23MK

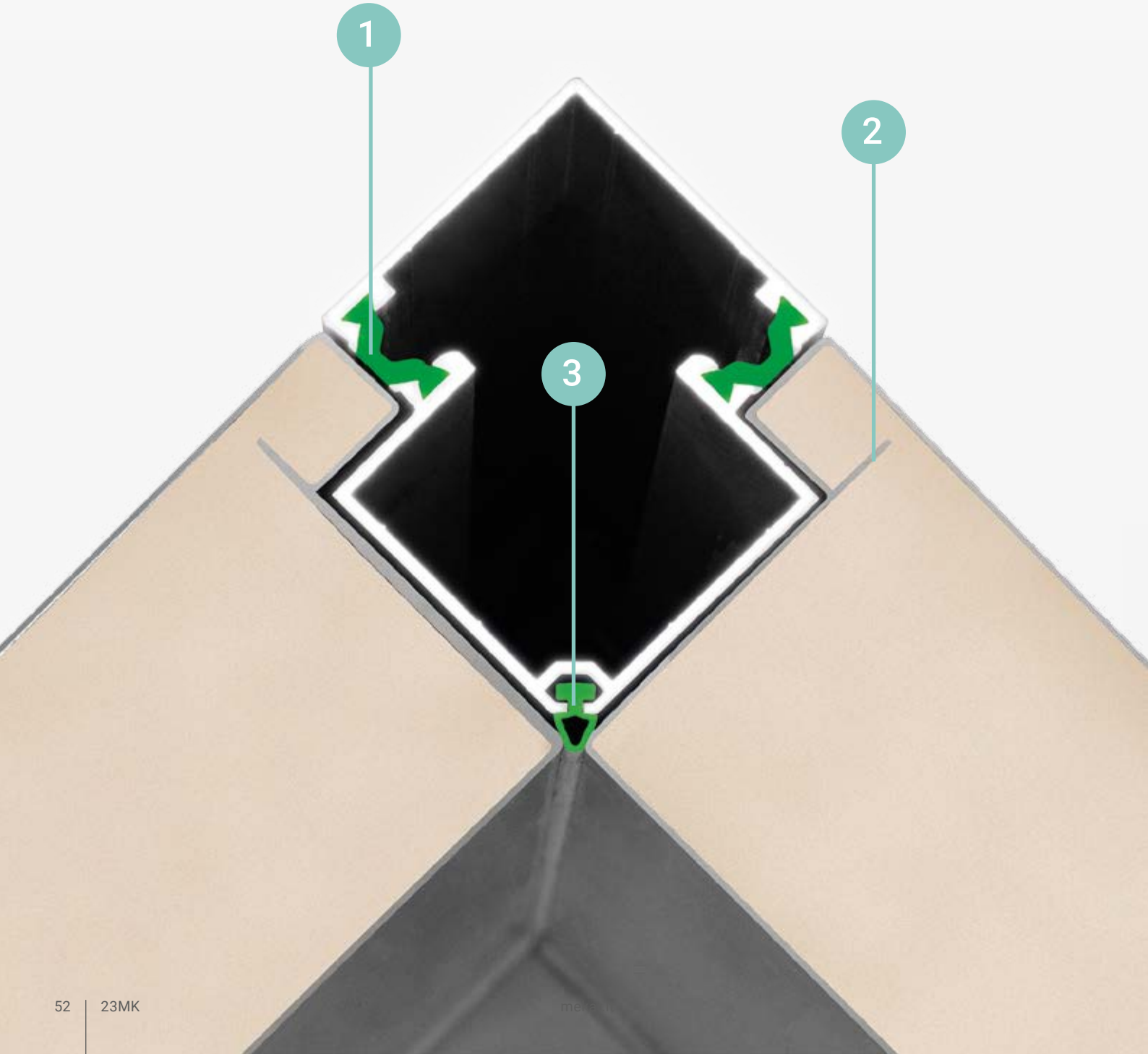
Air handling unit for the service sector

The 23MK series air handling units are characterized by sturdiness, flexibility, reliability and a deep industrialization, which allows to guarantee speed in delivery times while not renouncing to extreme versatility and multiplicity of configuration.

These features make it possible to maximize the combination of required performance, air crossing speed on the batteries, dimensional compactness and investment containment.

The 23MK series air handling units are available for a range of capacities between 1000 and 80000 m^3 / h and with total pressures up to 2500 Pa. However, in special execution units with higher values of flow rate and pressure can be made, based on specific customer requirements.

The details make the difference



STRUCTURAL PROFILES

Exclusive Mekar "***MK-Pro 2.0***" aluminum profile, specially designed and developed to optimize the construction aspect of the range. Available in the aluminum version with natural finish or in anodized aluminum, in the version with or without thermal break.

1

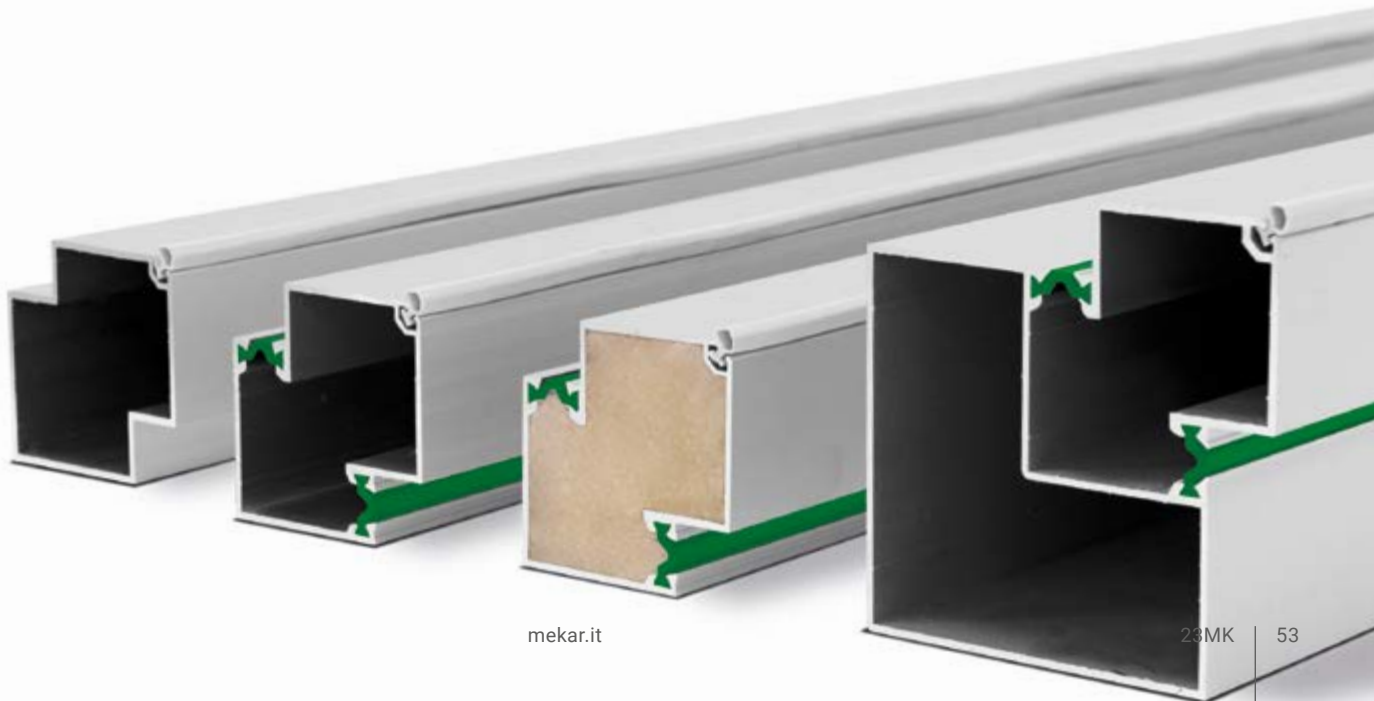
1The thermal cut is guaranteed by inserting a breaker segment made of extruded polyamide thermal conductivity 0.30 (W/m°K), which guarantees an optimal compromise between structural strength and maximum insulation capacity. Is also possible to select the profile even in the configuration injected with polyurethane foam density 45 kg/m^3, thermal conductivity 0.024 (W/m°K).

2

The particular conformation of the geometries and the constructive choices adopted make it possible to completely reduce the contact between external and internal surfaces, thus guaranteeing a total thermal bridge paneling.

3

The sealing gasket directly integrated on the corner profile allows to completely avoid the contact between the treated air inside the unit and the external surface.
In addition, the gasket eliminates the presence of the typical gap between the panels, guaranteeing a continuous surface, free of gaps where dirt can be deposited, for the benefit of a simpler and more effective sanitizing of the surfaces.



The details make the difference

INTERNAL SURFACES

The internal surfaces are completely smooth and free of screws, since all the fixings are confined inside the aluminum profile. This avoids stagnation of dirt and makes maintenance, cleaning and sanitizing operations easier, faster and safer.

ANGULARS AND BASE

Structural corners made of injection-molded PA6 Nylon, reinforced with glass fiber or alternatively and optional, made internally in stainless steel. The base is instead made of press-bent sheet metal of high thickness and selectable in multiple variations in terms of material, thickness, finishes and heights.

PANELS AND DOORS

In order to preserve the integrity of the insulating material and facilitate cleaning operations, each screw used to fasten the panels is coupled to an insert made of Nylon, appropriately developed to guarantee the complete integrity of the paneling even in the face of multiple interventions. The unit can also be configured with multiple types of fixed or adjustable hinges, standard or thermal cut handles of the fixed type, adjustable and with safety key or ratchet latches with reinforced omega for doors under pressure.

PANELING

Sandwich panels made in a wide range of materials and with a thickness of 60mm (standard) or 100mm (optional). The construction details adopted in the exclusive geometry of the Mekar panel make it possible to reduce contact between the whole internal panel and external panel guaranteeing an excellent thermal cut, guaranteed also thanks to a suitable gasket fixed in the perimeter part of each panel.
The inner lip of the gasket ensures pressure tightness on its stop against the frame.

60 mm
(Standard)

Casing classification according to EN1886

Mechanical resistance	D1
leakage	L1
filter by-pass	F9
transmittance	T2
thermal bridges	TB2/TB3

100 mm
(Optional)

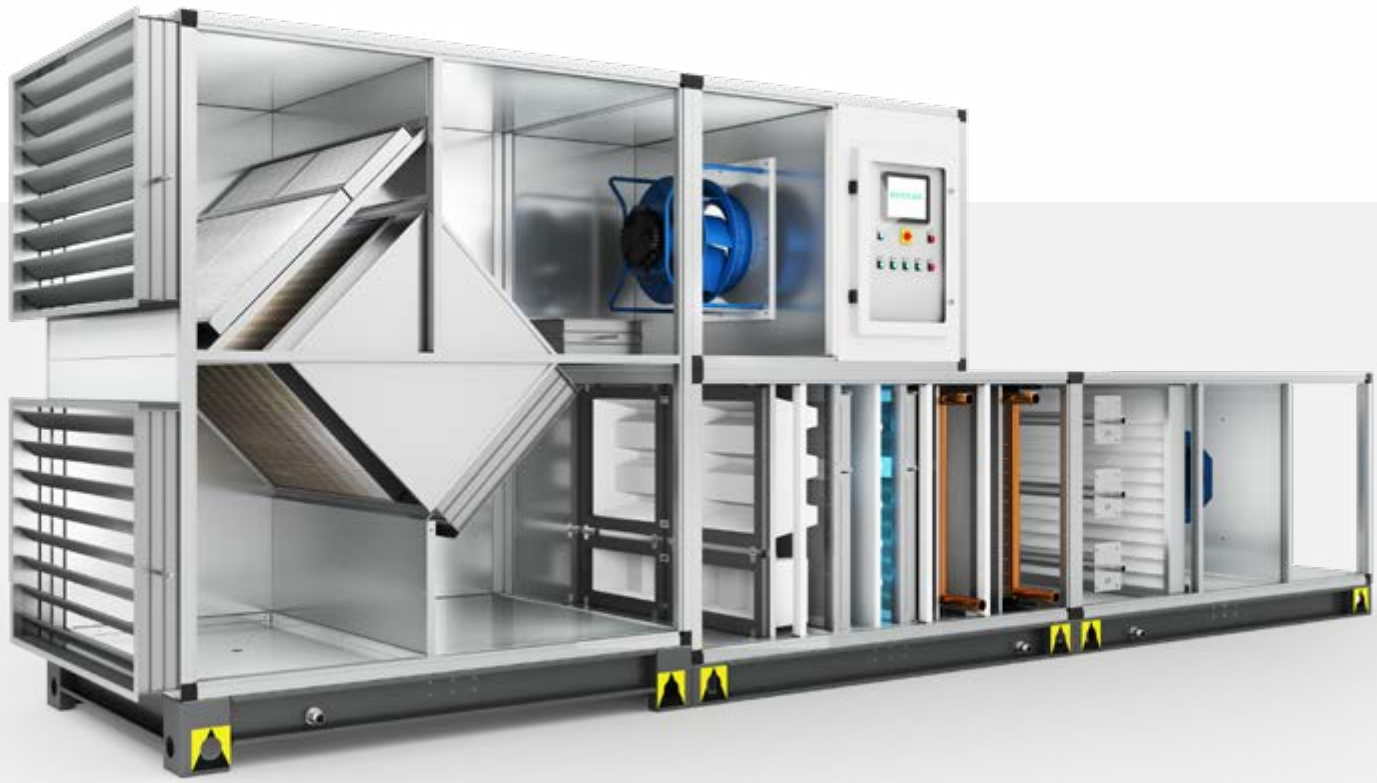
Classificazione casing secondo EN1886

Mechanical resistance	D1
leakage	L1
filter by-pass	F9
transmittance	T1
thermal bridges	TB2

THERMAL-ACOUSTIC INSULATION

Configurable in two alternatives, with insulation in injected polyurethane foam density 45 kg/m^3, thermal conductivity 0.024 (W/m°K) and reaction class to fire B2 or with mineral wool insulation density 90 kg/m^3, thermal conductivity 0.039 (W/m°K) which offers excellent performance in terms of thermal / acoustic insulation and excellent fire behavior with reaction class A1.

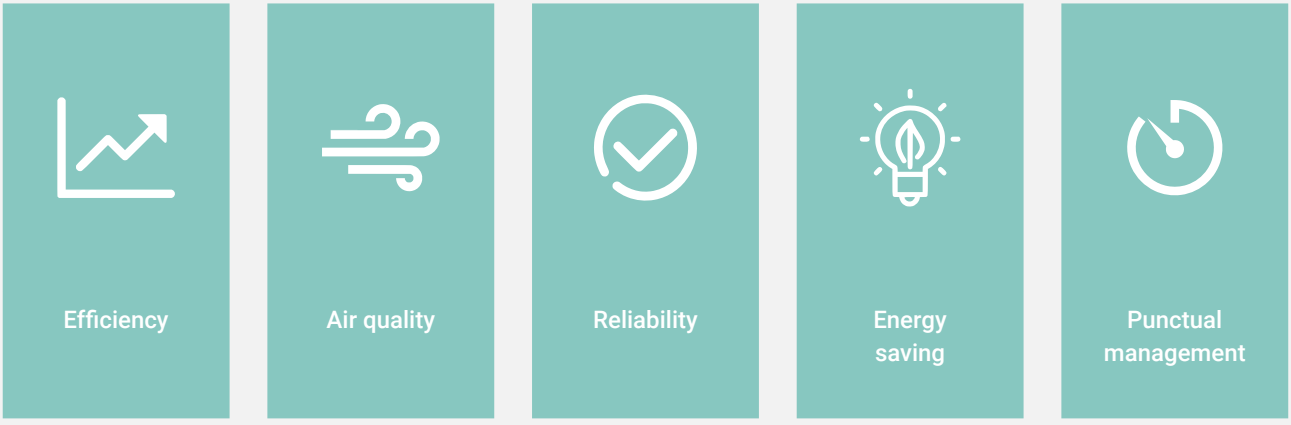
Innovation and constant search for maximum efficiency



For over 45 years we have been committed to research, design and production of solutions that aim to provide efficient, reliable, high-performance products in line with the most stringent regulations in force.
To always try to achieve these goals, we strongly value the aspect of continuous evolution and research, in order to develop, evaluate and validate increasingly innovative solutions, able to respond to the multiple needs of a constantly changing market. Thanks to a dedicated engineering, a team of highly specialized technicians and a profitable collaboration with partners and suppliers, we are now able to offer excellent solutions, which allow us to express the best results obtainable in the world of air treatment, in timely and dedicated to the individual specifications dictated by the customer.

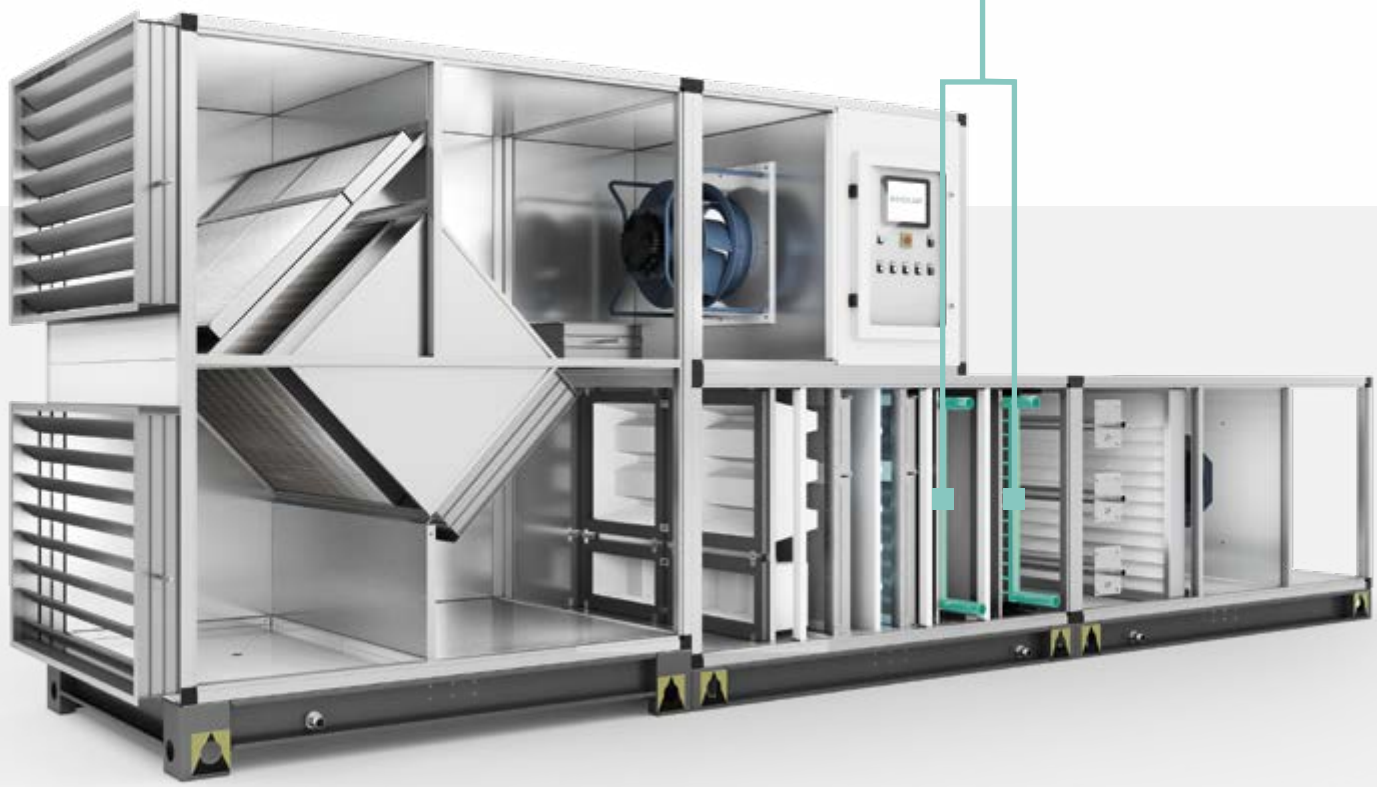
To follow, a brief introduction of some of the solutions that can be implemented in Mekar air handling units and which aim to offer the most innovative solutions available on the market today.

FOCUS POINT



Focus Point

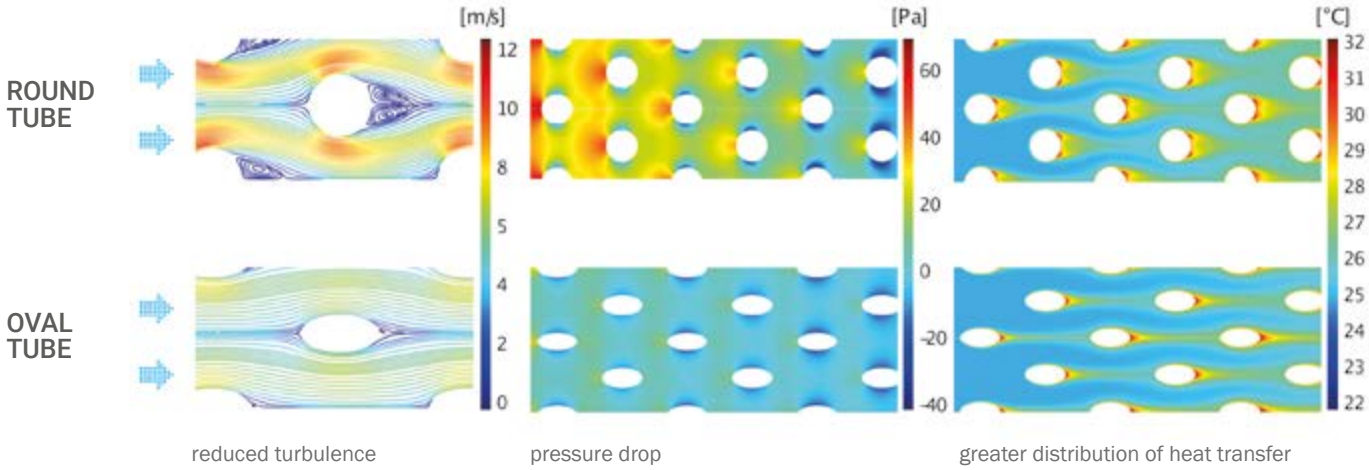
OVAL TUBE TECHNOLOGY



Energy efficiency in buildings is forcing heat-carrying fluid generators to work with increasingly lower thermal levels in order to increase the performance of the generators themselves. Consequently, for the same power output, the heat exchange battery of the CTA requires a greater surface area to the detriment of the load losses and therefore of the overall electrical absorption of the CTA.

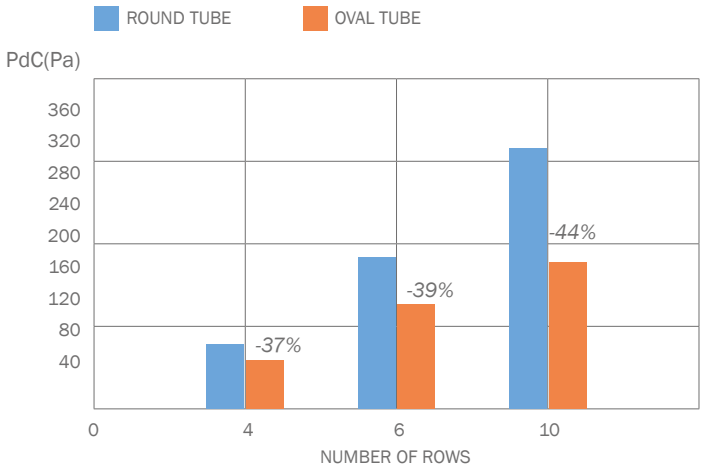
It is for these reasons that MEKAR, as an alternative to the traditional round tube heat exchangers, proposes the OVAL TUBE technology which guarantees an improvement in performance up to 15% and a reduction in air side pressure losses over 40%.

Round tube vs oval tube



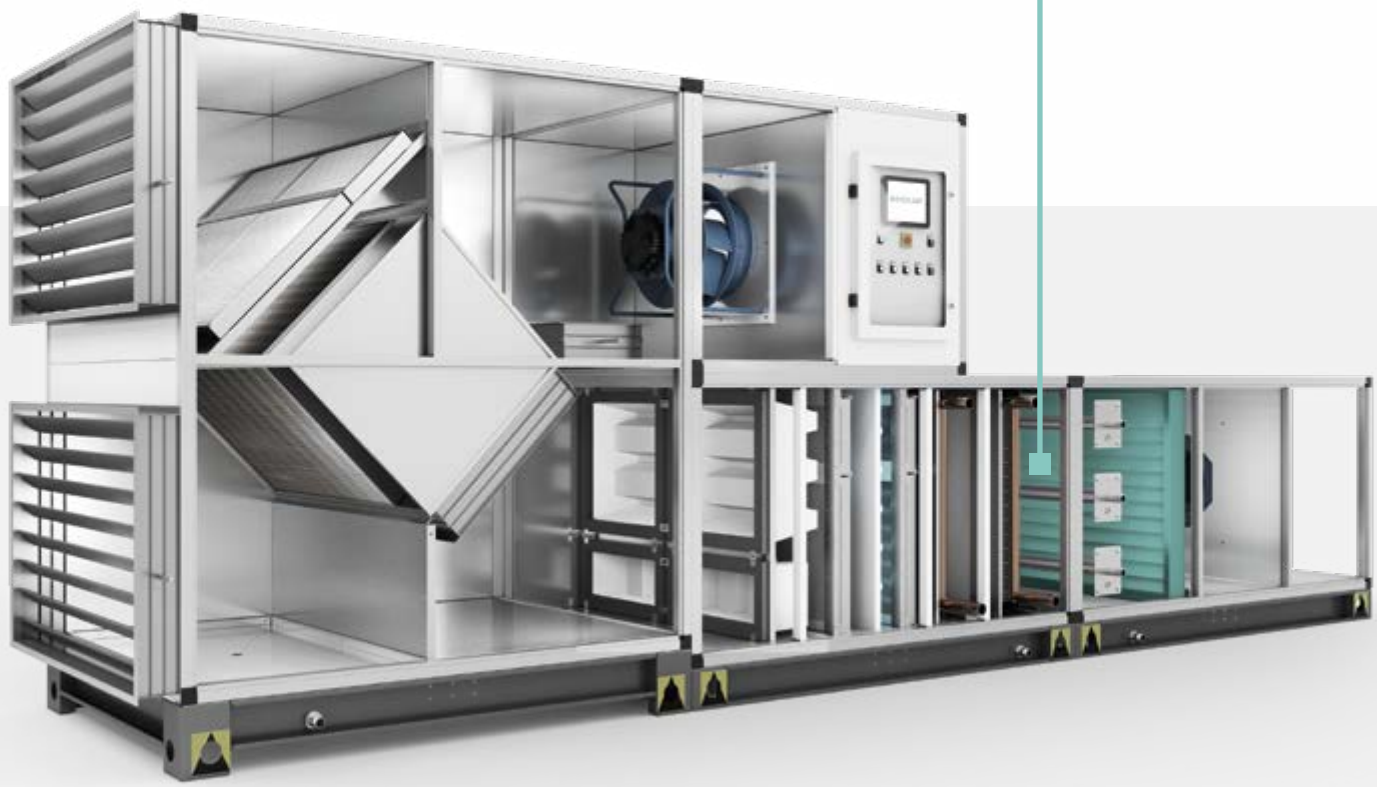
reduced turbulence | pressure drop | greater distribution of heat transfer

Air side pressure drop



Focus Point

HYBRID ADIABATIC HUMIDIFICATION



Water is a precious commodity and the efficiency of humidification systems inside CTAs is important to avoid waste especially in production systems with reverse osmosis.

Adiabatic humidification system that combines the use of atomization nozzles, capable of generating a homogeneous mist, which evaporates along the process at a subsequent stage composed of ceramic elements that absorb the remaining water and completely re-evaporate it .
The features and the main benefits of this innovative system are listed below:

- 95% humidification efficiency
- Reduced absorption lengths (from 60 cm)
- Low air side pressure drop (40 Pa at 2 / ms)
- Absence of aerosol components in the air
- Institut Fresenius and VDI 6022 certification
- Patented silver ionization group
- Reduced electricity consumption
- Reduced maintenance
- Easy and quick installation

Two adiabatic methods, cleverly combined.

Hybrid humidification is based exclusively on the advantages of two types of humidification such as atomization and evaporation. In this way there is a lasting solution to the problems that may occur in the event of separate use of these techniques. In terms of hygiene, energy efficiency and economy, the humidification system is therefore the first choice.

Atomization

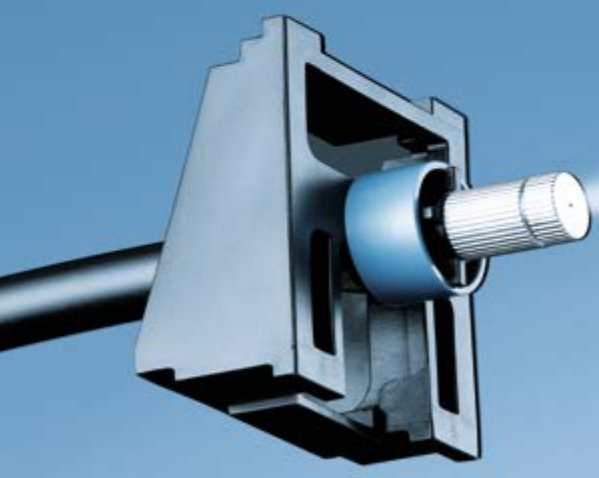
Humidification water is atomized by low-pressure molecular atomizers. The atomising nozzles have an adjustable spray mist and are optimally distributed over the entire section of the appliance. This arrangement allows a high evaporation effect and a homogeneous distribution of humidity.

Evaporation

The patented evaporation unit in high-quality ceramic is located at the end of the humidification section. It captures the humidification water and achieves the best possible post-evaporation. The ceramic allows the maximum use of the precious humidification water. At the same time it prevents the accumulation of water in the downstream components.
Hybrid humidification always guarantees air free of aerosols and hygienically humidified

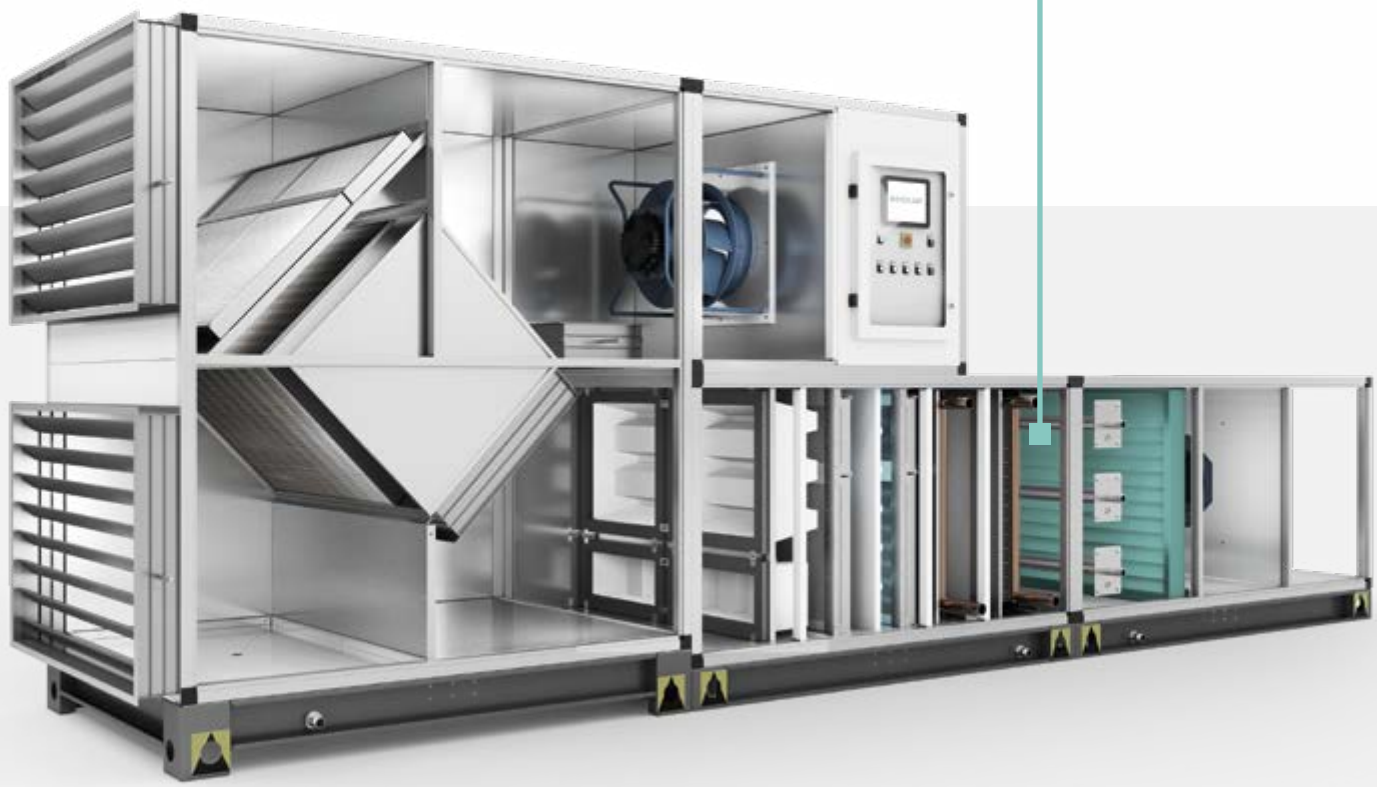
Adjustable molecular atomizing nozzles

Low pressure operation already allows considerable energy savings, thanks to low compression work.
Low-pressure molecular nozzles work in the range of 2 to 10 bar in an absolutely wear-free way.
The nozzle itself is housed on a flexible carrier clip that can be adjusted in a straight position or with an angle of 15°.
The nozzle spray cone can therefore be directed so that even the humidification water reaches the evaporation ceramic completely in the peripheral critical areas.



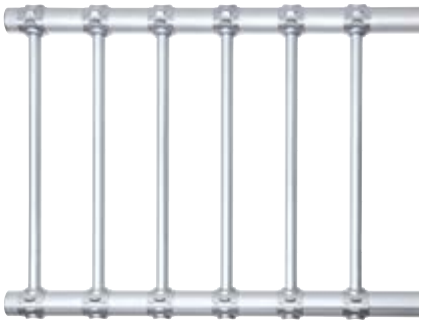
Focus Point

COMPACT ISOTHERMAL HUMIDIFICATION



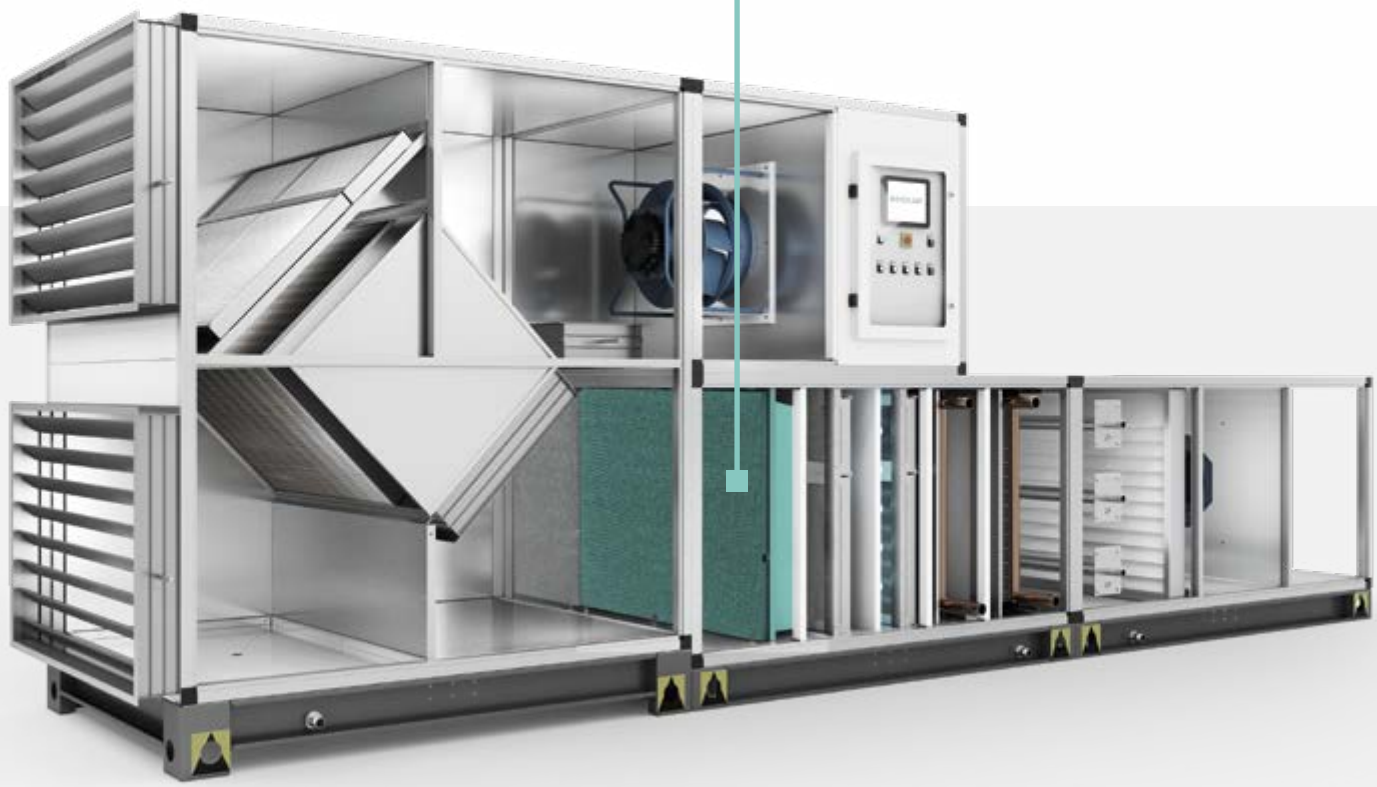
Always with great attention to space, MEKAR offers a multi-lance steam distribution system that reduces absorption distances compared to traditional steam distribution systems.
The patented central flow injectors nozzles extract the steam from the center of the distribution pipes, where it is hot and drier. In this way it is ensured that the steam is introduced into the humidification section without the formation of drops. Otherwise, when the steam touches the cooler outer surfaces of the tubes, it may condense.

A uniform distribution of the nozzles through the entire distribution system ensures a homogeneous exit in the air flow and reduces the humidification path compared to traditional steam pipes.



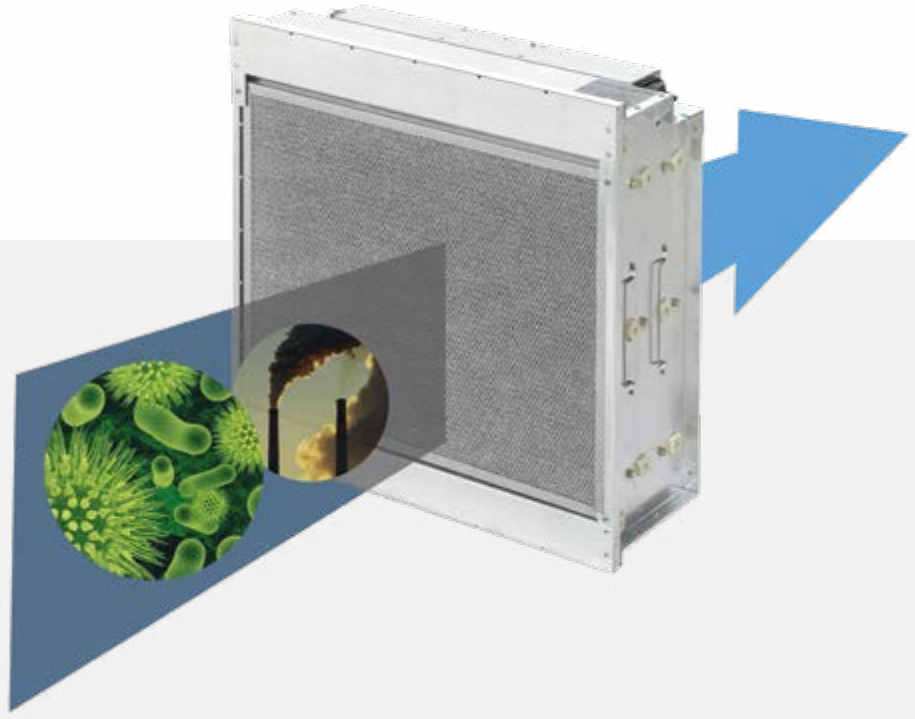
Focus Point

ELECTROSTATIC FILTRATION



With the ultimate aim of guaranteeing a filtration characterized by maximum efficiencies and able to meet the increasingly stringent energy saving requirements, Mekar can also supply units equipped with an innovative type of extremely high performance filters and certified according to UNI EN ISO16890. The high-efficiency electrostatic filtration systems are already widely used and tested in civil and industrial environments and are based on the phenomenon of electrostatic precipitation characterized by different pluses including:

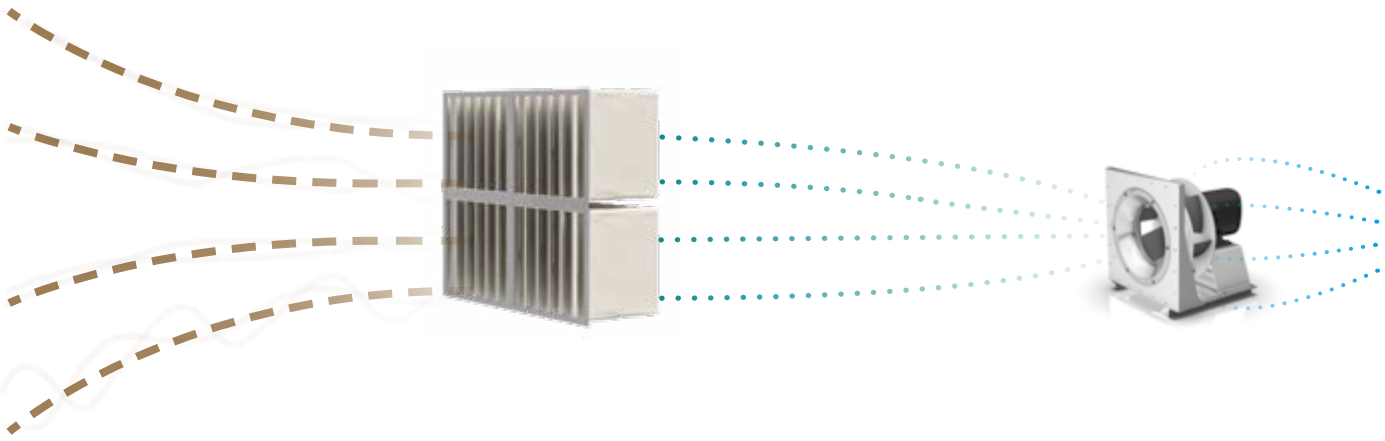
1. Extremely high filtration efficiencies, with efficiencies greater than 99%.
2. Contemporary removal of microorganisms such as bacteria, yeasts, molds and germs.
3. Negligible load losses through the filter.
4. Duration of filters equal to the useful life of the entire unit, with minimum maintenance requirements.
5. Very high degree of product reliability.



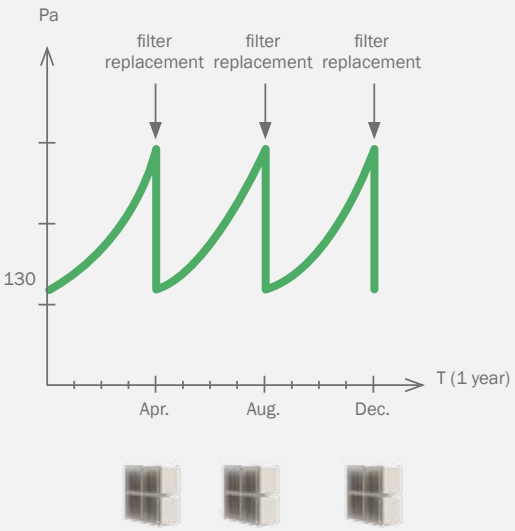
All this allows the recovery in a very short time of the major initial investment compared to a traditional filtration system, for example of the pocket type, thanks to the reduction of the electric consumption of the ventilating sections, since the load losses are very low, and to the costs for maintenance extremely inferior, since periodic replacement of the filters is not necessary.
Practical cases show that the return on investment typically occurs in a few months.
With the new UNI EN ISO 16890 classification, the electrostatic filter proposed by MEKAR is the only air filter with real energy classification A + over time.

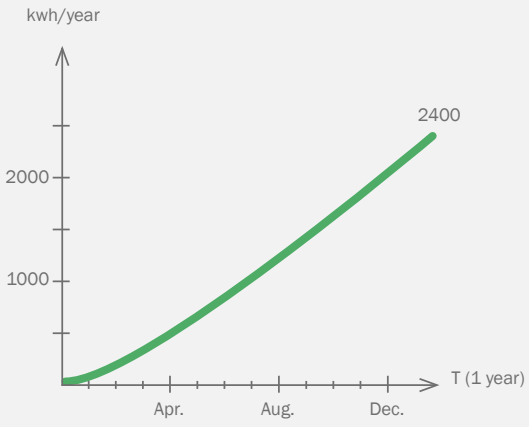
Case Study

Unit equipped with pocket filter

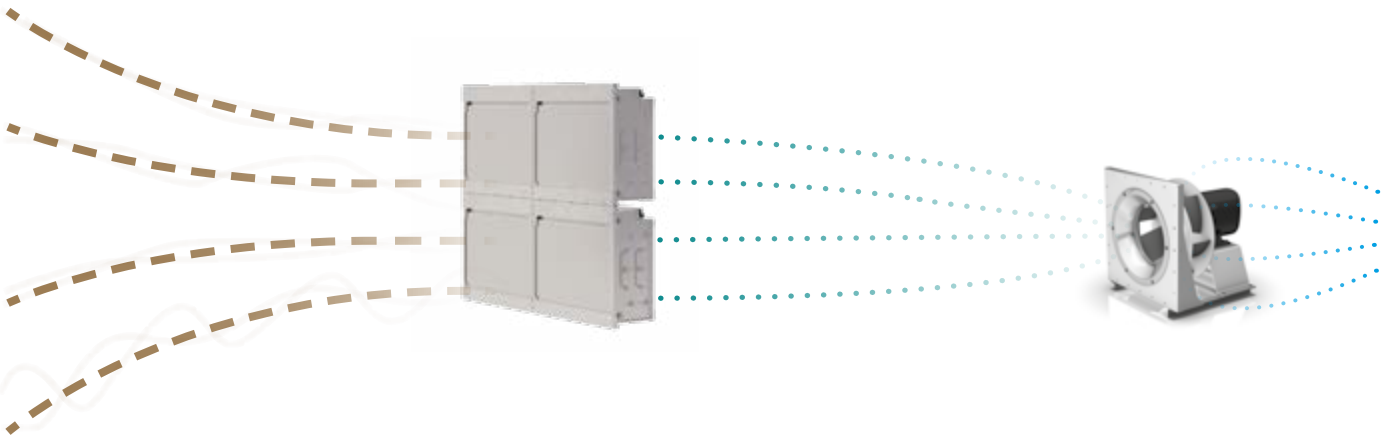


Energetic class	Consumption (kwh/a)	Filtration class EN ISO 16890	Initial load loss (Pa)	Final load loss (Pa)	Annual replacement
C	2400	ePM_1 70%	130	300	3



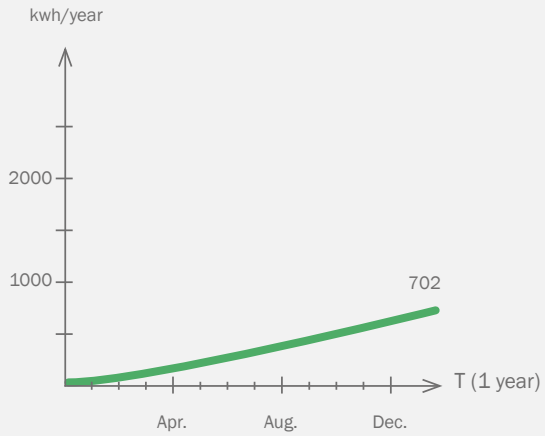


Unit equipped with electrostatic filter



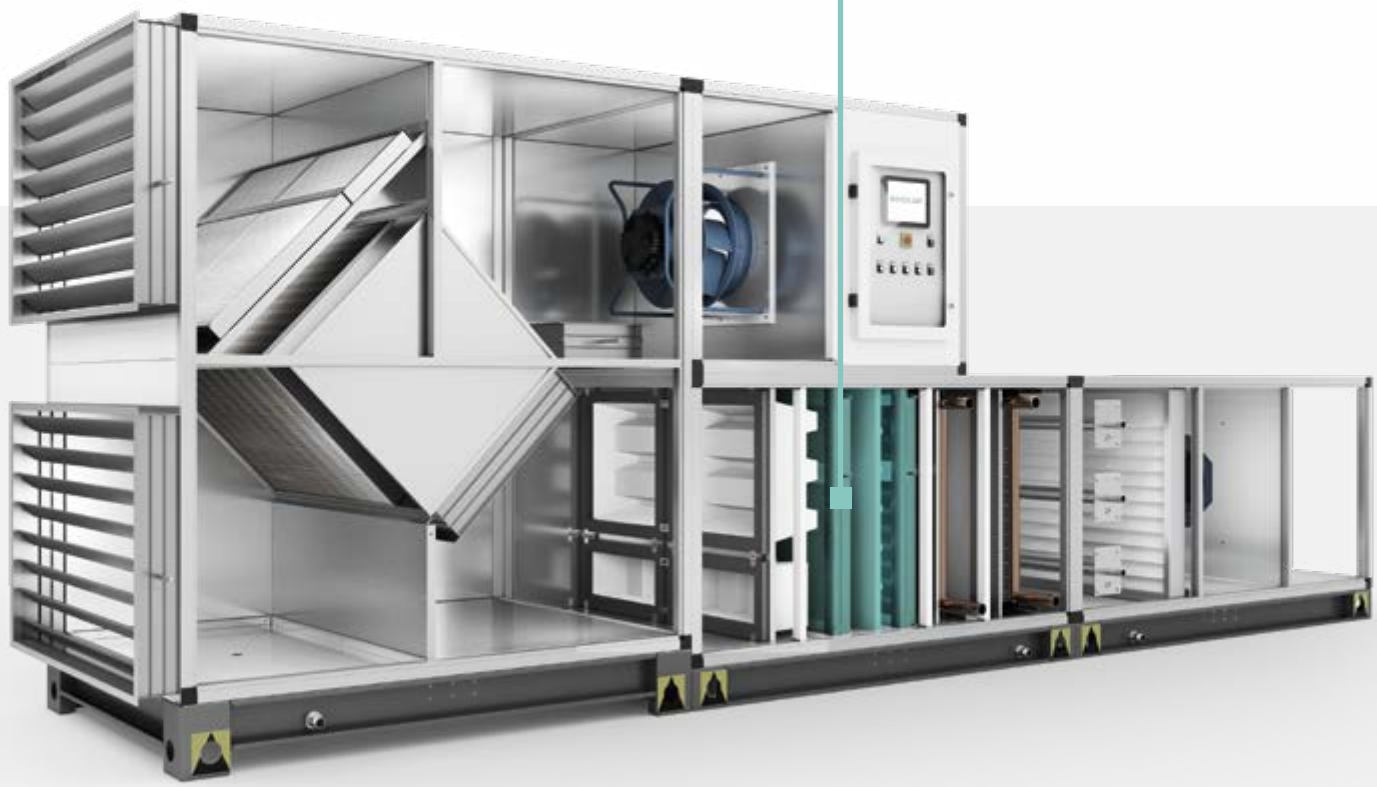
Energetic class	Consumption (kwh/a)	Filtration class EN ISO 16890	Initial load loss (Pa)	Final load loss (Pa)	Annual replacement
A+	702	ePM_1 70%	44	64	0

Data refer to the single filter cell with an air flow of 3,400 m^3 / h and operation of 6,000 hours.



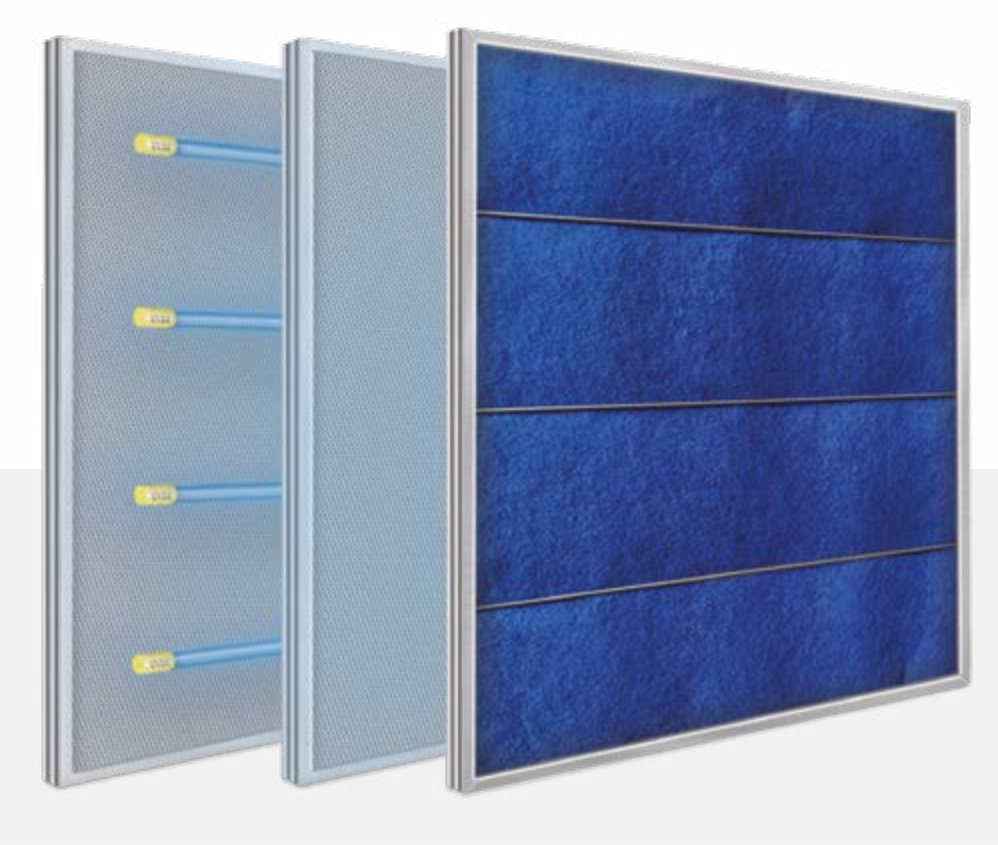
Focus Point

PHOTO-CATALYTIC OXIDATION SYSTEM



A complete sanitization, through the Photo-Catalytic Oxidation System

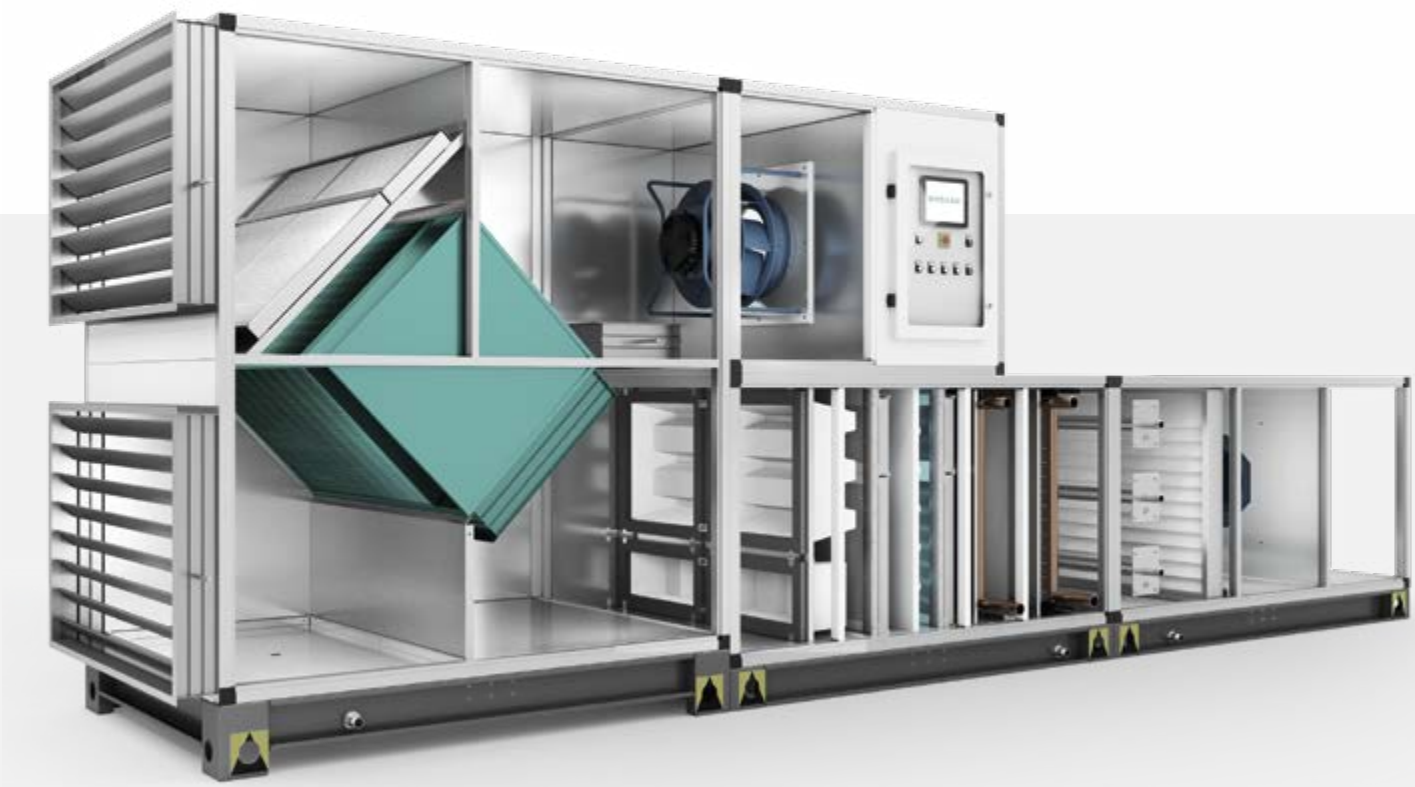
The Photo-Catalytic Oxidation System is a technology studied for over 20 years and applied and validated in multiple applications on an international scale. It is mainly based on the use of titanium dioxide as a photographic catalyst in synergy with a powerful UVC light capable of generating powerful oxidizing hydroxyl radicals and superoxide ions that destroy gaseous contaminants.
All reactions occur on the surface of the photo-catalyst in the air flow path ensuring 100% contact with all contaminants



The mechanism of operation occurs through a chemical and biological destruction deriving from a photo-catalytic oxidation process (PCO) that reduces and destroys gaseous contaminants, VOCs and odor molecules. Everything happens through a powerful UVC light, able to break down the DNA of all biological microorganisms (molds / fungi, bacteria and viruses) making them no longer vital and therefore no longer able to reproduce, proliferate and therefore infect.

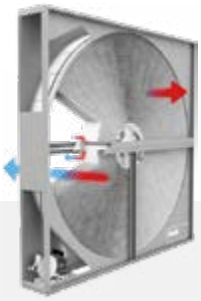
This process, besides being particularly efficient and efficient, guarantees the total absence of ozone.

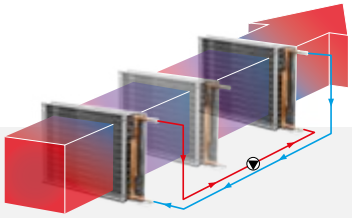
Innovation and constant search for maximum efficiency



For us, efficiency means guaranteeing ideal comfort while reducing energy expenditure, in order to limit operating costs and preserve the environment by reducing CO_2 emissions.

To achieve this goal, we rely on innovative design choices, which we apply rigorously and consistently in our product ranges in order to be able to provide solutions capable of meeting the ever-increasing demands for high efficiency required today by the market.





CURRENT PLATE HEAT EXCHANGERS

Aluminum plate heat exchanger in counter-current that allows to increase the volume of exchanged air, guaranteeing very high recovery efficiency, reducing the overall dimensions, ensuring robustness and high resistance values to the differential pressure with a recovery efficiency up to 93% .

Through such high efficiency values it is possible to compensate the electric consumption values of the fans, thus allowing to configure more compact air handling units.

ROTARY ENTHALPIC HEAT EXCHANGERS

Rotary heat exchangers that allow the exchange not only of heat, but also of humidity. Desiccant wheel to transfer sensitive and latent thermal energy with very high efficiency.

Aluminum matrix coated for moisture transmission in winter and summer, consisting of a cylindrical rotor and a containment frame complete with special seals to minimize the leakage between the inflow and expulsion air flows.

Also available with specific treatments to work in an aggressive atmosphere, such as applications located in coastal areas.

SINGLE-FLOW ENERGY TRANSFER SYSTEM

The use of the S.E.T. System allows significant energy savings with double benefits: eliminates post-heating needs in the summer and reduces the need for refrigeration compared to traditional cross-flow recovery systems

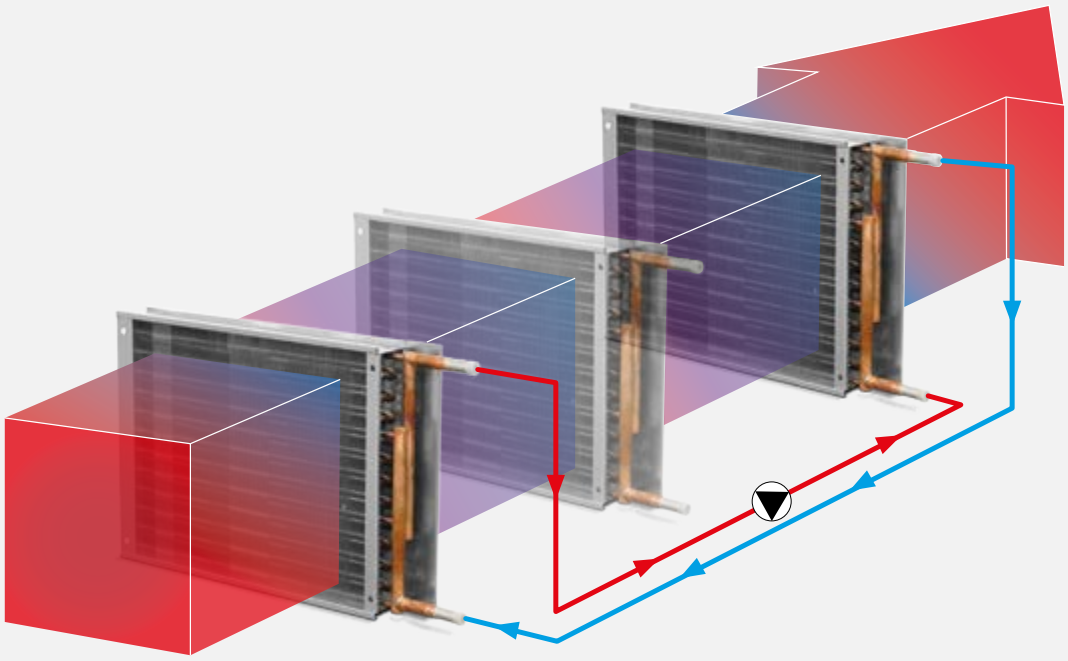
The level of COP in recovery is very high, and it is essentially due to an important power recovered in the face of very low pressure drops, offering higher seasonal energy savings compared to traditional recovery systems

Focus Point

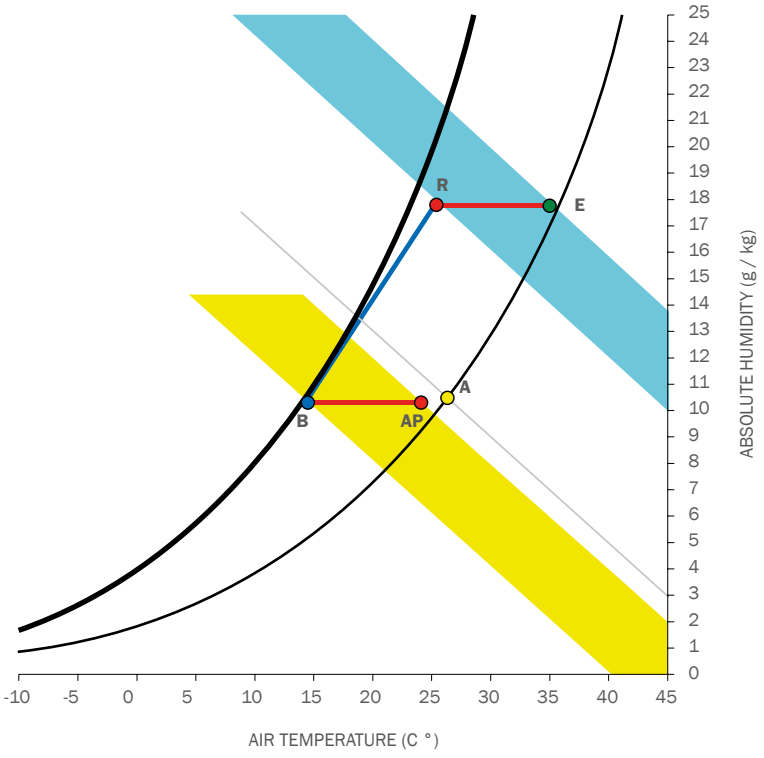
SINGLE-FLOW ENERGY TRANSFER SYSTEM

S.E.T. System It consists of a dual battery system hydraulically circulated on the summer cooling coil: the heat of the hot air entering the system is captured by the first battery and then transferred via a circulator to the post-heating battery. There is therefore a double benefit: both the reduction of the post-heating requirement and the reduction of the cooling requirement through the pre-cooling operated by the first coil.

SET. System is a recovery system that can be used only in the summer season. The heat recovery unit in the summer season is mainly bypassed to allow correct operation of the S.E.T. System



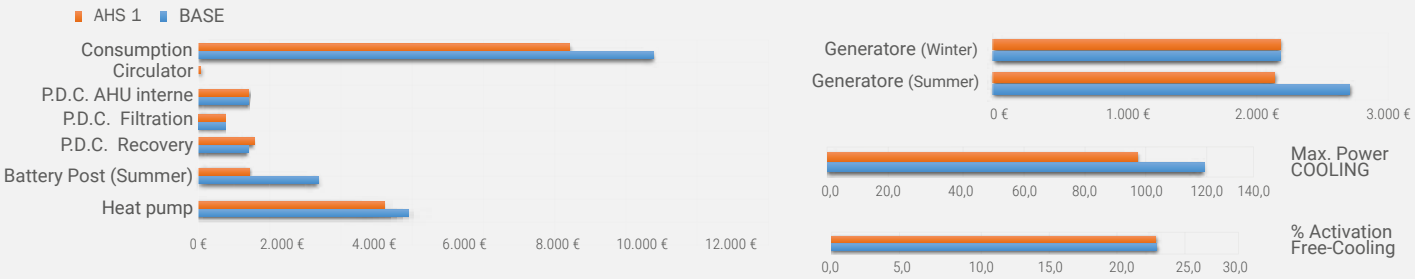
Transformation Psicro-metrica S.E.T. System

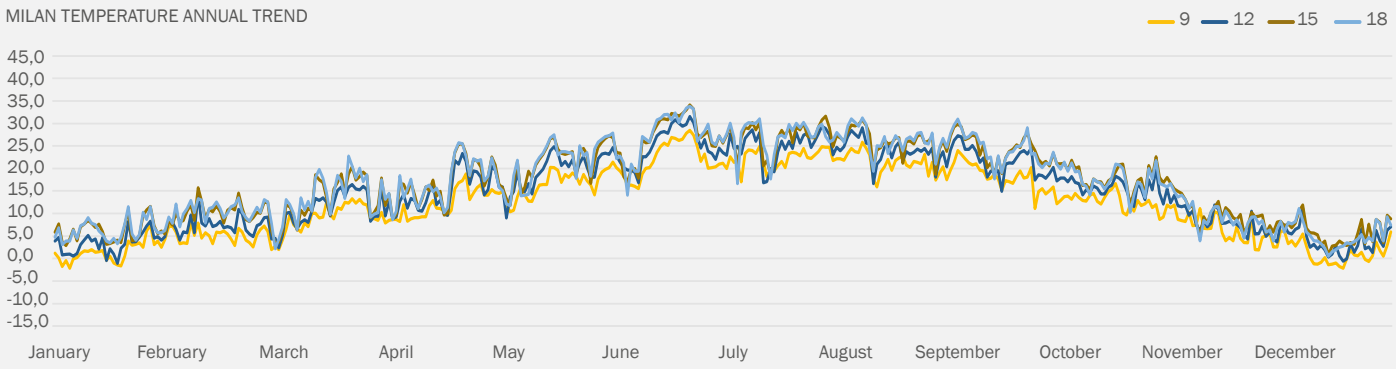


The share of pre-cooling energy (E-R) is transferred to the post-heating (B-AP)

Annual energy analysis

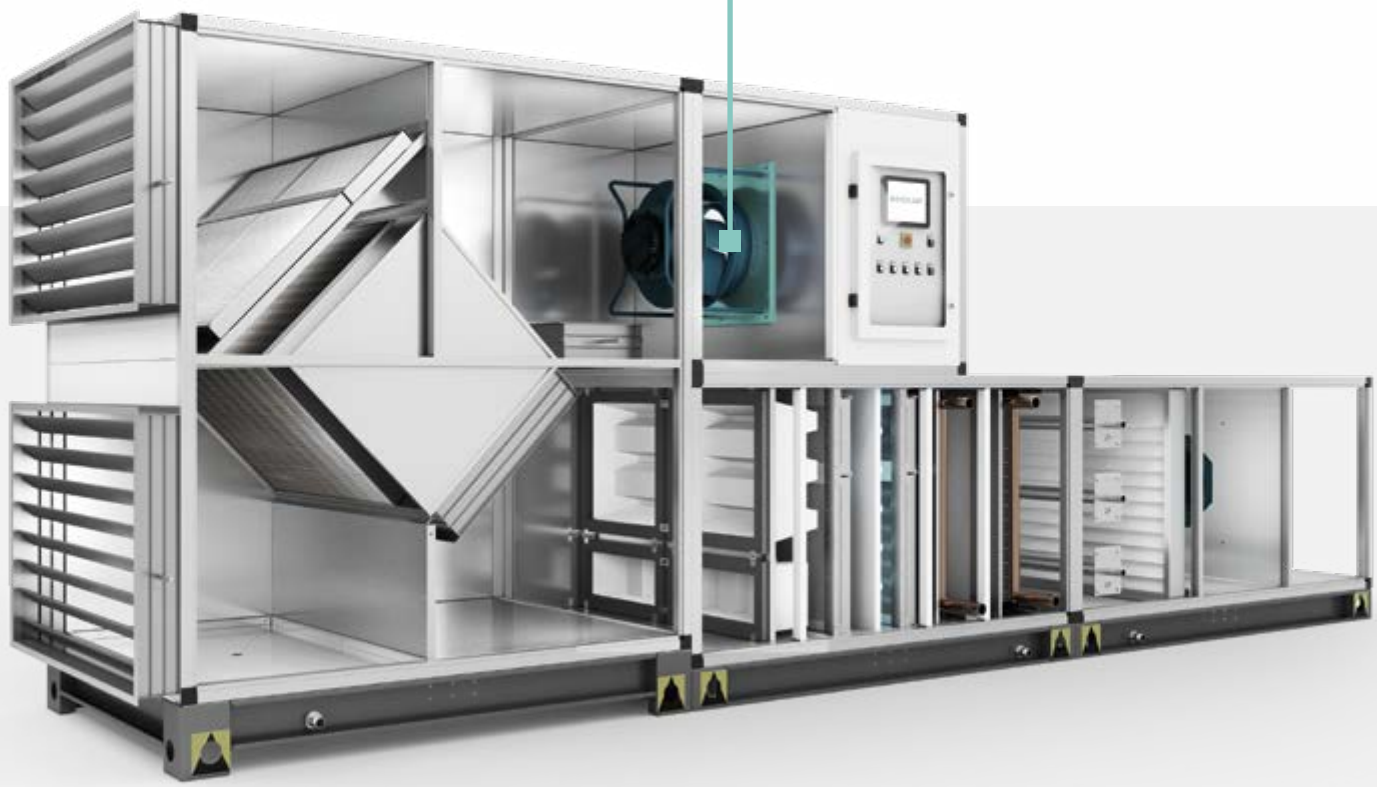
The following data refer to:
UTA flow: 10.000 cm/h, City: Milano, Costs Energy Consumption: 0.17 €/kW, Methane Cost: 0.85 €/mc
Summer Post: Boiler/Boiler | Filter: Fiber/Fiber | Battery: Round/Round





Focus Point

FAN WALL SYSTEM

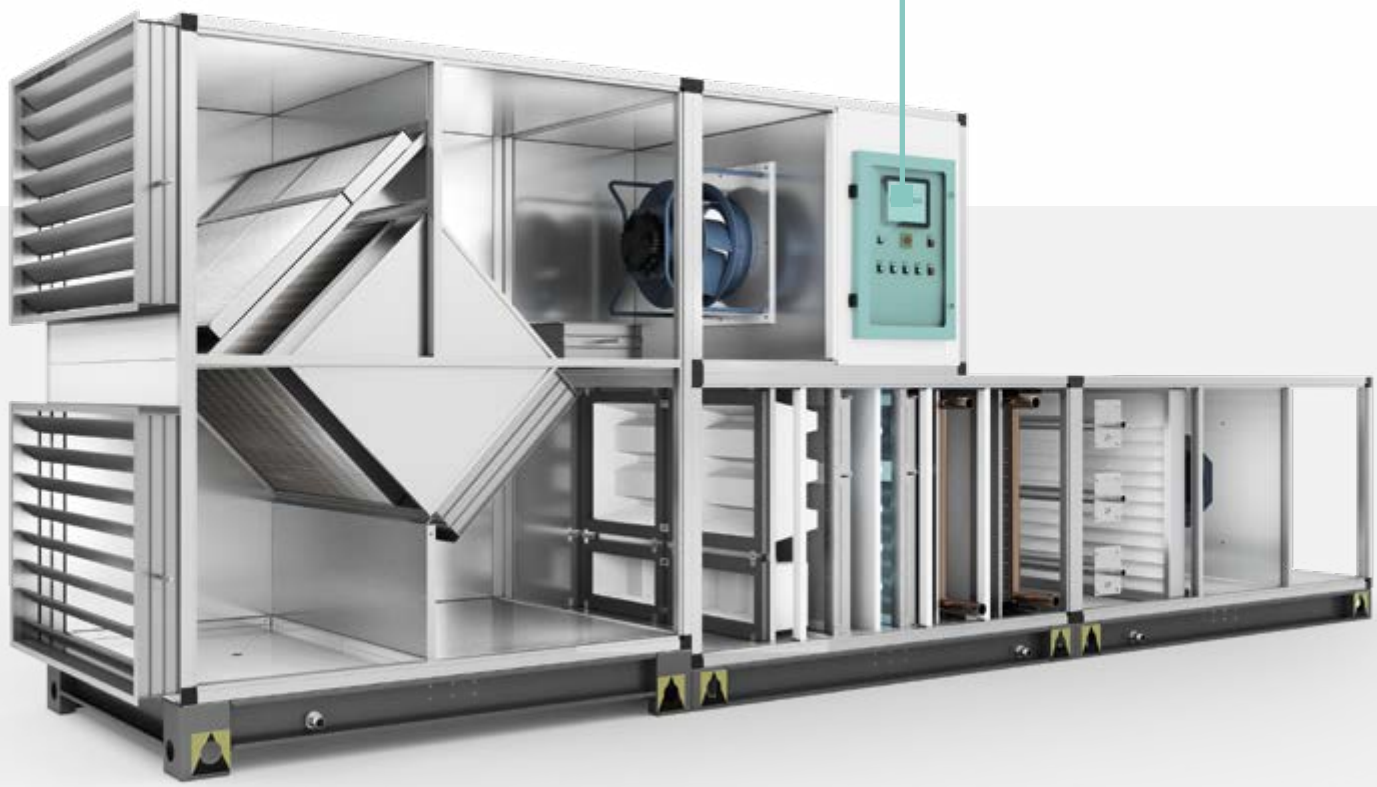


The Mekar range of products, in addition to being equipped with high-performance plug fan or external rotor motor fans, can also be configured with the innovative **Fan Wall System** solution that ensures significant benefits including:

- redundancy and guarantee of operations
- ease of maintenance and handling
- reduction of consumption
- greater compactness of the unit
- uniformity of the air flow on the exchangers

Focus Point

CONTROL SYSTEM



DeviceNet · EtherNet/IP · PROFINET · PROFIBUS · KNX · WebServer

M-Bus · Modbus · BACnet · CANopen · LonWorks · SNMP

We aim to provide integrated, functional and complete solutions capable of responding to the most specific needs, with considerable added value and reliability for our customers.

For this reason, over the years MEKAR has also specialized in the supply of complete regulation and wiring products, all made directly in the company by highly qualified personnel and technicians specialized and able to satisfy any control request. A complete 360° service, which ranges from the development of the customer's specific requests, to the design and parameterization, up to the installation of the elements and the power and control panel in order to guarantee an accurate performance management and a timely reading of the parameters psychometric.

The configuration of the functionalities and accessories can be done directly through the Mekar selection software, which allows the configuration of the solution in terms of regulation more suited to one's needs

The possibility of offering complete adjustment units, in addition to guaranteeing the customer a Plug&Play solution, allows the use of a product that has been fully tested and calibrated directly in the company, allowing not only a considerable saving in installation times but also a greater guarantee of functionality and reliability of the product, all managed and supplied by a single interlocutor.

Mekar, through its network of service centers distributed throughout the national territory, and thanks to specialized internal technicians, is also able to offer a complete support service as far as concerns on-site assistance, whether it relates to start-up or to assistance services in general.