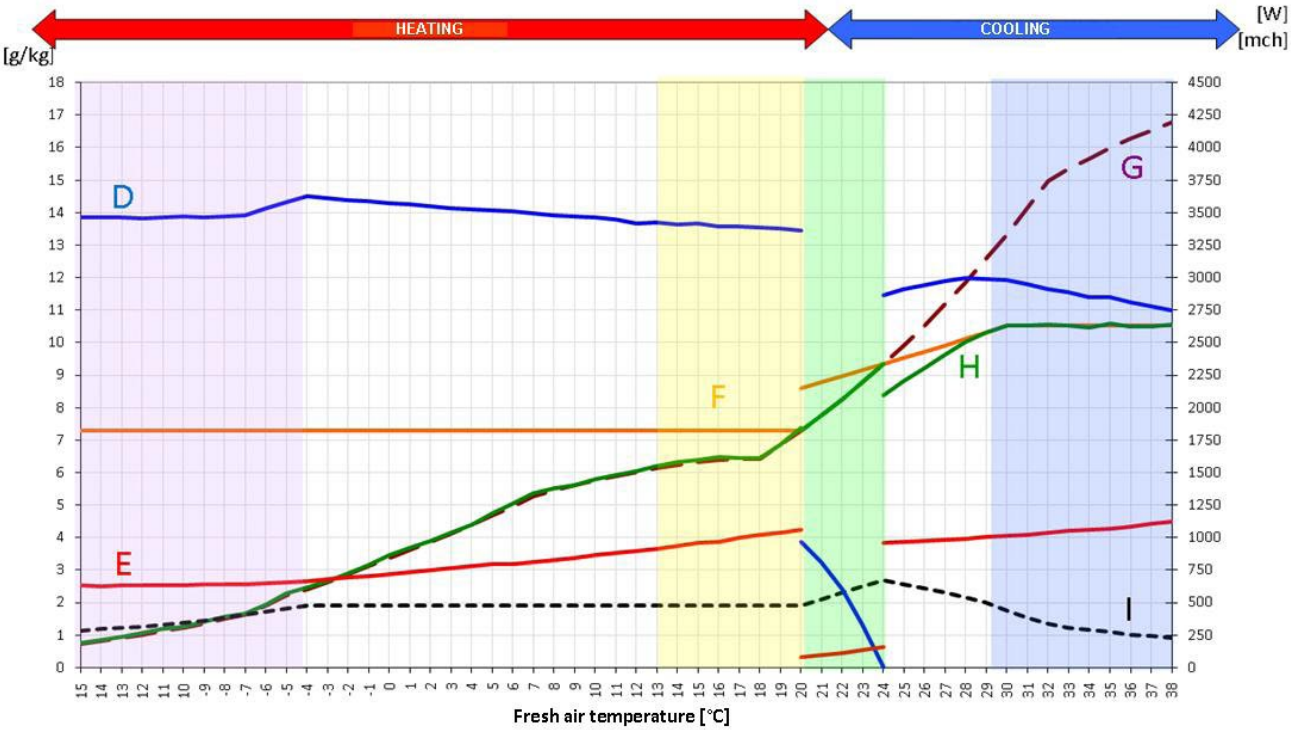


In the graph are represented the following variables:

A. Performance coefficient in heating (COP) and in cooling (EER): it is the ratio between the delivered capacity and the capacity absorbed by the compressor, the auxiliary circuit and from fans considering an available pressure of 50 Pa;

B. Desired temperature in the room

C. ELFOFresh² supply air temperature in the room

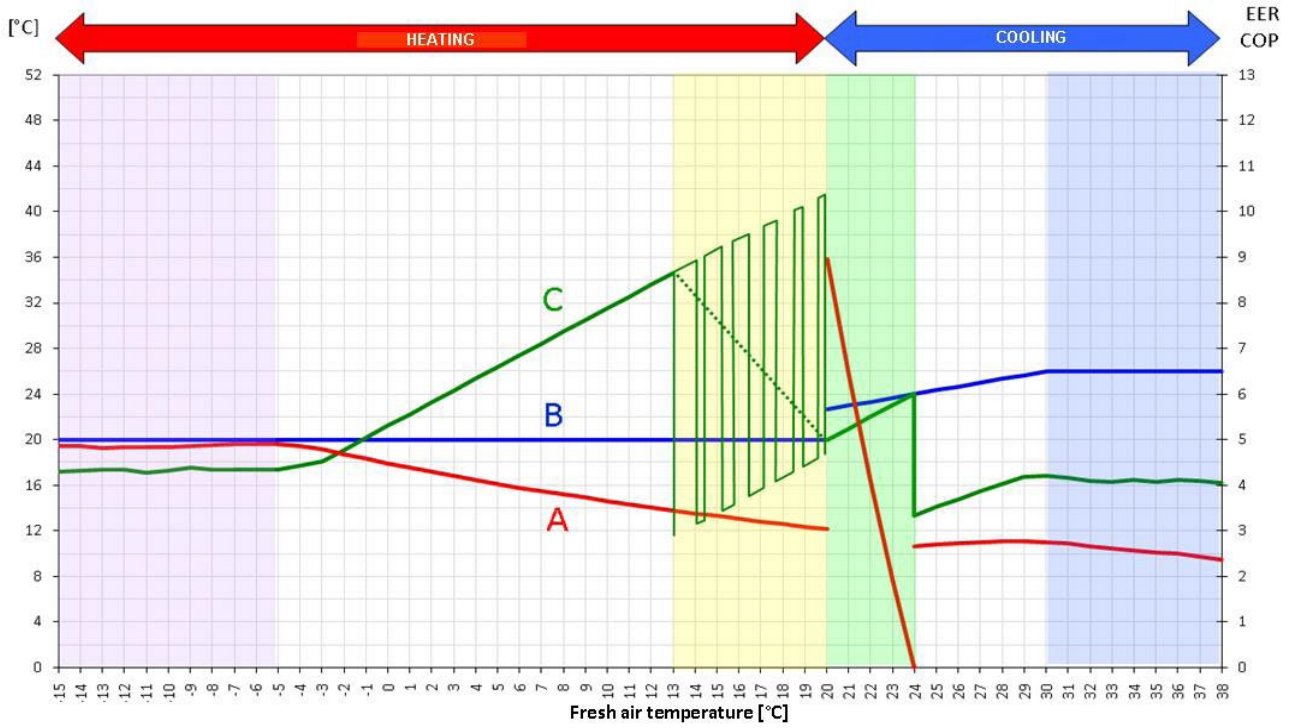


In the graph are represented the following variables:

D	heating / cooling capacity	(W)
E	Power input	(W)
F	specific indoor humidity	(g/kg)
G	specific outdoor humidity	(g/kg)
H	specific supply humidity	(g/kg)
I	supplied air flow	(mch)

In places where the outdoor air temperature falls down -5°C for many hours a year it is recommended to use the EHPCX accessory - heater kit in duct

ELFOFresh² 650 operation and performances criteria

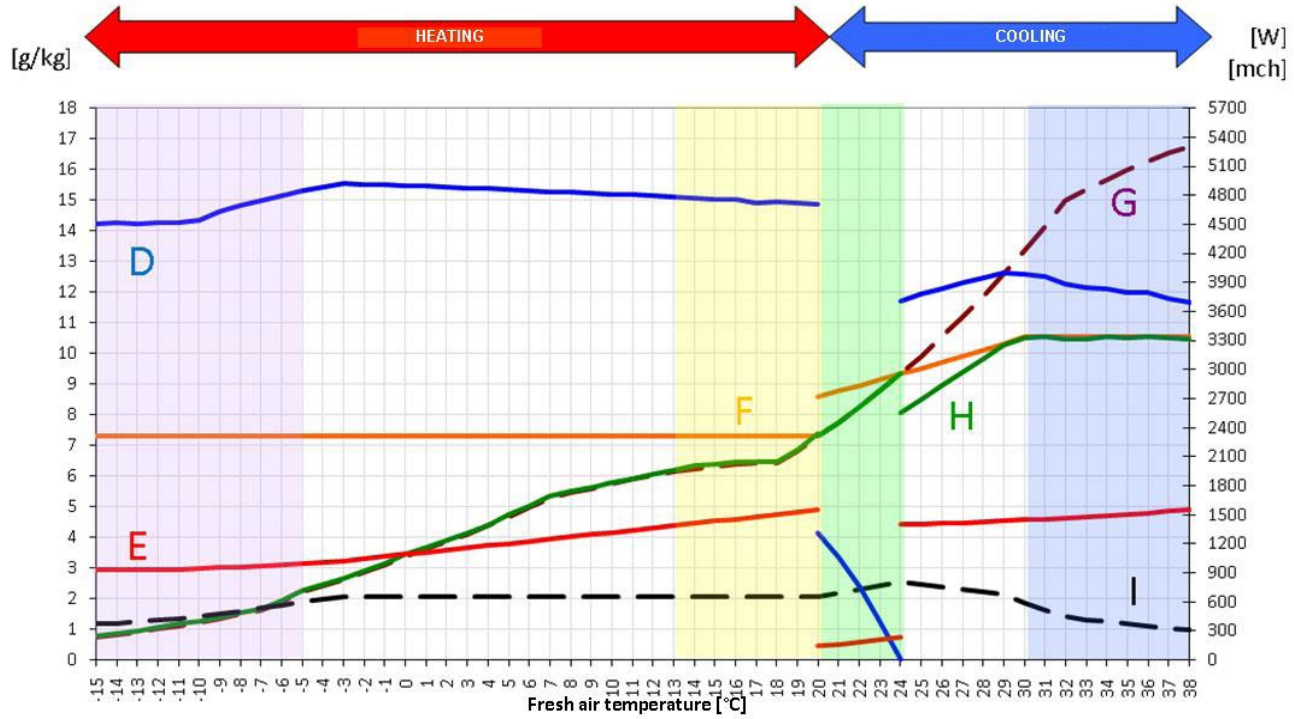


In the graph are represented the following variables:

A. Performance coefficient in heating (COP) and in cooling (EER): it is the ratio between the delivered capacity and the capacity absorbed by the compressor, the auxiliary circuit and from fans considering an available pressure of 50 Pa;

B. Desired temperature in the room

C. ELFOFresh² supply air temperature in the room



In the graph are represented the following variables:

D	heating / cooling capacity	(W)
E	Power input	(W)
F	specific indoor humidity	(g/kg)
G	specific outdoor humidity	(g/kg)
H	specific supply humidity	(g/kg)
I	supplied air flow	(mch)

In places where the outdoor air temperature falls down -5°C for many hours a year it is recommended to use the EHPCX accessory - heater kit in duct

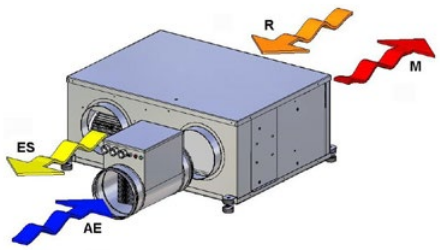
Accessories separately supplied

EHPCX - Kit of modulating pre-heating electric heaters in duct for fresh air low temperatures

In places where the outdoor air temperature falls down –5°C for many hours per year it is recommended to use the heater kit in duct.

In fact, the standard unit, to maintain an adequate level of comfort in the rooms, at low temperatures, operates in modulation of inlet air flow.

With this kit is no more necessary the air flow modulation and therefore it does not penalize the air renewal in the rooms. The resistance is equipped with an electronic control to modulate the capacity depending on the outside temperature variations to maintain a correct supply air temperature. Consumptions are at minimum necessary.



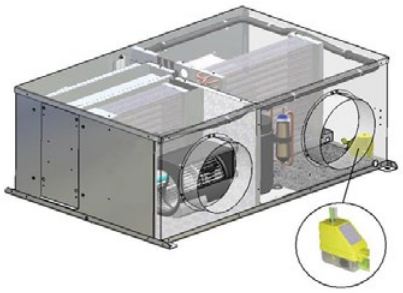
(AE) fresh air inlet
(ES) Exhaust air
(M)Ambient air supply
(R) Ambient air return

CDPX - Condensate drain pump

Centrifugal condensate discharge pump that guarantees an optimal condensate downflow everytime it is not possible to have a proper downflow by gravity.

The capacity is 7 liters per hour, with a prevalence of 6 meters. The packaged structure includes a floating chambre with two levels of intervention: the first level starts up itself the pump while the second level is a safety level that intervenes in case of difficulty of the pump in the downflow stopping the unit.

Size	70	120	200	300	500	650
0,7 kW	✓	✓	-	-	-	-
1,5 kW	-	-	✓	✓	-	-
3 kW	-	-	-	-	✓	✓



Condensate drain pump

FESX - Electronic filter

The filter is made up of an electronic cell with filtering capacity no lower than H10 specifically suitable against fine dust, microbe loads and allergenic elements.

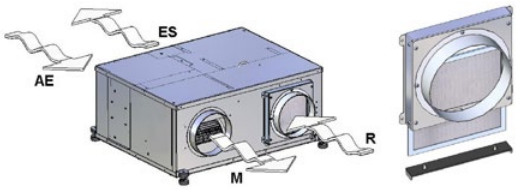
The cell is easily accessible for cleaning from both underneath and the side through special doors

The cell is equipped with an integrated control electronic card and it can also be supplied as an accessory delivered separately, replacing the standard air filter G3.

FAEX - Exaust air filter

The filter is positioned on the ambient air inlet and it allows the compressor and exhaust coil to protect from the fouling when there are no filters on the return outlets.

This option is available only for sizes from 200 to 650, since there is an exhaust air filter standard assembled inside the unit in sizes 70-120.

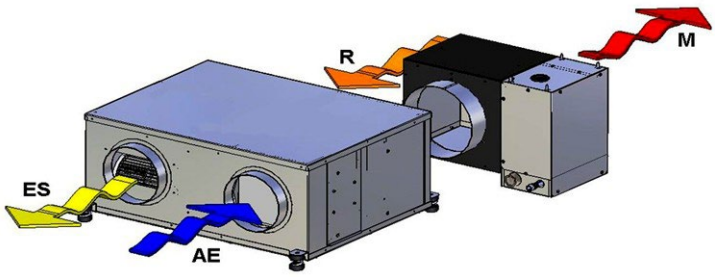


(AE) fresh air inlet
(ES) Exhaust air
(M)Ambient air supply
(R) Ambient air return

HSE3LX: Immersed electrode humidifier DN200 (size 200-300)

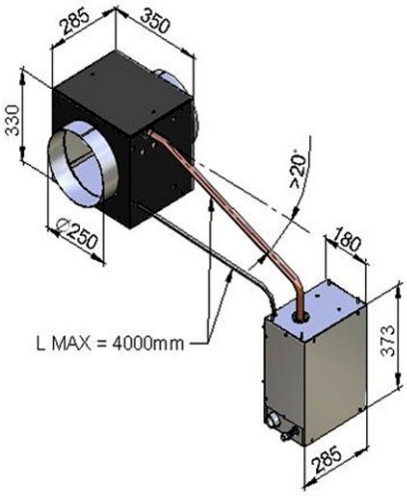
HSE3MX: Immersed electrode humidifier DN250 (size 500-650)

For the ambient air humidifcation it is possible to mount in the outlet duct a humidifier with steam distributor. The regulation of steam production, realized from the electronic of Elfofresh2 unit, can be modulated according to setpoint and relative humidity from the ambient thermostat probe (necessary in presence of humidifier). The humidifer is equipped with power supply and water inlet/outlet and it needs only the replacemnet of the cylinder boiler when the limestone deposits exceed the available limits.



(AE) fresh air inlet
(ES) Exhaust air
(M)Ambient air supply
(R) Ambient air return

steam distribution



steam production

In the event of limited space, the steam production module can be separated from the steam distribution module and installed in another position, for example, wall-mounted, up to 4 meters away. The steam tube rising segment must maintain a gradient no lower than 20°.

CMMBX - Serial communication module to supervisor (MODBUS)

This enables the serial connection of the supervision system and to the ELFOControl2, using Modbus as the communication protocol.

It enables access to the complete list of operational variables, commands and alarms.

Using this accessory every unit can dialogue with the main supervision systems.

Project criteria for the ELFOAir system

ELFOAir is the aeraulic distribution system that Clivet designed to complete their range of fresh air solutions with active thermodynamic recovery.

Drawing up a project and building the aeraulic distribution system correctly is a fundamental premise to benefitting fully from the fresh air produced by ELFOFresh² with thermodynamic recovery.

Incorrect choices in defining the parts and their positions can jeopardise the level of comfort in the house and even jeopardise the correct operation of the unit itself.

The ELFOAir system is the means through which ELFOFresh² provides fresh air inside houses, to guarantee the perfect operation of the distribution system ELFOAir was designed to offer complete compatibility with all of the ELFOFresh² units using the least possible number of elements to offer a complete solution that is simple to select and install at the same time.

The ELFOAir system must satisfy the following criteria:

- **reduced air speed:** the high air speed in the ducting can cause noise. To avoid this, it is advisable to maintain the air speed below 3 m/s to ensure there is no noise, even at night, at a time when there is almost no background noise in the room.
- **low pressure drops:** the lower the pressure drops, the lower the energy used for ventilation.

In the lay-out project for the ducts it is also advisable to take into account the following solutions:

- it is necessary to try and **reduce their extension as much as possible**, as well as the use of parts such as curves, which increase drops in pressure;
- **plan to install** the correct **return filter accessory (FAEX)** in sizes from 200 to 650 to avoid dust and other forms of dirt from fouling the ELFOFresh² recovery heat exchanger

To select the right system parts, simply follow the check list below:

Positioning the ELFOFresh² unit.

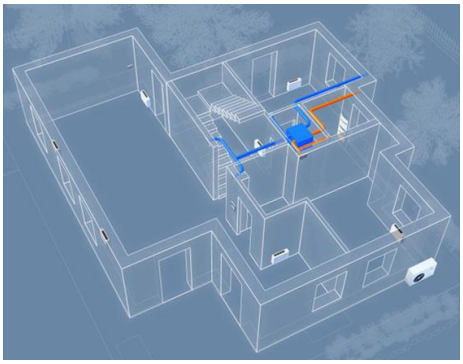
Position of the outdoor air inlets/exhaust

Definition of the outdoor air ducting

Defining the supply/extraction outlets and dumpers

Definition of the room's distribution system

Inspection of the system's pressure drops



Positioning the ELFOFresh² unit.

The active thermodynamic recovery of ELFOFresh² can be set up anywhere inside the house, nevertheless it is preferable to opt for installation in utility rooms, laundry rooms or bath anterooms. It is not advisable to install it in bedrooms and adjacent rooms, as the reduction in background noise at night, even with extremely quiet units such as ELFOFresh², could diminish the quality of sleep.

It is advisable to install it near the fresh air outlets in order to reduce the length of the relative ducts and in a position that is central to all of the rooms provided with ventilation.

Position of the outdoor air inlets/exhaust

The fresh air intake must be positioned in a zone where the concentration of impurities (dirt, odours, exhaust, etc..) in the air is low enough, not too close to the ground to protect it from dust and other volatile impurities that could be sucked up by ELFOFresh².

The air exhaust must be positioned outside the home. Avoid areas that are against the wind and place it away from terraces, balconies and bordering properties.

There must be at least 2 metres between the inlets and the exhaust to prevent a "short-circuit" between the two air flows. If this is not possible, install the grilles next to each other and position the openings with the two air flows facing opposite directions.

Definition of the outdoor air ducting

The ELFOAir system uses flexible insulated tubes to channel fresh air to and from ELFOFresh², with a diameter of 150mm for sizes 70-120, with a diameter of 200mm for sizes 200-300 and a diameter of 250mm for sizes 500-650. In order to reduce the drops in pressure it is good practice to try and reduce the extension of the ducts and the number of curves to a minimum in the project.

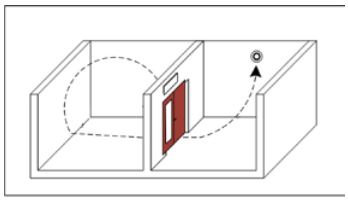
ELFOFresh², thanks to the anti-intrusion dumpers on the fresh air outlets, the metal pre-filter and the efficient filtering section, does not require the installation of additional filters on the fresh air intake duct.

Definition of the supply/extraction grilles

To ensure the air in the rooms is purified correctly, first define the position of the inlets and outlets, considering that the renewal air inlets must be fitted in the main areas(living and room), while stale air must be extracted from utility rooms (kitchen and bathrooms).

The following fall into the category of service rooms: the kitchen, bathrooms, laundry room, closets; other rooms where sometimes you might provide return grilles are large walk-in wardrobes and mezzanines where generally the phenomenon of air stratification occurs.

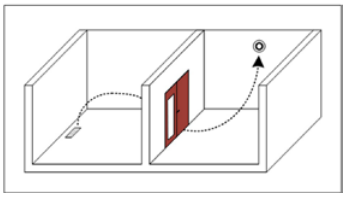
The following fall into the category of noble rooms: the living room, bedrooms and studies; in each of these rooms it is essential to have one or more inlets for fresh air intake.



SUPPLY WITH AIRJET DIFFUSERS

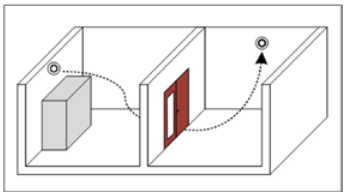
The supply inlets must be positioned according to the type of inlet that is used:

- the AIRJET 50/l or 80/l diffusers (DAIR50X and DAIR80X), due to their high induction diffusion characteristics, allow an even spread of air entering the room. This particular feature allows you to place the grille only at the top of the vertical walls, e.g. above the door or in the most appropriate position to direct the airflow in order to have a comprehensive effect in the whole room.



SUPPLY FROM BELOW

- the square grilles (GIVEX and GINOX) do not permit an air launch at the outlet of the grille itself and so their position must be at the farthest point in such a way that the air flow from the outlet to the door in the direction of extraction, affects the whole environment. The rectangular grilles can be installed at floor level or on the wall at electric socket height or near the ceiling.
- the square grille (GQIEX) or the valve (VIEX) do not permit an air launch at the outlet of the grille itself and so their position must be at the farthest point in such a way that the air flow from the outlet to the door in the direction of extraction, affects the whole environment. The grilles must be positioned on the wall near the ceiling or on the ceiling.



DOWNWARD AIR FLOW

The air must always be extracted from above by positioning one or more outlets in all the rooms with higher humidity and pollutant levels.

The ELFOAir system uses the same grilles for extraction as for supply except for the AIRJET 50/l and 80/l diffusers that are replaced by AIRJET 50/A and 80/A suction grilles.

The grilles or valve (GIVEX, GINOX, GQIEX, VIEX) used in extraction must only be placed high up or on the ceiling.

AIRJET 50/l – 80/l

GIVEX

GINOX

GQIEX

VIEX

Note: It is essential to make sure that there are no objects in front of the openings/grilles (furniture, wardrobes, etc.) that could interfere with the normal air circulation in the rooms.

The supply air flow (extraction) must therefore be determined for each single room as follows:

The supply renewal rate (extraction) is calculated as the relationship between the total volume of the rooms where the air is supplied (extraction) and ELFOFresh²'s rated air flow and this is multiplied by the volume of the room.

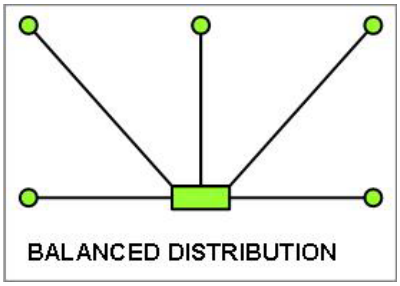
The number of openings/grilles to use for each room depends on the air flow of each room, bear in mind the maximum air flow allowed for each opening.

Note: It is good practice to make sure the rooms have a renewal air flow of at least 20 m^3/h per person.

Note: If in one room there is a supply point and a return point (e.g. single kitchen-living room) it is necessary to make sure that you do not create a by-pass i.e. that the air blown into the room is not immediately sucked away without affecting the environment. In this situation you should place the supply point low down and extraction point high up on opposite walls in the room, or have the supply provided by AIRJET diffusers and extraction from the same position.

Definition of the room's distribution system

The air distribution in ELFOAir is a "manifold" system and therefore consists of one or more distribution boxes (manifolds) where flexible hoses are "attached" to it to supply the openings/grilles of the ventilation system.



This kind of solution offers 2 great advantages:

- using a single duct in terms of diameter, facilitating installation considerably
- avoid noise migration from one room to another through the ducting

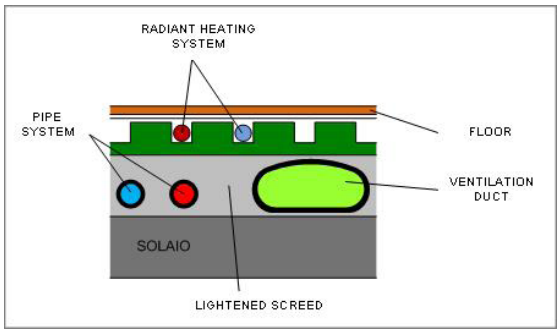
There are two available distribution boxes: the first has 8 fittings (4 on each side) and the second features 14 fittings (8 on the front and 6 on the side).

The choice of the box depends on the number of ducts required, the position of the duct connections on the distribution box based on the available spaces and maximum airflow.

To ensure optimally balanced distribution, it is preferable to install the distribution boxes in a central position in relation to the outlets that supply openings (see the figure to the side).

Air flow adjustment for each outlet is provided by calibrating the control system present in each specific outlet except for the rectangular grilles (GIVEX and GINOX) where you must use a separate flow regulator (REPPX) to be placed at the entrance to the flat tube.

Flexible ducts that are used by the ELFOAir system from the distribution box to the outlets can be of two types:



- TFT90X round flexible tube with DN90 outer diameter and inner diameter of 78 mm, suitable for a maximum flow rate of 60m³/h (v = 3.48 m/s). For higher flow rates, only for the square grille (GQIEX) or the valve (VIEX), you can use two ducts on the same line thanks to the A90DPX adapter. The round flexible tube must be insulated with a special IT90X isolation, since, under certain transitional conditions, the supply flow temperature could cause condensate build-up.
- TFPNX flat flexible tube with 52 mm height and 132 mm width (section 0.0041m²), suitable for a maximum airflow rate of 50m³/h (v = 3.38 m/s). For higher flow rates, only for the square grille (GQIEX) and the valve (VIEX), you can use two ducts on the same line thanks to the A90DPX adapter. The flat flexible tube must be insulated with a special IT100X isolation, since, under certain transitional conditions, the supply flow temperature could cause condensate build-up.

Both the tubes can be ceiling-mounted or buried in the screed as their mechanical characteristics afford resistance to crushing. The flat tube dimensions allow a reduction in the thickness of the screed, as shown in the drawing.

The length of each duct is determined based on the route that connects the box to the grille.

If the path from the distribution box to the inlet involves bends in tight spaces, the use of one or more stamped elbows will be required.

Since the pressure drops with each bend are significant, it is a good idea to try to avoid their use whenever possible.

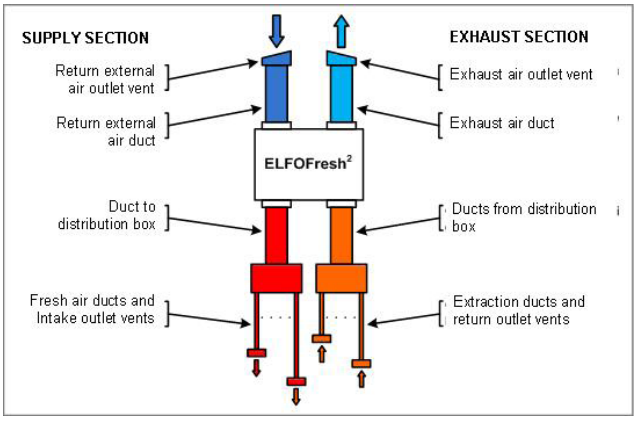
Inspection of the system's pressure drops

Once the layout for distribution has been determined it is necessary to make sure that the pressure drops in the supply and extraction sections do not exceed the maximum available pressure of the ELFOFresh² fresh air unit.

When checking the distribution system, take into account all of the elements that cause pressure drops.

For the supply section: fresh air intake grille, fresh air ducts, pre-heating heater (if any), ducts to the distribution box, humidifier (if present), flexible extraction ducts, outlets/grilles for supply and generated pressure drops for balancing the system through the integrated control system in the outlets or through the flow rate controllers (only for rectangular GIVEX and GINOX grilles).

For the extraction section: fresh air exhaust grille, fresh outdoor air ducts, return air filter, ducts to the distribution box, humidifier (if present), flexible extraction ducts and outlets/grilles for extraction and generated pressure drops for balancing the system through the integrated control system in the outlets or through the flow rate controllers (only for rectangular GIVEX and GINOX grilles).



Note: the use of the electrostatic FES filter in place of the standard folded FAS filter allows you to reduce considerably the pressure drops in the supply section and therefore save energy on ventilation.

The pressure drops of each single part vary in relation to the air flow, while the pressure drops of the ducting also change depending on the length of the duct.

In the next "accessory section" are shown the pressure drops of each element of the system ELFOAir.

Since ELFOAir, a system of distribution manifolds, the analysis of total pressure drops is greatly simplified.

The pressure drops that the ELFOFresh² must win downstream of each box of distribution coincide with the loss of load higher among all those of the individual ducts to it connected.

So one just needs to identify the supply and extraction duct, which features the highest pressure drops.

(Normally it is the duct more extended or the one with the greatest number of curves)

The pressure drop in the supply/extraction section is therefore equal to the sum of the drops in pressure of its parts (openings, ducting, ducts), considering the duct with the highest pressure drop for the supply/extraction ducts.

If the total pressure drop of the single sections is greater than the maximum available pressure, the distribution layout will need to be reviewed in order to fall within this limit.

ELFOFAir Configurator SELECTION SOFTWARE

If done manually, sizing and checking the ELFOAir system requires an excellent knowledge of fluid dynamics.

ELFOFAir Configurator is an essential work tool that Clivet has put at the disposal of all professionals in order to make these operations simple, quick and absolutely reliable.

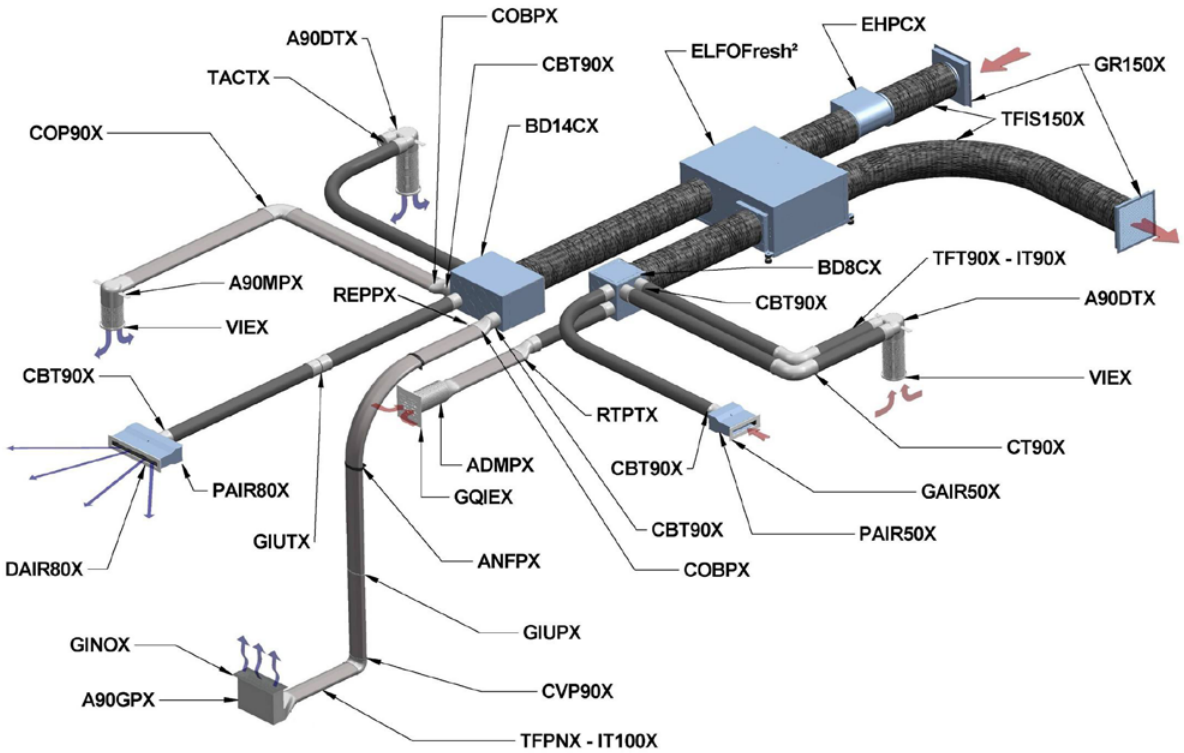
Just enter a small amount of data regarding the home and ELFOAir's distribution system and the software will automatically and rapidly:

- calculates the pressure drops on both sections
- generates a complete bill of materials for the ELFOAir system.

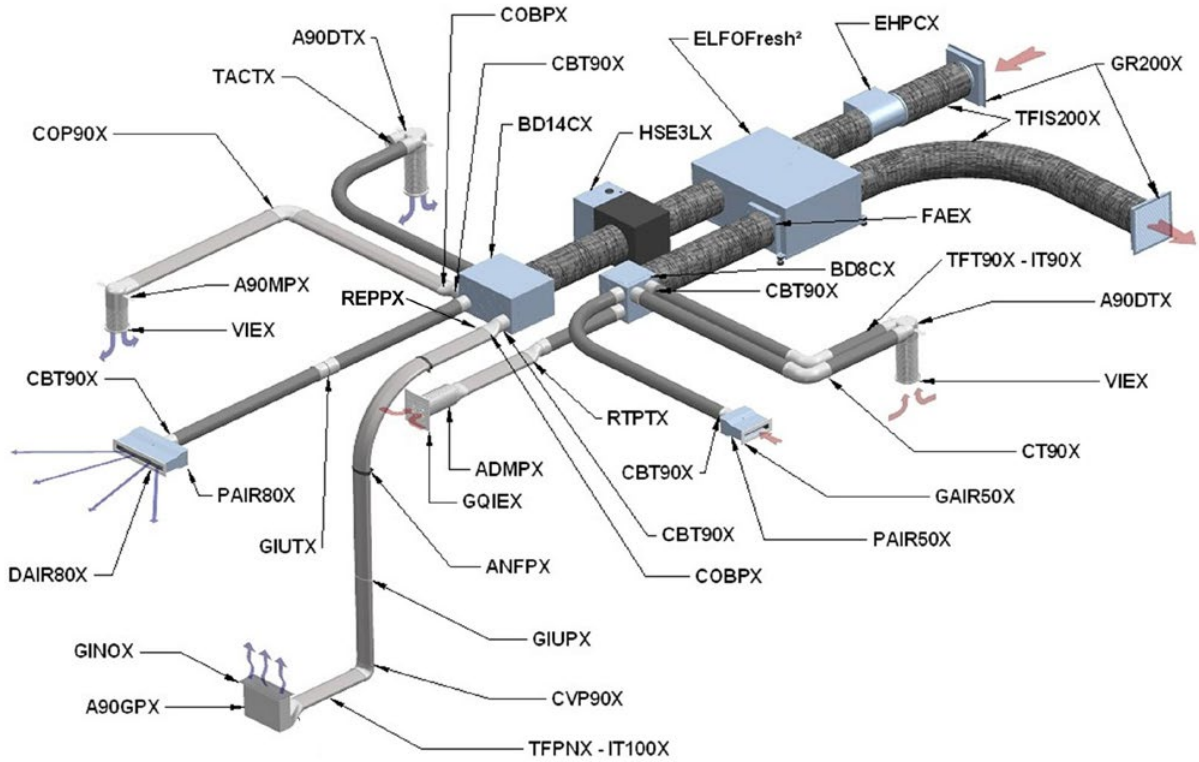
Air distribution examples

Here are two typical examples of ELFOFresh² air distribution depending on the size of the unit.

ELFOFresh² 70-120



ELFOFresh² 200-300



Option compatibility

Description	REF.	Description	ELFOFresh²			ELFOPack
			70-120	200-300	500-650	
Internal suction and supply grilles	**DAIR50X**	AIRJET 50/I supply diffuser - white frame and black inside	X	X	X	X
	DAIR80X	AIRJET 80/I supply diffuser - white frame and black inside	X	X	X	X
	GAIR50X	Intake grille + extractable filter AIRJET 50/A - white frame and black inside	X	X	X	X
	GAIR80X	Intake grille + extractable filter AIRJET 80/A - white frame and black inside	X	X	X	X
	PAIR50X	Suction/supply plenum with AIRJET 50 control damper - rear connection	X	X	X	X
	PAIR80X	Suction/supply plenum with AIRJET 80 control damper - rear connection	X	X	X	X
	GINOX	Suction/supply rectangular grill 350x130mm stainless	X	X	X	X
	GIVEX	Suction/supply rectangular grill 350x130mm white	X	X	X	X
	FREX	Filter for rectangular grilles 350x130mm (5 pcs.)	X	X	X	X
	VIEX	Extraction/intake valve in ABS DN125 without air filter	X	X	X	X
	FT125X	Filter for DN125 valve (5 pcs.)	X	X	X	X
	GQIEX	Extraction/intake squared grill of DN125 joint with air filter	X	X	X	X
Round tube distribution (from the distribution box to outlet)	**TFT90X**	DN90 round flexible tube (Int. diam. 78mm) in a 20m. coil without insulation	X	X	X	X
	IT90X	Insulation in a 20m coil for DN90 round flexible tube	X	X	X	X
	CBT90X	Connector to distribution box for DN90 round tube	X	X	X	X
	GIUTX	Connecting joint for DN90 round tube	X	X	X	X
	CT90X	Printed curve of 90-degree angle for DN90 round tube	X	X	X	X
	A90DTX	90-degree adaptor, double DN90 round tube for DN125 valve + cap	X	X	X	X
	TACTX	Cap for DN90 round tube (5 pcs.)	X	X	X	X
	ANFTX	DN90 seal O-Ring (10 pcs.)	X	X	X	X
Flat tube distribution (from the distribution box to outlet)	**TFPNX**	Flat flexible tube 132x52mm in a 20m coil without insulation	X	X	X	X
	IT100X	Insulation in a 20m coil for flat flexible tube 132x52	X	X	X	X
	COBPX	DN90 connector joint (CBT90X) --> flat tube	X	X	X	X
	GIUPX	Seal and connecting joint for flat tube (10 pcs.)	X	X	X	X
	CVP90X	Vertical 90-degree curve for flat tube	X	X	X	X
	COP90X	Horizontal 90-degree curve for flat tube	X	X	X	X
	CTP180X	Joint for 180-degree flat tube rotation	X	X	X	X
	A90MPX	90-degree adaptor, single tube for DN125 valve	X	X	X	X
	A90DPX	90-degree adaptor, double flat tube for DN125 valve	X	X	X	X
	ADMPX	Straight adaptor, single flat tube for DN125 valve	X	X	X	X
	A90GPX	90-degree adaptor, single tube for flat grill 350x130 mm	X	X	X	X
	TACPX	Cap for flat tube (5 pcs.)	X	X	X	X
	ANFPX	Fixing ring for flat tube (10 pcs.)	X	X	X	X
	REPPX	Flow controller for flat tube	X	X	X	X
	RTPTX	Round/flat tube connecting joint	X	X	X	X
External distribution (Ducts from the outside to the unit and from the unit to the distribution boxes)	**BD8CX**	8-output distribution box, DN150-200 joint	X	X	X	X
	BD14CX	14-output distribution box, DN200 joint		X	X	X
	TFIS150X	DN150 soundproofing insulated flexible tube in a 10mt. coil	X			X
	TFIS200X	DN200 soundproofing insulated flexible tube in a 10mt. coil		X		X
	TFIS250X	DN250 soundproofing insulated flexible tube in a 10m coil			X	
	GR150X	Exhaust / return square wall grille with circular coupling DN150	X			
	GR200X	Exhaust / return square wall grig with circular coupling DN200		X		X
	GR250X	Exhaust / return square wall grig with circular coupling DN250			X	
	GF150X	F/F DN150 Joint	X			
	GF200X	F/F DN200 Joint		X		X
	GF250X	F/F DN250 Joint			X	
	R2015X	DN200-DN150 Reducer				X
	R2520X	DN250-DN200 Reducer			X	
	DY200X	DN200-DN200-DN200 Y-branch		X	X	
	DY250X	DN250-DN200-DN200 Y-branch				
Air recirculation	**GPRX**	Grill for recirculation air return plenum 325x175 mm white				X
	PRX	Soundproofed plenum for air recirculation				X
	CPRX	Manifold for air recirculation plenum DN 150 - 200				X

X = Accessories separately supplied

1 - Internal suction and supply grilles

DAIR50X - AIRJET 50/I supply diffuser - white frame and black inside

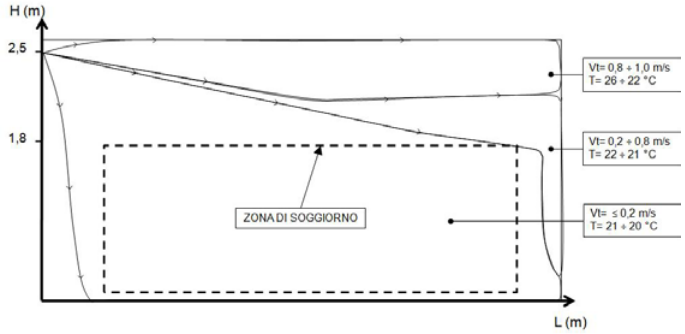
DAIR80X - AIRJET 80/I supply diffuser - white frame and black inside

AIRJET 50/I and AIRJET 80/I are special input diffusers specifically developed to ensure a high standard of comfort with air distribution and diffusion.

The air blown into the environment through the AIRJET diffuser, mixes with the whole mass of air in the room in such a subtle way as to create a uniform temperature and air quality throughout the room.

This is the element that guarantees that the premises are ventilated adequately in compliance with the sound level, air speed and temperature requirements.

The living area is the area with a height of 1.8 m in which the air velocity must not exceed 0.2 m/s, the speed above which the human body perceives its motion and therefore a feeling of discomfort.



Winter operation simulation

The AIRJET diffuser is positioned at a height of 2.5 metres.

The living area is the comfort zone with air velocity less than/equal to 0.2 m/s and temperatures of 20-21°C.

The length of the launch L is determined, through the following images, based on the airflow and model (AIRJET 50/I or AIRJET 80/I)

From the front it looks like a linear diffuser with slits. Some micro-nozzles are housed on the inside to allow proper airflow to achieve considerable ranges although with reduced flow rates.

It consists of an outer frame in extruded aluminium, which is painted white RAL 9010, a perforated metal sheet and black micro-nozzles.

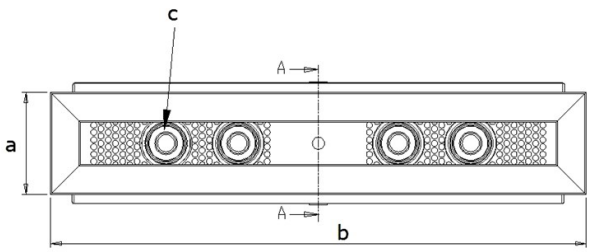
The diffuser is attached to the plenum (separately-supplied accessory) with a simple pressure.

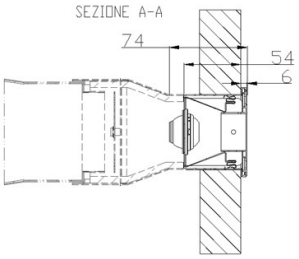
Two sizes are available:

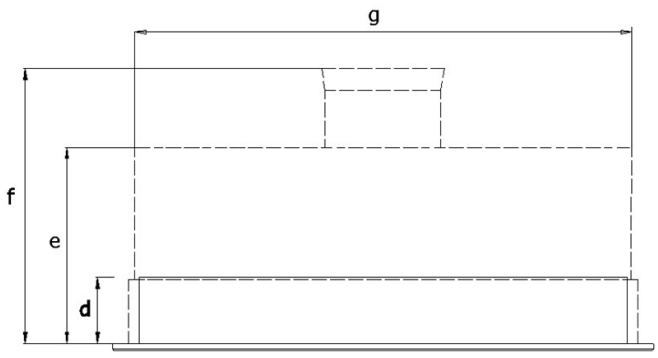
AIRJET 50/I: nominal airflow rate of 50m³/h, with 2 adjustable micro-nozzles

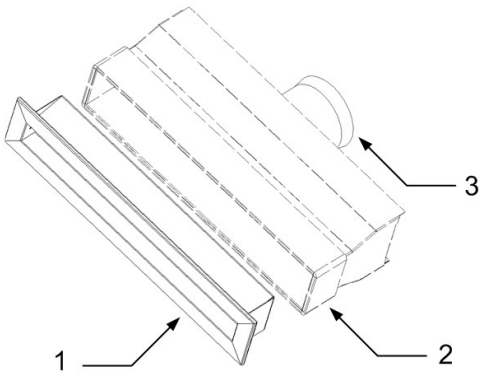
AIRJET 80/I: nominal airflow rate of 80m³/h, with 4 adjustable micro-nozzles

Dimensions		
	AIRJET 50/I	AIRJET 80/I
a	85	85
b	295	445
c	Num. 2	Num. 4
d	54	54
e	161	161
f	226	226
g	257	408



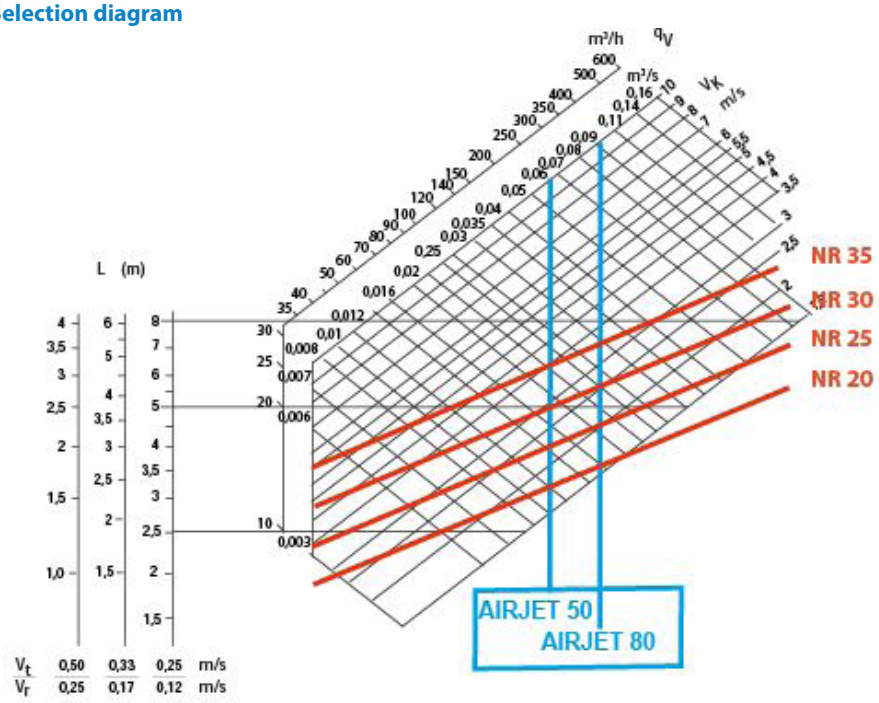






1 - AIRJET diffuser
2 - Plenum
Accessory separately supplied
3 - CBT90X connector
Accessory separately supplied

Selection diagram



Key
Δp - Pressure drop [Pa]
NR - Sound level [dB]
Ak - actual Section [m^2]
Vk - Effective air intake velocity [m/s]
Vt - Terminal velocity [m/s]
Vr - residual velocity in the occupied zone [m/s]
qV - Air flow rate [m^3/h, m^3/s]
L - Range, launch [m]
Height of the room: 2.7 m
Height of occupied area: 1.8 m

Flow rate measurement qV (m^3/h, m^3/s)

The flow rate qV is calculated by multiplying the effective intake velocity Vk (m/s), measured using a hot-wire anemometer or a pitot tube, by the actual section Ak (m^2) shown in the table at the side.

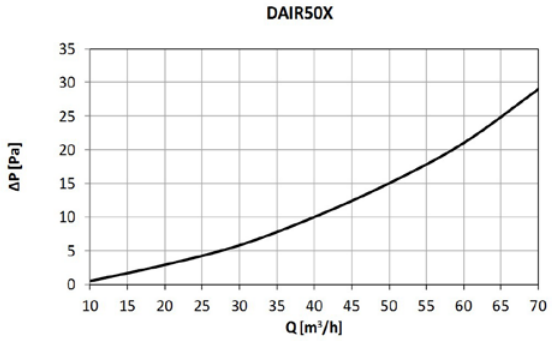
Ak - values (m^2)

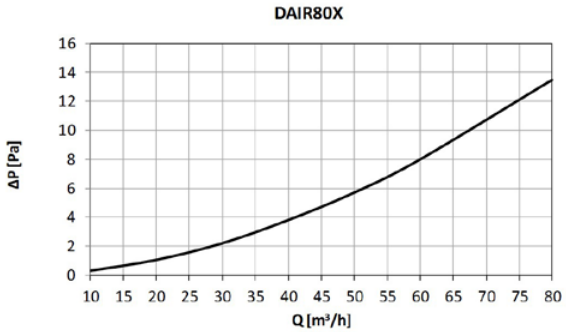
Size	Ak
AIRJET 50/I	0,0062
AIRJET 80/I	0,00098

qv (m^3/s) = vk x Ak

qv (m^3/h) = vk x Ak x 3600

Pressure drop





Dp = pressure drop
Q = Air flow

GAIR50X - Intake grille + extractable filter AIRJET 50/A - white frame and black inside

GAIR80X - Intake grille + extractable filter AIRJET 80/A - white frame and black inside

Suction grille consisting of an outer frame in extruded aluminium, which is painted white RAL 9010, and a perforated metal sheet painted black.

Easy to remove air filter, consisting of a metal frame containing the filtering section.

In needle-punched, resinated acrylic polyester fabric with high-efficiency, and superlative against dusts and pollens (UNI-EN779, filtering level G3, class M1).

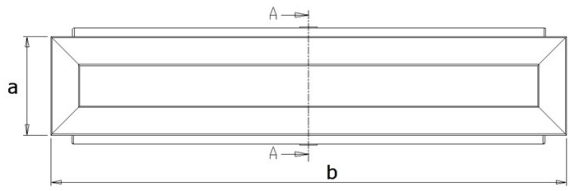
It can be regenerated by water-washing, blowing, vacuuming.

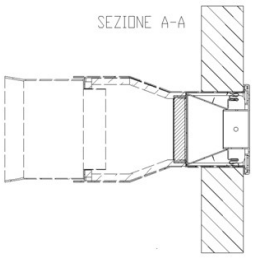
Two sizes are available:

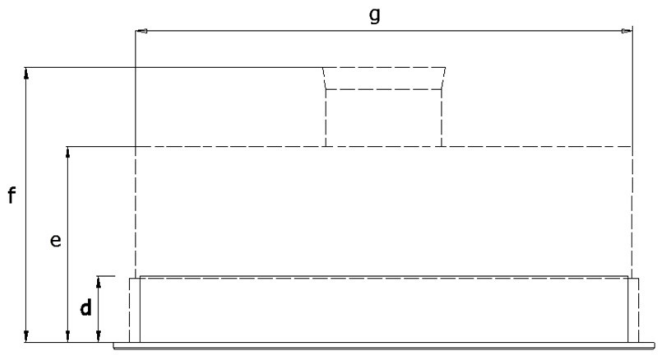
Intake grille + extractable filter AIRJET 50/A

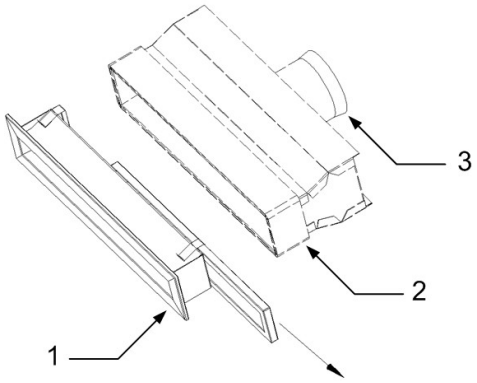
Intake grille + extractable filter AIRJET 80/A

Dimensions		
	AIRJET 50/A	AIRJET 80/A
a	85	85
b	295	445
d	54	54
e	161	161
f	226	226
g	257	408



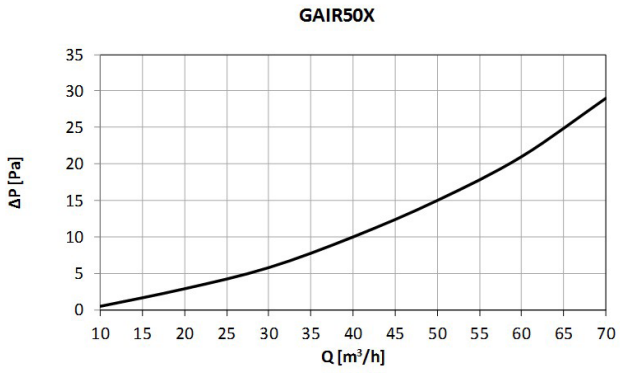


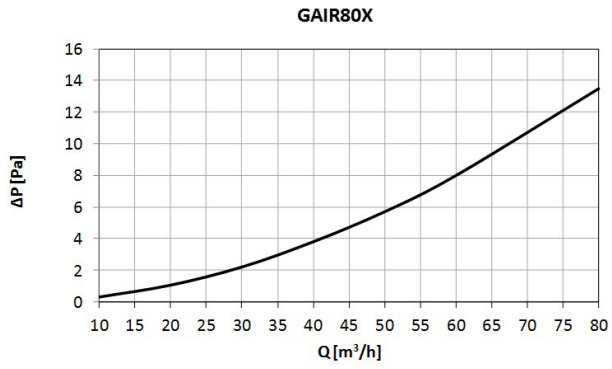




1 - Intake grille + extractable filter AIRJET
2 - Plenum
Accessory separately supplied
3 - CBT90X connector
Accessory separately supplied

Pressure drop





Dp = pressure drop
Q = Air flow

PAIR50X - Suction/supply plenum with AIRJET 50 control damper - rear connection

PAIR80X - Suction/supply plenum with AIRJET 80 control damper - rear connection

The plenums are used to complete the supply diffusers and for the extraction grilles.

The plenum is equipped with a control damper ensuring accurate airflow adjustment.

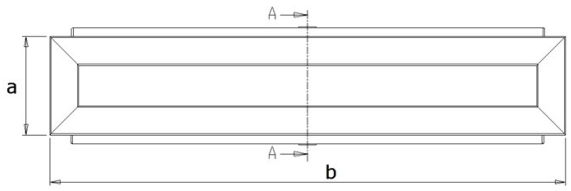
The rear part is suitably configured for connection to various flexible round or flat pipes through the special CBT90X connector.

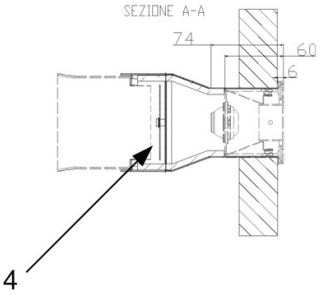
Two sizes are available:

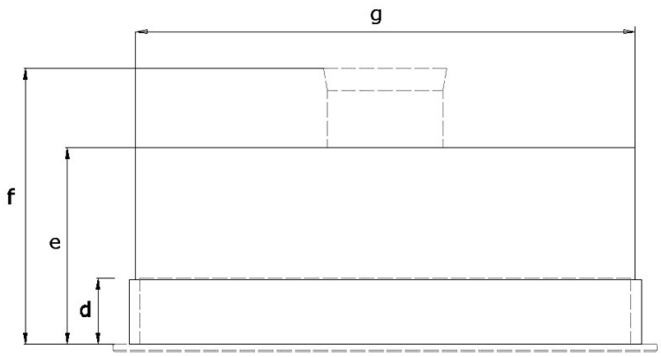
Plenum with AIRJET 50 control damper

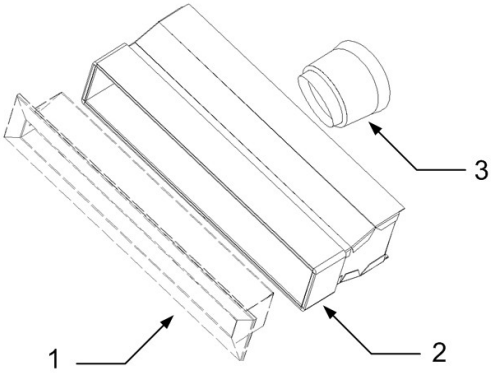
Plenum with AIRJET 80 control damper

Dimensions		
	AIRJET 50	AIRJET 80
a	85	85
b	295	445
d	54	54
e	161	161
f	226	226
g	257	408





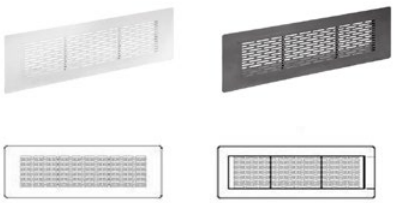




1 - Supply diffuser or Intake grille
Accessory separately supplied
2 - Plenum with damper
3 - CBT90X connector
Accessory separately supplied
4 - Calibration damper

GINOX - Suction/supply rectangular grill 350x130 stainless

GIVEX - Suction/supply rectangular grill 350x130 white



Grille for floor, wall or ceiling installation.

Floor installation is possible for a system of just mechanical ventilation (e.g. ELFOFresh²) while it is inadvisable for the system with integration (e.g. ElfoPack) that would generate air stratifications and uneven temperature levels.

FREX - Filter for rectangular grilles 350x130mm (5 pcs.)

Simple flat filter for rectangular grilles measuring 350x130 mm.

Provided in boxes of 5 pieces.

VIEX - Extraction/intake valve DN125

Valve for wall or ceiling installation.

It is possible to adjust the airflow through the central disc.

PP white plastic material.

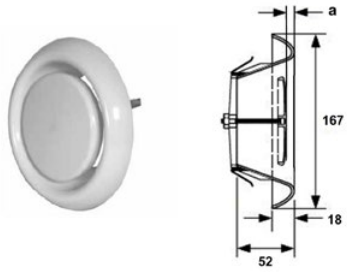
It is coupled to the following adapters:

A90DTX: 90-degree adaptor, double DN90 round tube for DN125 valve + cap. Max air flow of 120 m^3/h

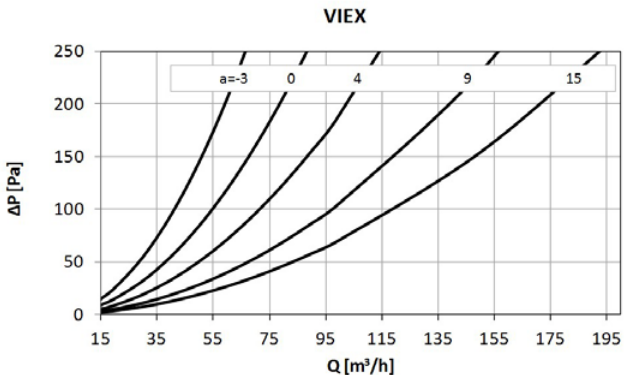
A90MPX: 90-degree adaptor, single tube for DN125 valve. Max air flow of 50 m^3/h

A90DPX: 90-degree adaptor, double flat tube for DN125 valve. Max air flow of 100 m^3/h

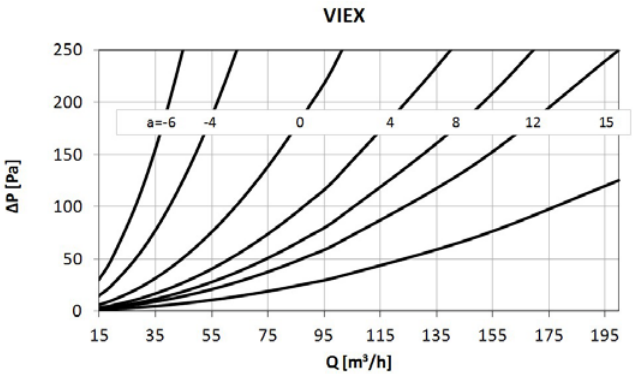
ADMPX: straight adaptor, single flat tube for DN125 valve. Max air flow of 50 m^3/h



Air supply



Extraction of stale air



Dp = pressure drop

Q = Air flow

FT125X - Filter for DN125 valve (5 pcs.)

Conical filter to be housed inside the opening.

For installation, simply remove its internal plate and reposition it once it is inserted on the central internal threaded screw.

Provided in boxes of 5 pieces.

GQIEX - Extraction/intake squared grill of DN125 joint with air filter

Supply and/or return grille in steel for wall or ceiling installation supplied with a removable and washable metal filter and control dampers.

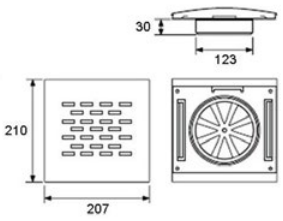
It is coupled to the following adapters:

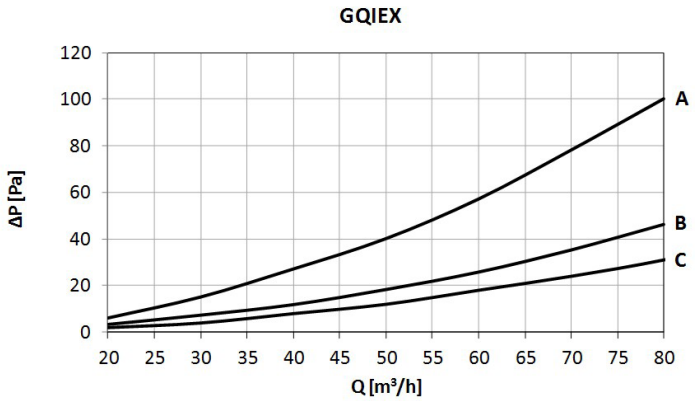
A90DTX: 90-degree adaptor, double DN90 round tube for DN125 valve + cap. Max air flow of 120 m^3/h

A90MPX: 90-degree adaptor, single tube for DN125 valve. Max air flow of 50 m^3/h

A90DPX: 90-degree adaptor, double flat tube for DN125 valve. Max air flow of 100 m^3/h

ADMPX: straight adaptor, single flat tube for DN125 valve. Max air flow of 50 m^3/h





A with filter damper 50% open

B with filter damper 100% open

C without filter damper 100% open

Dp = pressure drop
Q = Air flow

2 - Flat tube distribution

TFT90X - DN90 round flexible tube (Int. diam. 78mm) in a 20m coil without insulation

Polypropylene PE piping, corrugated double-layer on outside to ensure crush resistance in installations under the screed.

Internally the pipe has a smooth surface ensuring reduced pressure drop.

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

Its extreme flexibility allows an extremely easy installation thanks to a minimum radius of curvature of 150 mm.

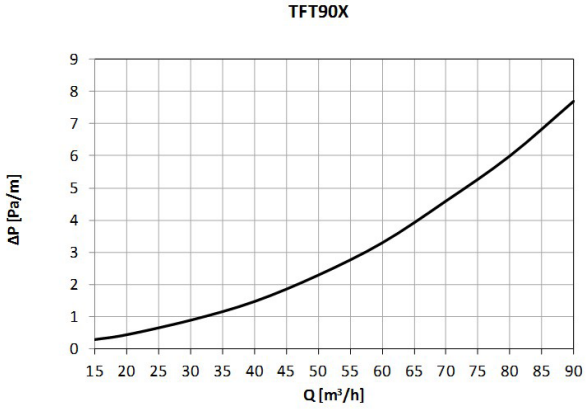
The piping connects to the distribution boxes and to the AIRJET diffusers/return grilles through the CBT90X connector.

Airtightness is guaranteed by the ANFTX O-ring supplied separately.

The flexible tube, supplied in 20 m coils, can be cut with a simple cutting tool and can be connected – without using any special equipment – to all the other components of the round tube system.

For correct installation, use the appropriate IT90X external insulating material supplied separately.

Note: we recommend a maximum airflow rate of 60 m^3/h (v = 3.48 m/s) in order not to have excessive air speed and consequent noise emission.



Dp = pressure drop
Q = Air flow

Provided in a coil of 20 m

IT90X - Insulation in a 20m coil for DN90 round flexible tube

Flexible tube insulation allows a reduction of heat loss, prevents condensate build-up during summer operation and allows a reduction in noise.

Provided in a coil of 20 m

For particular installations (example: burying in screed) contact the technical Office..

CBT90X - Connector to distribution box for DN90 round tube

The connection between the round flexible tube and the distribution box must be carried out using the appropriate joint.

The connector is secured to the box and tube by means of a quick-mount pressure fitting system. To guarantee airtightness, quick-fit sealing rings must be used.

GIUTX - Connecting joint for DN90 round tube

The connection between two sections of a round flexible tube must be effected using the appropriate joint.

The connection is effected on both sides of the joint using 1 sealing ring mounted on the second rib of the tube, by means of a quick-mount pressure fitting system.

CT90X - Printed curve of 90-degree angle for DN90 round tube

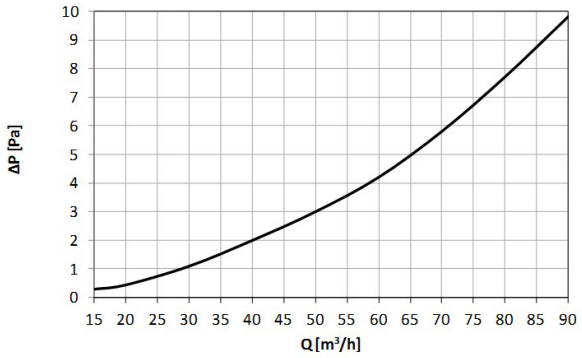
Flexible round tubes can be bent with a minimum radius of curvature of 150 mm.

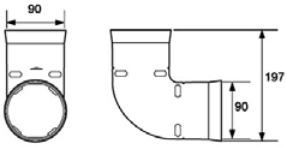
If the bend must have a smaller radius, 90° stamped elbows can be used.

The corrugated tube is joined to both ends of the elbow by means of a quick-mount pressure fitting system.

Lastly, a sealing ring must be mounted on the second rib of the two tube sections.

CT90X





Dp = pressure drop
Q = Air flow

A90DTX - 90-degree adaptor, double DN90 round tube for DN125 valve + cap

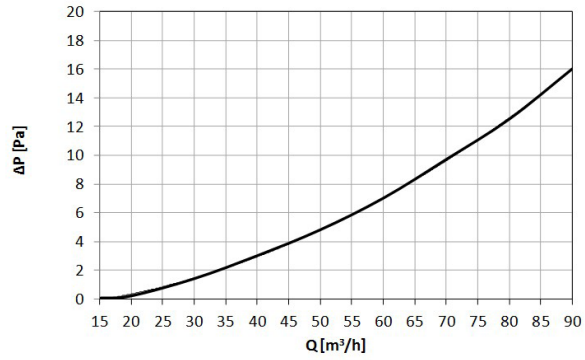
This allows you to connect the extraction and intake valves to the air distribution system with a round tube. It is equipped with two air inlets for a maximum airflow rate of 120m³/h. If the airflow rate through the valve is below 60m³/h, a single inlet is sufficient; the other inlet will remain closed with the relevant closing cap supplied with each adapter.

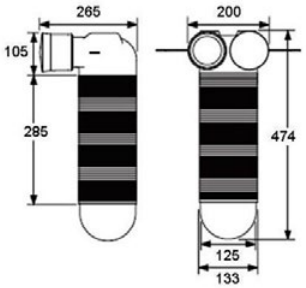
When cutting the cap you can shorten the cylindrical segment to the desired size with a cutting tool.

The segment has reference marks to facilitate this operation.

The valve adapter is supplied closed and ends with a round cap to be cut after the building work, so as to prevent dust and dirt from entering the flexible tubes.

A90DTX





Dp = pressure drop
Q = Air flow

No. 1 Cap included with the supply

TACTX - Cap for DN90 round tube (5 pcs.)

The cap can be applied to unused inlets/outlets of the distribution box and to 90° round tube adapters for valves with 2 inlets.

No sealing ring is required for mounting the cap.

Provided in boxes of 5 pieces.

ANFTX - DN90 seal O-Ring (10 pcs.)

To guarantee the airtightness of any other component of the system, quick-fit sealing rings must be used.

This component, therefore, must always be used to connect the round flexible tube to the joints, valve adapters, grilles and elbows.

Provided in boxes of 10 pieces.

3 - Flat tube distribution

TFPNX - Flat flexible tube 132x52mm in a 20m coil without insulation

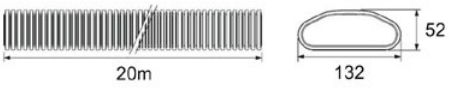
Polypropylene PE piping, corrugated double-layer on outside to ensure crush resistance in installations under the screed.

Internally the pipe has a smooth surface ensuring reduced pressure drop.

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

Its flat shape and reduced height make installation extremely easy and it saves space in the underfloor screed. The flexible pipe allows a minimum horizontal curvature radius of 300 mm.

The piping connects to the distribution boxes and AIRJET diffusers/return grilles through the COBPX connector.



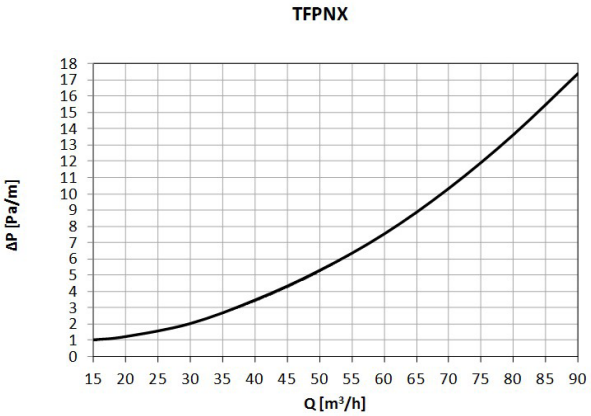
Airtightness is guaranteed by the GIUPX connection joint supplied separately.

The flexible tube, supplied in 20 m coils, can be cut with a simple cutting tool and can be connected – without using any special equipment – to all the other components of the round tube system.

For correct installation, use the appropriate IT100X external insulating material supplied separately.

Internal section 0.0041 m^2.

Note: we recommend a maximum airflow rate of 50 m^3/h (v = 3.38 m/s) in order not to have excessive air speed and consequent noise emission.



Dp = pressure drop
Q = Air flow

Provided in a coil of 20 m

IT100X - Insulation in a 20m coil for flat flexible tube 132x52

Flexible tube insulation allows a reduction of heat loss, prevents condensate build-up during summer operation and allows a reduction in noise.

Provided in a coil of 20 m

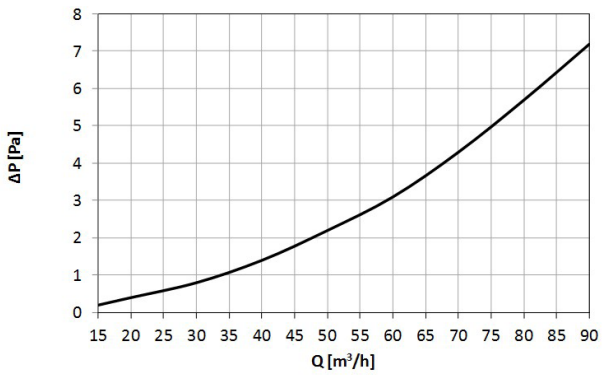
For particular installations (example: burying in screed) contact the technical Office.

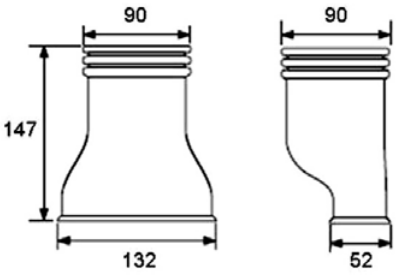
COBPX - DN90 connector joint (CBT90X) --> flat tube

The connection between the flat flexible tube and the distribution box must be carried out using the appropriate joint.

The connector is secured to the box by means of a quick-mount pressure fitting system and a sealing ring positioned on the central groove, while the tube is coupled to the connector using an appropriate joint for flat flexible tubes with double sealing ring.

COBPX





*** Joint included for flat flexible tube with double sealing ring.

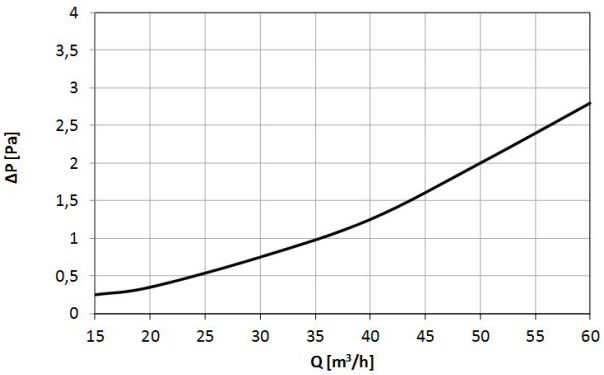
Dp = pressure drop
Q = Air flow

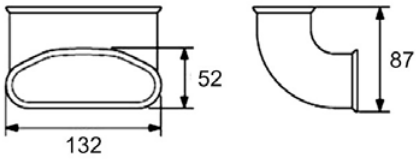
CVP90X - Vertical 90-degree curve for flat tube

If the bend must have a smaller radius, 90° stamped vertical elbows can be used.

The flexible tube can be attached exclusively using an appropriate joint for flat flexible tubes with double sealing ring.

CVP90X





*** Joint included for flat flexible tube with double sealing ring.

Dp = pressure drop
Q = Air flow

GIUPX - Seal and connecting joint for flat tube (10 pcs.)

The connection between two sections of a flat flexible tube must be effected using the appropriate joint.

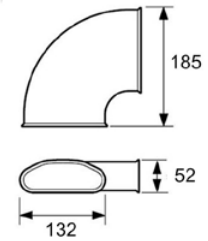
The connection is carried out on both sides using 2 sealing rings supplied already mounted in the joint..

Provided in boxes of 10 pieces.

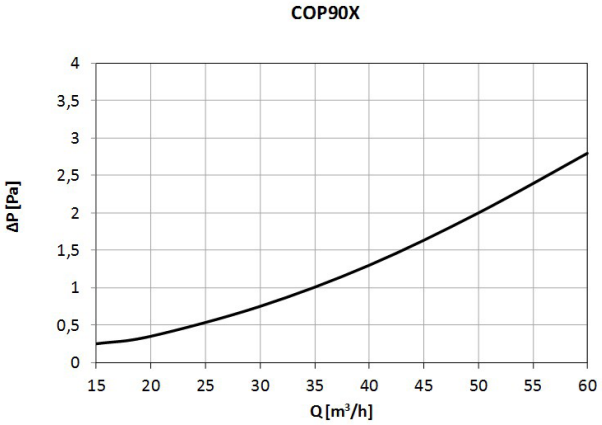
COP90X - Horizontal 90-degree curve for flat tube

Flexible flat tubes can be bent horizontally with a minimum radius of curvature of 300mm.

If the bend must have a smaller radius, 90° stamped horizontal elbows can be used.



*** Joint included for flat flexible tube with double sealing ring.



Dp = pressure drop
Q = Air flow

CTP180X - Joint for rotating the flat tube through 180°

Thanks to this special joint, flat flexible tubes can be rotated through 180° on the horizontal axis.

The flexible pipe connection with rotational joint takes place exclusively through the use of a special joint for flat flexible tubes with double seal ring.

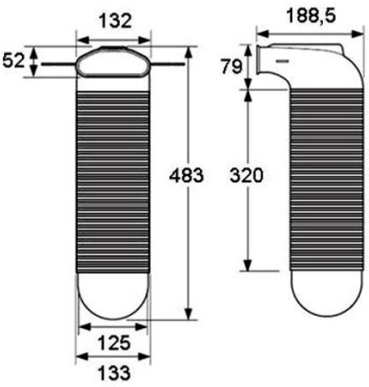
A90MPX - 90-degree adaptor, single tube for DN125 valve

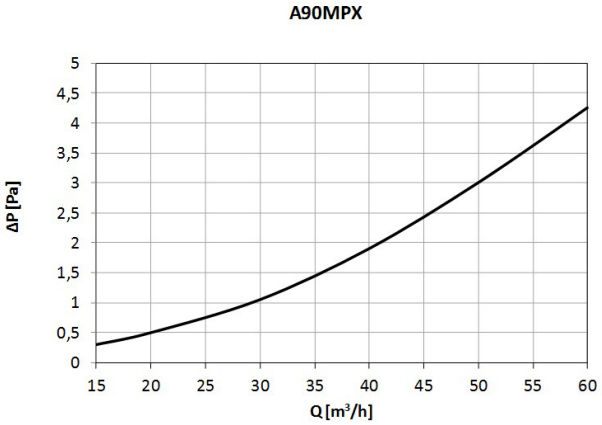
Allows for connecting the air intake and extraction valves to the air distribution system with a flat tube.

It is equipped with one air inlet guaranteeing a maximum airflow rate of 50m³/h.

If required, the cylindrical body can be shortened with a cutting tool. The body has a series of reference marks to make it easier to cut.

The valve adapter is supplied closed and ends with a round cap to be cut, which – during installation of the distribution system – can function as a closing cap if turned through 180°, so as to prevent dust and dirt from entering the flexible tubes.





Dp = pressure drop
Q = Air flow

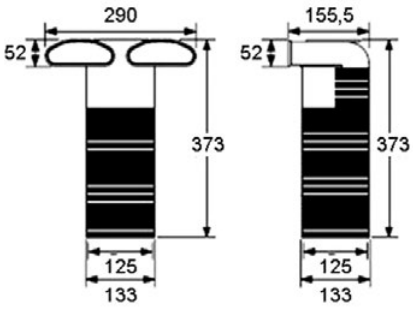
A90DPX - 90-degree adaptor, double flat tube for DN125 valve

Allows for connecting the air intake and extraction valves to the air distribution system with a flat tube.

It is equipped with two air intakes guaranteeing a maximum airflow rate of 100m^3/h.

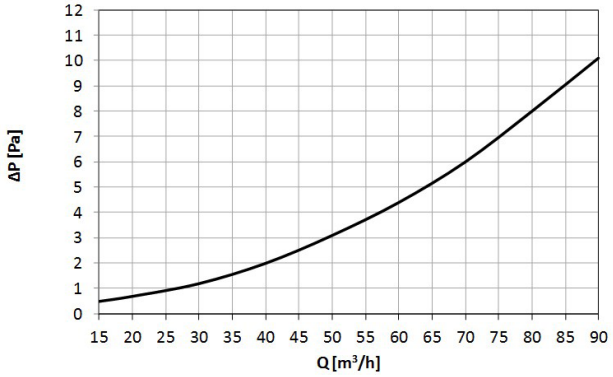
If required, the cylindrical body can be shortened with a cutting tool. The body has a series of reference marks to make it easier to cut.

The valve adapter is supplied with a round cap, which – during installation of the distribution system – can be used to prevent dust and dirt from entering the flexible tubes.



*** Joint included for flat flexible tube with double sealing ring.

A90DPX



Dp = pressure drop
Q = Air flow

ADMPX - Straight flat single-tube adapter for DN125 valve

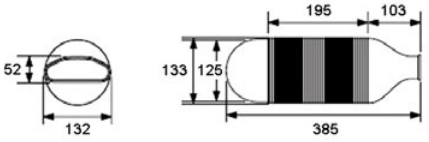
Allows for connecting the air intake and extraction valves to the air distribution system with a flat tube.

It is equipped with one air inlet guaranteeing a maximum airflow rate of 50m^3/h.

If required, the cylindrical body can be shortened with a cutting tool. The body has a series of reference marks to make it easier to cut.

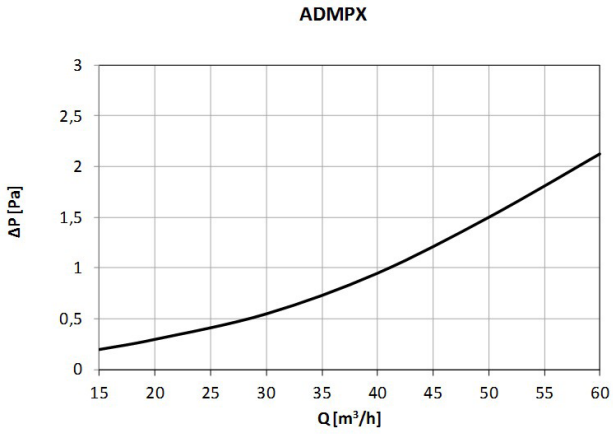
The valve adapter is supplied closed and ends with a round cap to be cut after the building work, so as to prevent dust and dirt from entering the flexible tubes.

In cases with round tube air distribution it is necessary to provide an RTPTX joint for round tube/ flat pipe connection.



*** Joint included for flat flexible tube with double sealing ring.

ADMPX



Dp = pressure drop
Q = Air flow

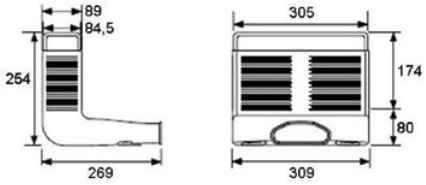
A90GPX - 90-degree adaptor, single tube for flat grill 350x130 mm

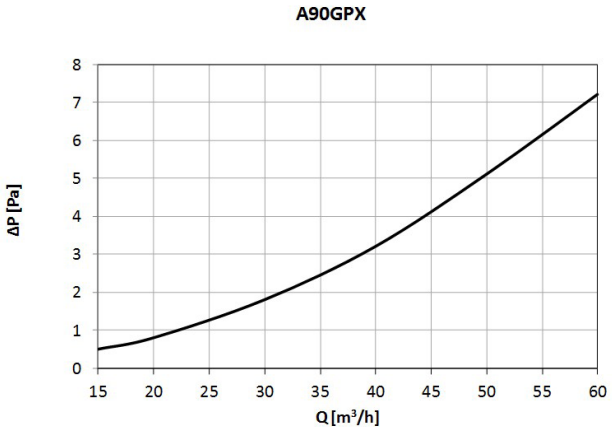
It is used to connect the flat grilles to the air distribution system; you can shorten the height with a cutting tool.

Can be quickly installed thanks to incorporated mounting lugs on the wall as well as on the floor.

A connection and sealing joint for flat tubes (GIUPX) allows easy connection of the flat tube to the adapter.

In cases with round tube air distribution it is necessary to provide an RTPTX joint for round tube/ flat pipe connection.





Dp = pressure drop
Q = Air flow

TACPX - Cap for flat tube (5 pcs.)

The cap can be applied to unused inlets/outlets of the distribution box and to 90° round tube adapters for valves with 2 inlets.

No sealing ring is required for mounting the cap.

Provided in boxes of 5 pieces.

ANFPX - Fixing ring for flat tube (10 pcs.)

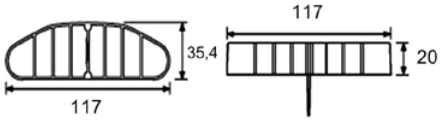
The flat flexible tube can be secured to the wall using an appropriate fixing ring, which – on its own – is able to anchor the tube vertically, horizontally or onto the ceiling, and secure the connections to the flexible duct.

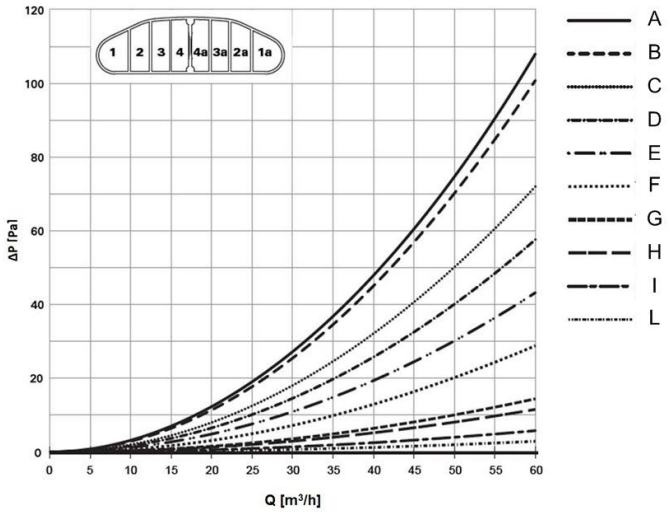
Provided in boxes of 10 pieces.

REPPX - Flow controller for flat tube

To adjust the amount of air conveyed to an intake/exhaust valve or grille, a flow regulator (diaphragm with closed sections) must be installed.

The flow regulator has 8 sections (1, 2, 3, 4, 4a, 3a, 2a, 1a). Depending on the required need, one or more sections can be added to adjust the airflow.





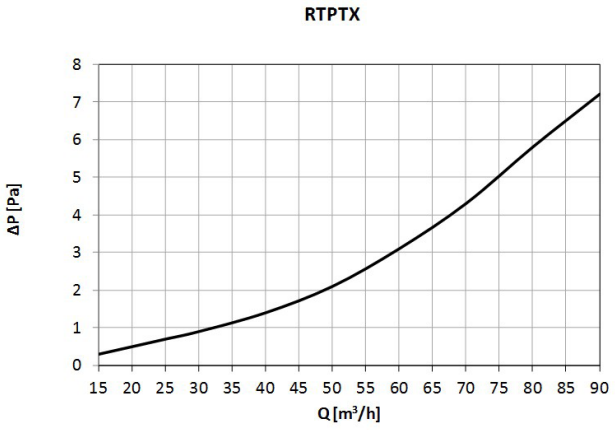
Dp = pressure drop
Q = Air flow

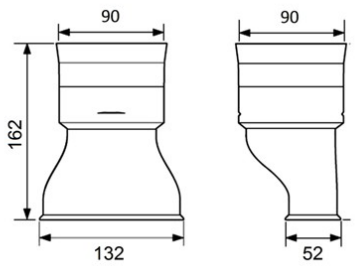
A	1 opening 1 or 1a	F	4 openings 1, 2 and 1a, 2a
B	1 opening 4 or 4a	G	4 openings 3, 4 and 3a, 4a
C	2 openings 1 and 1a	H	6 openings 1, 2, 3 and 1a, 2a, 3a
D	2 openings 2 and 2a	I	6 openings 2, 3, 4 and 2a, 3a, 4a
E	2 openings 3 and 3a	L	all open

RTPTX - Round/flat tube connecting joint

The connection between two sections of a flat flexible tube must be effected using the appropriate joint.

The connection is effected on both sides of the joint using 1 sealing ring mounted on the second rib of the tube, by means of a quick-mount pressure fitting system.





Dp = pressure drop
Q = Air flow

4 - External distribution

BD8CX - 8-output distribution box, DN150-200 joint

BD14CX - 14-output distribution box, DN200 joint

Distribution box that can be used for supply and return.

During installation, thanks to pre-shearing only the necessary holes are used for connecting the flexible tubes.

The connection between the box and round tube DN90 is performed by the CBT90X accessory.

The flat tube 132x52 is connected using the CBT90X and COBPX accessories.

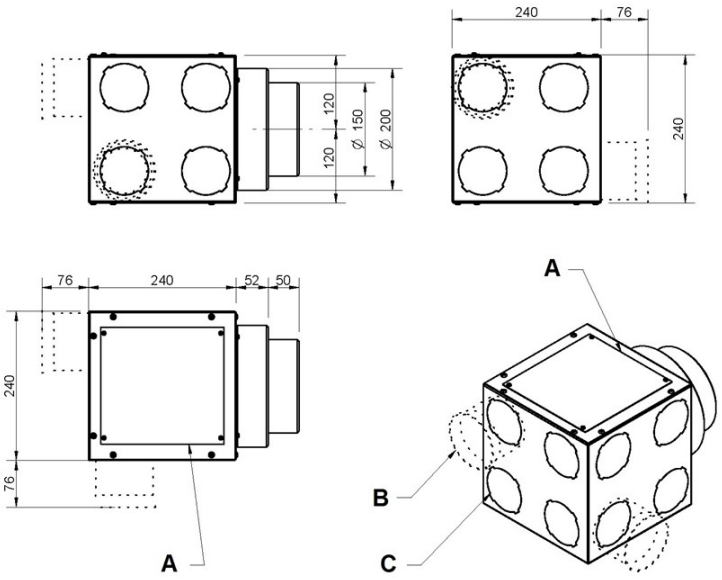
The box is provided with a removable plate for inspection and cleaning.

Internally, the box is lined with sound-proofing material ensuring improved air flow noise levels.

The distribution box is provided with 4 angular brackets for installation.

The box can be installed horizontally or vertically.

8 connections



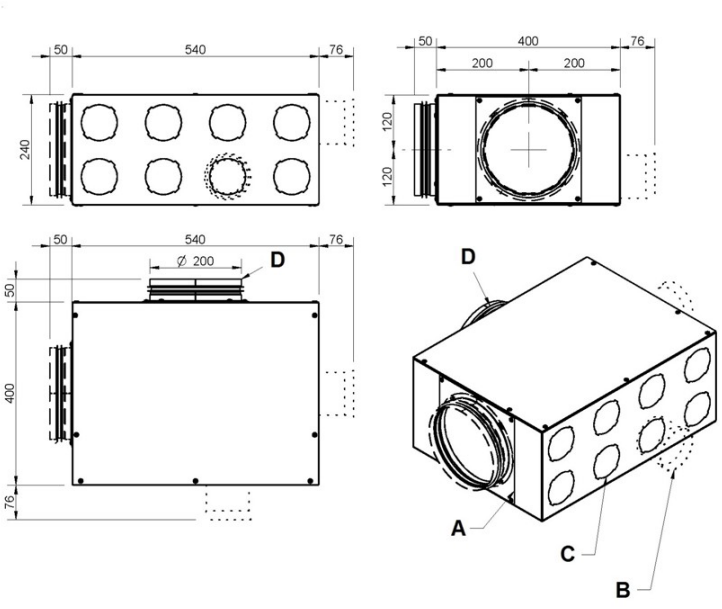
Number of ducts	Max. air flow [m³/h]	Pressure drop [Pa]
1	60	15
2	120	15
3	180	15
4	240	15
5	320	15
6	360	15
7	420	15
8	480	15

A. inspection

B. CBT90X (supplied separately)

C. pre-cut connections

14 connections



Number of ducts	Max. air flow [m³/h]	Pressure drop [Pa]
1	60	15
2	120	15
3	180	15
4	240	15
5	320	15
6	360	15
7	420	15
8	480	15
9	540	15
10	600	15
11	660	15
12	720	15
13	780	15
14	840	15

A. inspection

B. CBT90X (supplied separately)

C. pre-cut connections

D. DN200 air fitting

TFIS150X - DN150 soundproofing insulated flexible tube in a 10m coil

TFIS200X - DN200 soundproofing insulated flexible tube in a 10m coil

TFIS250X - DN250 soundproofing insulated flexible tube in a 10m coil

For connecting the unit to the air distribution boxes and to the return/exhaust grilles, an insulated flexible pipe is used as it affords extensive installation flexibility and effective sound damping and reduction in heat loss.

The flexibility guaranteed by the reduced-pitch spiral allows for creating 180° curves without crushing and therefore ensures reduced pressure drops.

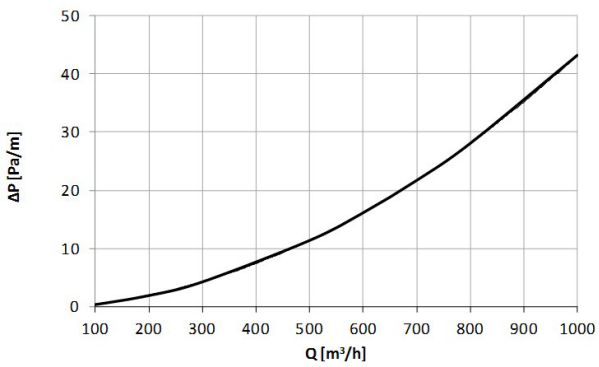
There are three available diameters: DN150, DN200 and DN250.

Technical specifications of the tube used:

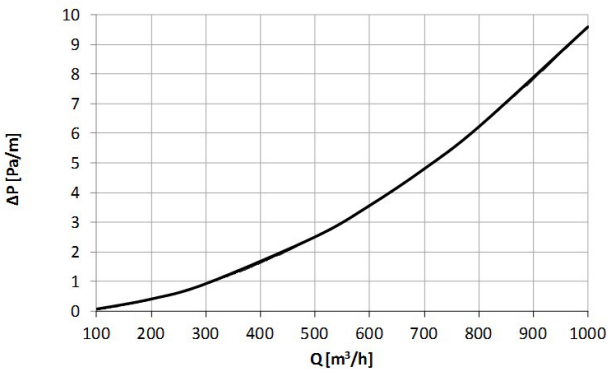
- piping consisting of layers of aluminium foil reinforced with a polyester film and spiral in spring steel
- lining with fibreglass matting with 25 mm thickness and density of 16 kg/m^3.
- external lining (vapour barrier) in layers of reinforced aluminium
- operating temperature = -30°C to +140° C
- maximum working pressure = 2500 Pa
- maximum speed = 30 m/s
- reaction to fire = class 1
- colour = natural aluminium

Provided in a coil of 10 m

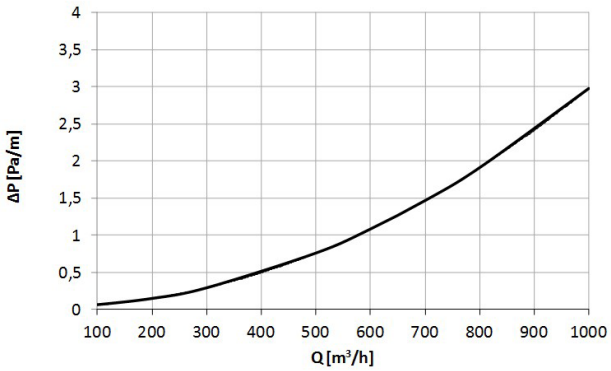
TFIS150X



TFIS200X



TFIS250X



Dp = pressure drop
Q = Air flow

GR150 - Wall-mounted square exhaust/return grille with circular DN150 connection

GR200 - Wall-mounted square exhaust/return grille with circular DN200 connection

GR250 - Wall-mounted square exhaust/return grille with circular DN250 connection

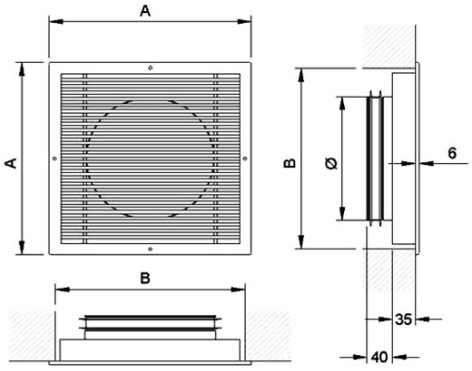
The outdoor air return and exhaust can be carried out on the wall by reaching this exhaust/intake grille with the pipe.

There are two available grids:

- DN150 for ELFOFresh2 70-120 sizes
- DN200 for ELFOFresh2 200-300 sizes and ElfoPack 5 size
- DN250 for ELFOFresh2 500-650 sizes

The grille is square and fitted with small openings to install it on outdoor walls and can be used both for supply and return purposes.

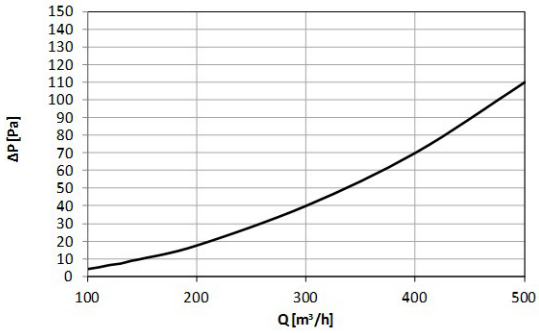
It is fitted with a circular connection at the back fitted with a sealing gasket and a wire mesh bird screen



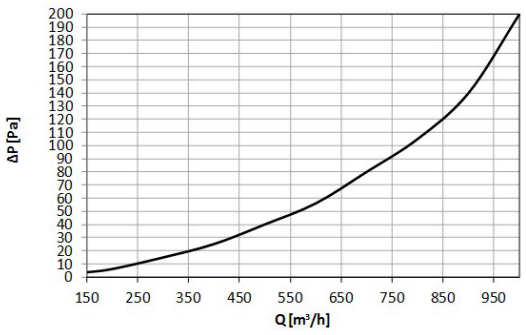
Grille size	A	B	C	Weight
Diameter [Ø]	[mm]	[mm]	[mm]	[kg]
150	226	206	40	1.4
200	310	276	40	1.5
250	370	336	40	1.9

Air inlet

GR150X

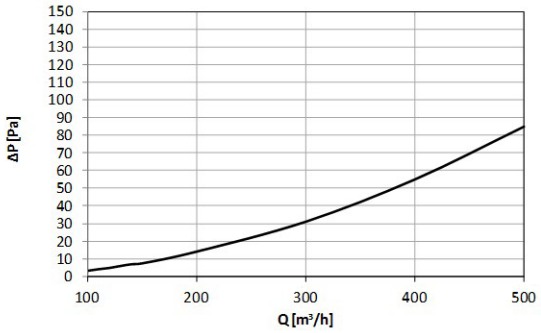


GR200X

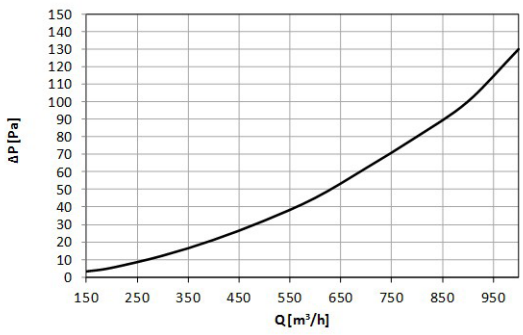


Discharged air

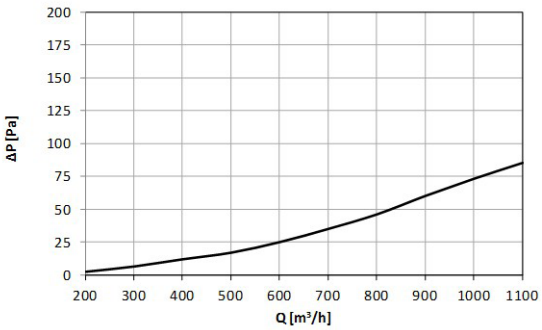
GR150X



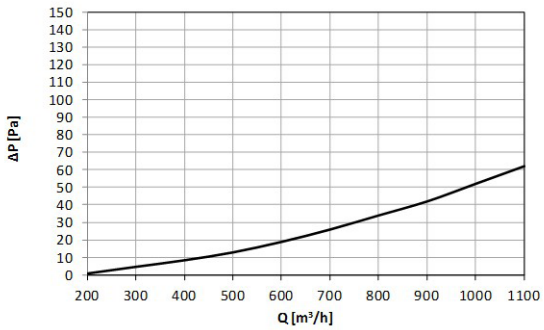
GR200X



GR250X



GR250X



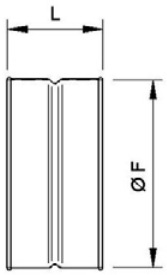
Dp = pressure drop
Q = Air flow

GF150X - F/F DN150 Joint

GF200X - F/F DN200 Joint

GF250X - F/F DN250 Joint

Joint to use to connect to the unit the pieces of DN200 and DN250 insulated flexible piping and components such as humidifier and heaters.



F	L	Weight
Diameter [Ø]	[mm]	[kg]
150	95	0.18
200	95	0.25
250	140	0.42

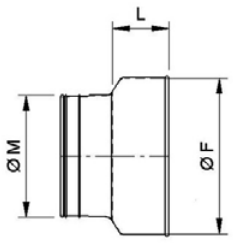
R2015X - DN200-DN150 reducer

R2520X - DN250-DN200 Reducer

There are some cases where it is necessary to switch from a DN250 diameter to a DN200 diameter, or from a DN200 diameter to a DN150 diameter.

For example, the preheating, electric heaters kit has a DN 200 diameter and so, in order to connect it to the ELFOFresh2 500-650, it needs this reduction plus the F/F 200 joint.

The female-male reduction is made of stamped galvanised sheet steel, with 45° bend, and is used for compact installations with reduced pressure drops and low noise level.



F	M	L	Weight
Diameter [Ø]	Diametro [Ø]	[mm]	[kg]
200	150	75	0.34
250	200	94	0.54

DY200X - DN200-DN200-DN200 Y-joint

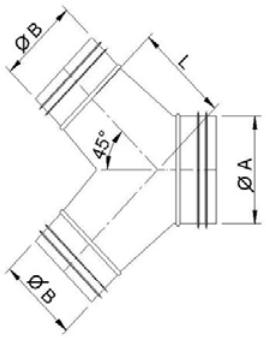
DY250X - DN250-DN200-DN200 Y-joint

For the 500 and 650 ELFOFresh² units, two air distribution boxes are used for intake air and two boxes for extraction, so it is necessary to split the DN250 flexible pipe coming from the ELFOFresh² into two DN200 pipes.

The DN250-DN200-DN200 Y-branch with 45° angle allows this splitting.

If, however, you need to bring air into distant rooms you can have more distribution boxes also with the 200-300 size ELFOFresh² systems and in this case it is necessary to use the DN200-DN200-DN200 Y-branch.

The branch is made of galvanized metal sheet and the connections are male and equipped with seal gaskets.

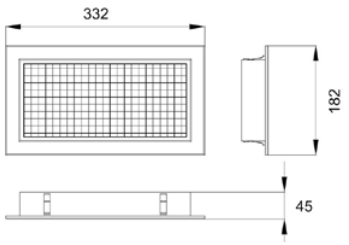


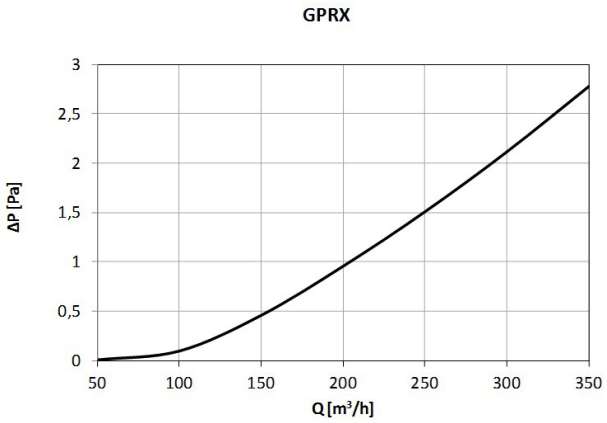
A	B	B	L	Weight
Diameter [Ø]	Diameter [Ø]	Diameter [Ø]	[mm]	[kg]
200	200	200	230	2.1
250	200	200	280	3.5

5 - Air recirculation

GPRX - Grill for recirculation air return plenum 325x175 mm white

Return grille in aluminium, which is painted white RAL 9001, with useful surface of 0.0292 m² for connection to a PRX soundproof plenum.





Dp = pressure drop
Q = Air flow

Soundproofed plenum for air recirculation for DN90 tube x 5 fittings

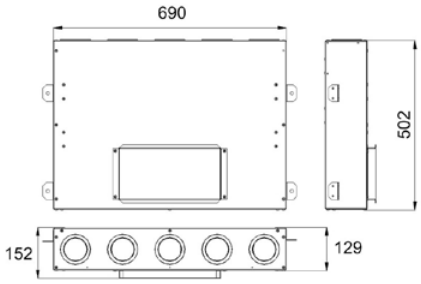
Recirculation plenum in zinc-magnesium sheet metal with internal sound-proof lining for installation in false ceilings or for wall-mounting.

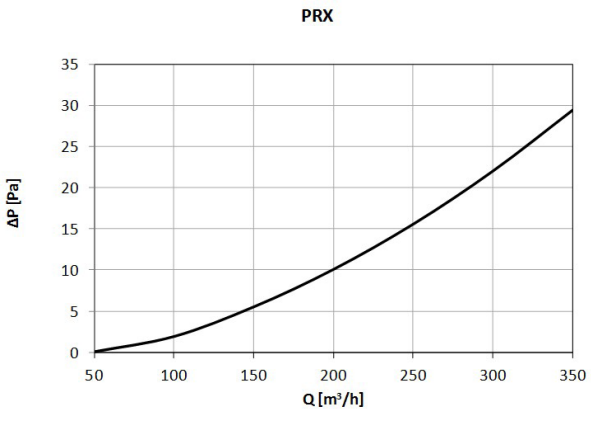
The plenum allows the housing of the GPRX return grille.

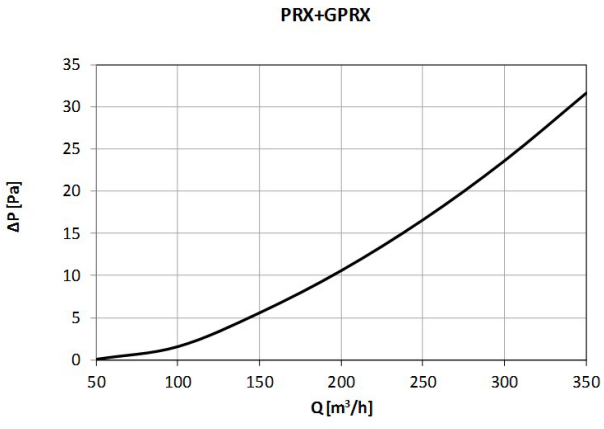
The plenum can be connected to the manifold for the CPRX recirculation plenum if the recirculation duct has a DN150 or DN200 mm internal diameter.

If the space available is modest, the recirculation Plenum can be connected to up to 5 TFT90X round flexible tubes through the relevant CBT90X Connector or to TFPNX flat tubes through the CBT90X Connector and COBPX Joint.

The number of flexible ducts is dependent on the recirculation air flow rate.



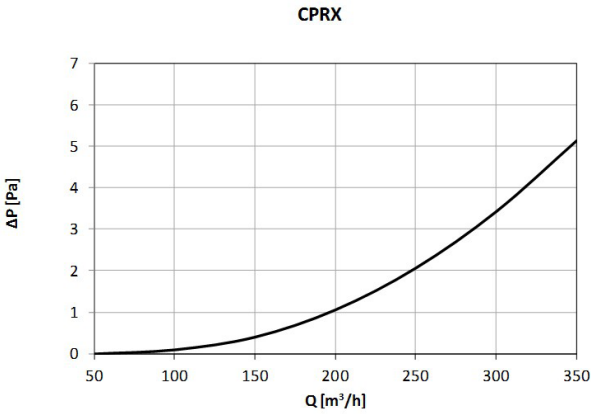


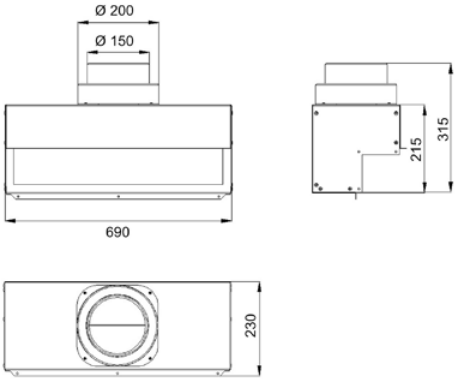


Dp = pressure drop
Q = Air flow

CPRX - Manifold for DN150-200 air recirculation plenum

Zinc-magnesium sheet metal manifold with internal sound-proof lining insulation required for the connection between the PRX soundproof recirculation Plenum and the DN150 or DN200 flexible duct.

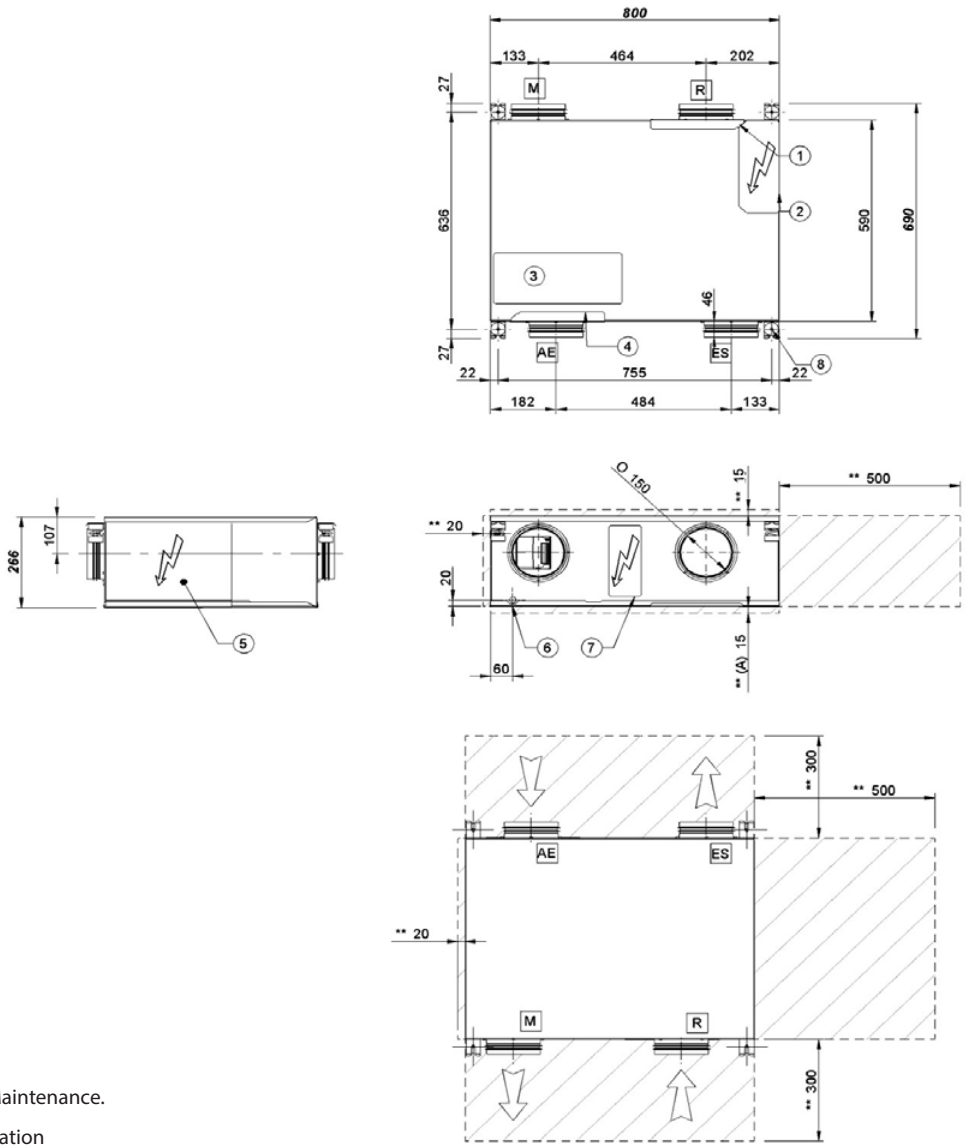




Dp = pressure drop
Q = Air flow

Dimensional drawings

Sizes 70-120



**Minimum dimension for Maintenance.

A(15): only for ceiling installation

(1) Removable panel for lower access to the exhaust air filter

(2) Removable panel for lower access to the electrical panel

(3) Removable panel for lower access to the treatment air filter

(4) Removable panel for lower access to the fresh air filter

(5) Removable panel for lateral access to the elctrical panel

(6) Drain stub

(7) Removable panel for access to customer terminal block

(8) Fixing points

(AE) fresh air inlet

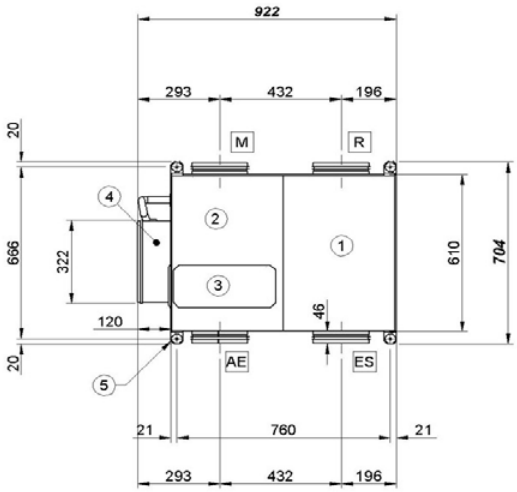
(ES) Exhaust air

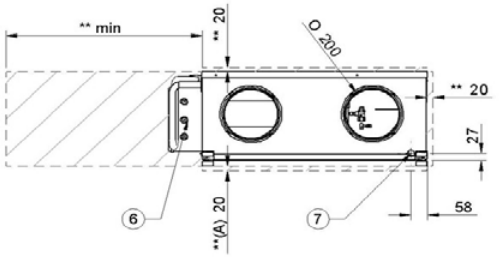
(M)Ambient air supply

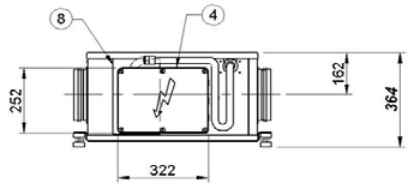
(R) Ambient air return

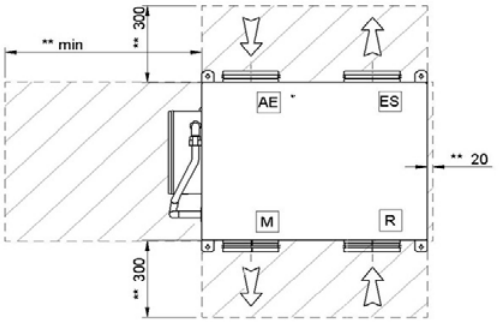
Size		70	120
Length	mm	800	800
Depth	mm	690	690
Height	mm	266	266
Operating weight	kg	37	43
Shipping weight	kg	40	40

Sizes 200-300









**Minimum:

A. ceiling installation, filter access from below, electrical panel that can be controlled remotely at a distance of at least 200

B. ceiling installation, filter access from below, electrical panel that cannot be controlled remotely, minimum distance of 700

C. floor installation, lateral filter access, electrical panel that can be controlled remotely at a distance of at least 400

D. floor installation, lateral filter access, electrical panel that cannot be controlled remotely, minimum distance 700

**Minimum dimension for Maintenance.

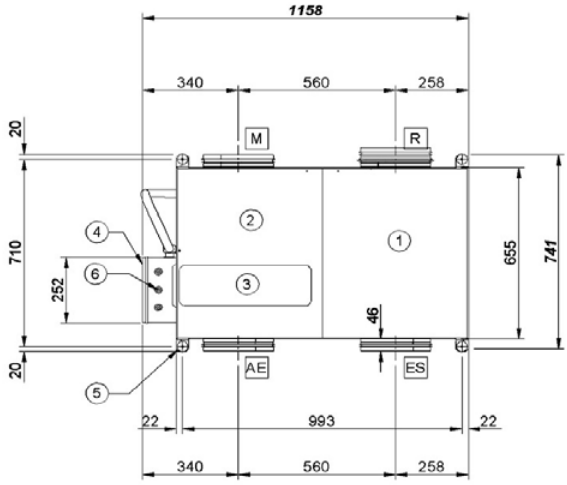
A(20): only for ceiling installation

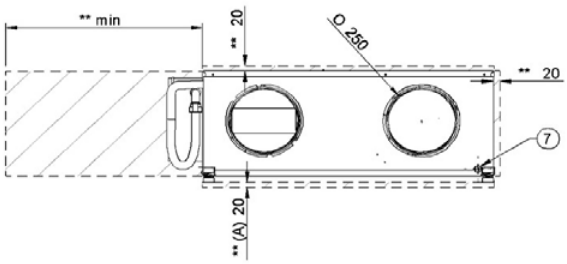
1. removable panel for access to the components of handling section
2. removable panel for access to the components of the recovery section
3. removable panel for lower access to the air filter
4. Remote electric control board (2m cable)
5. hole to hang unit
6. Electric line input
7. condensate drain pipe outlet
8. removable panel for lateral access to the air filter

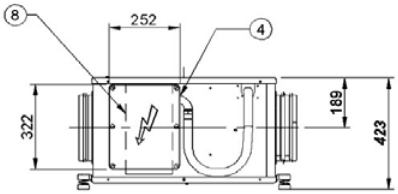
(AE) fresh air inlet
(ES) Exhaust air
(M)Ambient air supply
(R) Ambient air return

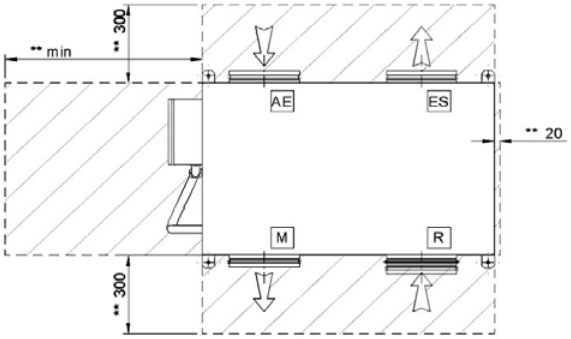
Sizes			200	300
Length		mm	922	922
Depth		mm	704	704
Height		mm	360	360
Operating weight		kg	70	75
Shipping weight		kg	85	90

Sizes 500-650









**Minimum:

A. ceiling installation, filter access from below, electrical panel that can be controlled remotely at a distance of at least 200

B. ceiling installation, filter access from below, electrical panel that cannot be controlled remotely, minimum distance of 700

C. floor installation, lateral filter access, electrical panel that can be controlled remotely at a distance of at least 400

D. floor installation, lateral filter access, electrical panel that cannot be controlled remotely, minimum distance 700

Minimum dimension for Maintenance.

A(20): only for ceiling installation

1. removable panel for access to the components of handling section
2. removable panel for access to the components of the recovery section
3. removable panel for lower access to the air filter
4. Remote electric control board (2m cable)
5. hole to hang unit
6. Electric line input
7. condensate drain pipe outlet
8. removable panel for lateral access to the air filter

(AE) fresh air inlet
(ES) Exhaust air
(M)Ambient air supply
(R) Ambient air return

Sizes			500	650
Length		mm	1158	1158
Depth		mm	751	751
Height		mm	423	423
Operating weight		kg	95	100
Shipping weight		kg	115	120

Description per specification of supply

ELFOFresh²

Sizes 70-120

Unit for the renewal and purification of air with thermodynamic active recovery for indoor installation. Complete with high-efficiency refrigeration circuit, that can be reversed into a heat pump with rotary airtight compressor with R134A refrigerant, low-consumption supply and extraction fans with electronic control, built-in, cabled controls with re-positionable electrical panel complete with electronic control and all protection and safety devices.

Load-bearing structure with a RAL9001 pre-painted frame in sheet metal for sizes 70-120 and "Aluzink" sheet metal for sizes 200-650. The fan area is completely lined with anti-condensation and soundproofing material.

Refrigeration circuit with airtight rotary compressor mounted on anti-vibration rubber grommets and complete with oil charge and suction filter, refrigerant charge, high pressure safety pressure switch, suction pressure transducer, 4-way cycle inversion valve, lamination capillary and liquid receiver.

Direct expansion, finned coil exchangers for pretreatment of outdoor air and energy recovery from exhaust air, made from copper tubes arranged in staggered rows and mechanically expanded for improved 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. The surface of the coils has been subjected to an hydrophilic treatment to make it easier to discharge condensation and reduce frost.

Thermoformed ABS condensate collection tray fitted with drain pipe.

Supply and exhaust brushless centrifugal electric fan at high energy efficiency with double intake directly coupled to the electric motor with plastic scroll diam 146 mm and metal pallets.

Pleated filter, made up of a galvanized plate frame with galvanized and electric-welded protective mesh and 100% regenerable polyester filtering media with PVC resin. G3 efficiency according to CEN-EN 779 standard (Eurovent class EU3 - average efficiency 84% ASHRAE 52 - 76 Atm). Self-extinguishing (resistance to fire class 1 - DIN 53438).

Flat filter used for the return of fresh air and ambient air, consisting of a galvanized sheet metal frame with galvanized electrowelded protective meshes and 100% polyester renewable filtering septum with G2 efficiency level in accordance with the CEN-EN 779.

Electrical panel located inside the unit and can be easily accessed from the bottom or sides via the removable panels.

The control section consists of a Board with microprocessor control system that manages the control of the unit based on the outdoor and indoor air conditions and includes: outdoor air temperature probe, temperature and humidity probe for room supply air, return ambient air temperature probe and potential-free contacts for remote ON/OFF, summer/winter mode, silent mode and ventilation only.

Thermodynamic recovery function active in summer and winter; Dehumidify is perfect in summer for matching with the radiant cooling FREECOOLING.

HID-P1 room thermostat with ambient temperature and humidity probe connected to the unit via a shielded twisted pair at a maximum distance of 15 m with the following functions: setting the desired room temperature and humidity, ON/OFF, summer/winter mode setting, fan-only mode setting, diagnostic management with code specific to the type of error.

Based on the unit's configuration:

Setup to ELFOSystem with RS485 Modbus PRELF

Plug-in electronic board for connection to ELFOSystem using Modbus RS485 serial port

Electronic filter FES

High-efficiency electrostatic filter for the filtration of the renewal air to eliminate fumes, particulates, bacteria and viruses.

Filtration level equivalent to class H10.

Heating elements in duct EHPCX

Modulating electric heaters kit in the duct for preheating the renewal air coming from the outside with temperatures below -5°C.

ELFOFresh² 70 TECHNICAL DATA

- R134A refrigerant
- Heating capacity under nominal conditions (A7/A20) 0,517 kW, efficiency factor COP=3,38
- Cooling capacity under nominal conditions (A35/A27) 0,446 kW,efficiency factor EER=2,24
- Nominal air flow 70 m³/h, Voltage 230/1/50
- CPAN-U 70 Clivet model

ELFOFresh² 120 TECHNICAL DATA

- R134A refrigerant
- Heating capacity under nominal conditions (A7/A20) 0,984 kW, efficiency factor COP=3,9
- Cooling capacity under nominal conditions (A35/A27) 0,846 kW,efficiency factor EER=2,54
- Nominal air flow 120 m³/h, Voltage 230/1/50
- CPAN-U 120 Clivet model

Sizes 200-650

Unit for the renewal and purification of air with thermodynamic active recovery for indoor installation. Complete with high-efficiency refrigeration circuit, that can be reversed into a heat pump with rotary airtight compressor with R134A refrigerant, low-consumption supply and extraction fans with electronic control, built-in, cabled controls with re-positionable electrical panel complete with electronic control and all protection and safety devices.

Structure made entirely from "aluzink" plate that guarantees excellent mechanical characteristics and high corrosion strength over time. The ventilating section is completely lined with anti-condensate and soundproofing material.

Refrigeration circuit with airtight rotary compressor mounted on anti-vibration rubber grommets and complete with oil charge and suction filter, refrigerant charge, high pressure safety pressure switch, suction pressure transducer, 4-way cycle inversion valve, lamination capillary and liquid receiver.

Direct expansion, finned coil exchangers for pretreatment of outdoor air and energy recovery from exhaust air, made from copper tubes arranged in staggered rows and mechanically expanded for improved 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.

Condense collection tray made of 1050 H24 aluminium alloy with anti-condensation insulation, welded and equipped with siphon drain tube.

Centrifugal supply and exhaust fans with high energy efficiency and double intake, brushless electric motor directly coupled to the fan with plastic auger and impeller with diameter of 146 mm, maximum available pressure of 120 Pa that can be calibrated for operation based on the effective pressure drops in the system.

Pleated filter, made up of a galvanized plate frame with galvanized and electric-welded protective mesh and 100% regenerable polyester filtering media with PVC resin. G3 efficiency according to CEN-EN 779 standard (Eurovent class EU3 - average efficiency 84% ASHRAE 52 - 76 Atm). Self-extinguishing (resistance to fire class 1 - DIN 53438). Metal mesh pre-filter with G1 efficiency.

The electrical panel assembled outside the unit is connected to it by a fast- connect cable (2 mt) that allows its remotization in positions where the maintenance/control of the parameters is easier. The power section includes: - fuses compressor and fans, fans control contactors and compressor control contactor.

The control section consists of a Board with microprocessor control system that manages the control of the unit based on the outdoor and indoor air conditions and includes: outdoor air temperature probe, temperature and humidity probe for room supply air, return ambient air temperature probe and potential-free contacts for remote ON/OFF, summer/winter mode, silent mode and ventilation only.

Thermodynamic recovery function active in summer and winter; Dehumidify is perfect in summer for matching with the radiant cooling FREECOOLING.

HID-P1 room thermostat with ambient temperature and humidity probe connected to the unit via a shielded twisted pair at a maximum distance of 15 m with the following functions: setting the desired room temperature and humidity, ON/OFF, summer/winter mode setting, fan-only mode setting, diagnostic management with code specific to the type of error.

Based on the unit's configuration:

Setup to ELFOSystem with RS485 Modbus PRELF

Plug-in electronic board for connection to ELFOSystem using Modbus RS485 serial port

Electronic filter FES

High-efficiency electrostatic filter for the filtration of the renewal air to eliminate fumes, particulates, bacteria and viruses.

Heating elements in duct EHPCX

Modulating electric heaters kit in the duct for preheating the renewal air coming from the outside with temperatures below -5°C.

Immersed electrode humidifier HSE3LX/HSE3MX

Immersed electrode humidifier for humidification of renewal air in heating operation, equipped with power supply and independent loading and draining.

ELFOFresh² 200 TECHNICAL DATA

- R410A refrigerant
- Heating capacity under nominal conditions (A7/A20) 1,81 kW, efficiency factor COP=4,1
- Cooling capacity under nominal conditions (A35/A27) 1,63 kW,efficiency factor EER=2,87
- Nominal air flow 200 m^3/h, Voltage 230/1/50
- CPAN-U 200 Clivet model

ELFOFresh² 300 TECHNICAL DATA

- R410A refrigerant
- Heating capacity under nominal conditions (A7/A20) 2,33 kW, efficiency factor COP=3,93
- Cooling capacity under nominal conditions (A35/A27) 2,17 kW,efficiency factor EER=2,96
- Nominal air flow 300 m^3/h, Voltage 230/1/50
- CPAN-U 300 Clivet model

ELFOFresh² 500 TECHNICAL DATA

- R410A refrigerant
- Heating capacity under nominal conditions (A7/A20) 3,58 kW, efficiency factor COP=4,27
- Cooling capacity under nominal conditions (A35/A27) 3,13 kW,efficiency factor EER=2,86
- Nominal air flow 500 m^3/h, Voltage 230/1/50
- CPAN-U 500 Clivet model

ELFOFresh² 650 TECHNICAL DATA

- R410A refrigerant
- Heating capacity under nominal conditions (A7/A20) 5 kW, efficiency factor COP=3,94
- Cooling capacity under nominal conditions (A35/A27) 4,23 kW,efficiency factor EER=2,78
- Nominal air flow 650 m^3/h, Voltage 230/1/50
- CPAN-U 650 Clivet model

COP and EER are calculated according to the standard EN14511:2008

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