# KITCHEN EXHAUST FILTRATION UNIT

## THE REVOLUTION IN AIR FILTRATION


expansion® electronic

BETTER AIR FOR A BETTER QUALITY OF LIFE

# INDEX

# FILTRATION SYSTEMS FOR COMMERCIAL KITCHENS

The quality of the air in professional kitchens is a very important parameter that most of the insiders underestimate.
Managing it correctly affects security of the workers (cooks, help cooks, waiters, etc.) but also the quality of the room, because there is nothing worse for a customer than coming out of the restaurant with soaked clothes from unpleasant odors of food.
At the same time, healthy and suitable working conditions must be guaranteed for all workers.
An adequate system of aspiration and treatment of fumes, finally, also benefits from neighborly relations.
The extractor hood or filtering hood is intended to provide a comfortable environment for the operation of the kitchen staff and not only. The non-optimal functioning of an air treatment system (filtering or suction hood, filtering ceiling and deodorizing unit) leads to higher maintenance costs of the premises and poor hygienic and safety conditions, both for the customers and for the operators. It is therefore essential to gear up to be up to standard. Each cooking equipment emits fumes or vapors produced by combustion during food preparation.
The function of the hoods is that of capturing and expelling such fumes, in addition to reducing in part the contribution of heat from the equipment.
The air treatment process has two critical aspects: on the one hand, systems that restore the air in the kitchen area, with the consequent winter and summer air-conditioning costs, are needed; on the other hand, there is the risk of introducing into the environment air that contains combustion residues, fumes and odors.

There are technological solutions aimed at reducing energy use and reducing pollutants in output such as:

1. Electrostatic or electronic filters, FEL SYSTEM
2. Ozone filters, FX SYSTEM
3. Negative ion filters, FI SYSTEM
4. Plasma, a cylindrical cartridge system that emits ozone and negative ions. It works well only if there is not a high concentration of humidity in the filtered air.
5. UV lamps, a system made up of neon tubes that generate ultraviolet rays that produce ozone. They have a big limit, they last only about 4000 hours.

# REFERENCE STANDARDS

The Italian and international reference standards are represented by a series of UNI and VDI that, according to the thermal flow, provide suitable fume extraction systems and their removal from the outside.
In particular, Expansion Electronic electrostatic filters are certified according to the new **UNI EN ISO16890** global standard, which classifies the air filters on the basis of their capacity to retain the dispersed airborne particulate matter (PM10, PM2.5 and PM1). This legislation is generating a general revolution in the air filtration sector. It replaces the previous and obsolete standard EN 779: 2012 (F7, F8, F9), anti-dust air filters for general ventilation.

ISO
16890

# ADVANTAGES OF A GOOD VENTILATION SYSTEM

One of the fundamental elements for the wellbeing of your customers and kitchen staff is certainly the suction or filtration system. The propensity to purchase this equipment has been increasing in recent years, so much that aspiration/filtration is perceived essentially as a mandatory advantage and a plus. Having good suction and filtration brings a competitive advantage in terms of:

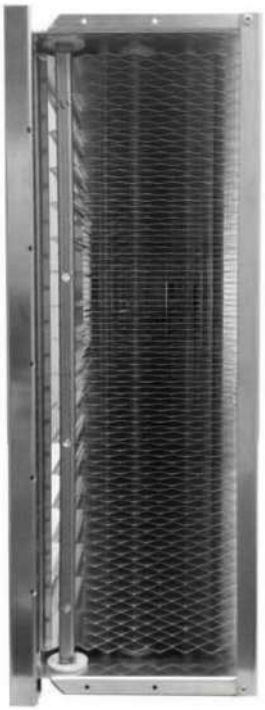

It is essential to size the suction volumes, the filter unit and the flue that conveys the fumes to the roof of your building, in relation to the equipment in the kitchen.
In addition, careful attention must be paid to the direction the fumes will take once evacuated, considering the distance and location of your neighborhood.
At this point, once the hood has been sized, it is necessary to decide what to install as an aspirating and/or filtering element.

There are essentially 3 types:
- traditional hoods with suction box.
- compensating hoods with labyrinth filters and filtering unit.
- suction ceilings (they also function as filtration).

# FEL SYSTEM
# ELECTROSTATIC FILTER

To have an efficient and up to standard suction system, it is always advisable to use these new technologies, independently if there is the presence or absence of an exhaust chimney.
Expansion Electronic has studied and developed the new range of active electrostatic filters for oil and oily vapors applications with integrated electronics, the FEL SYSTEM series. Their main characteristics are:

- Passing the tests according to the UL867 regulation, with the achievement of the UL certification, United States standard that relates to the safety of the equipment and specifically deals with the Safety of Electrostatic Air Filters.
- High filtration efficiency on 0.3 ÷ 0.4 micron particles, comparable to classes E10, E11 according to EN 1822: 2009 and classes ePM1, ePM2.5, ePM10 according to EN ISO 16890;
- Pointed contact blades specially designed for the purpose of dripping high amounts of oily pollutants, with reduced formation of electrical discharges between the plates;
- Low pressure drops that guarantee significant energy saving;
- The built-in electronics that allows generating the voltages necessary for filter operation directly on the filter itself. Equipped with bi-color LED for signaling any malfunctions;
- Thermal protection that automatically blocks the filter functioning when temperatures are too high;
- ASHRAE standard sizes that allow retrofit with the classic pocket filters according to EN 15805;
- Multipolar connection suitable for network supply (230V-50 / 60Hz) and for series connection;
- Completely regenerable by washing with specific detergents without the need to remove the electronics as it is waterproof;
- As a result, there are no disposal and replacement costs.



# ECOKITCHEN EXHAUST FILTRATION UNIT

In order to offer a complete service to its customers in the "extraction and ventilation systems for professional kitchens" sector, EXPANSION ELECTRONIC, in addition to producing hoods for industrial catering, has also developed a range of filtration units for professional kitchens. Each internal component is designed and produced internally by the company, offering the possibility of optimizing the results and needs of the client, as well as the actual suction characteristics of the system seen in its entirety.


## ECOKITCHEN FEATURES

1. Completely washable and regenerable filters;
2. Noble materials;
3. Electrostatic technology for removing particulate grease and oily vapors;
4. Ionizing technology + ozone for the removal of odorigenic molecules;
5. Activated carbon for the elimination of ozone residue and bad odors;
6. Installation of low energy consumption Plug Fan motors;
7. Possibility of customization for use in both small and large kitchens.

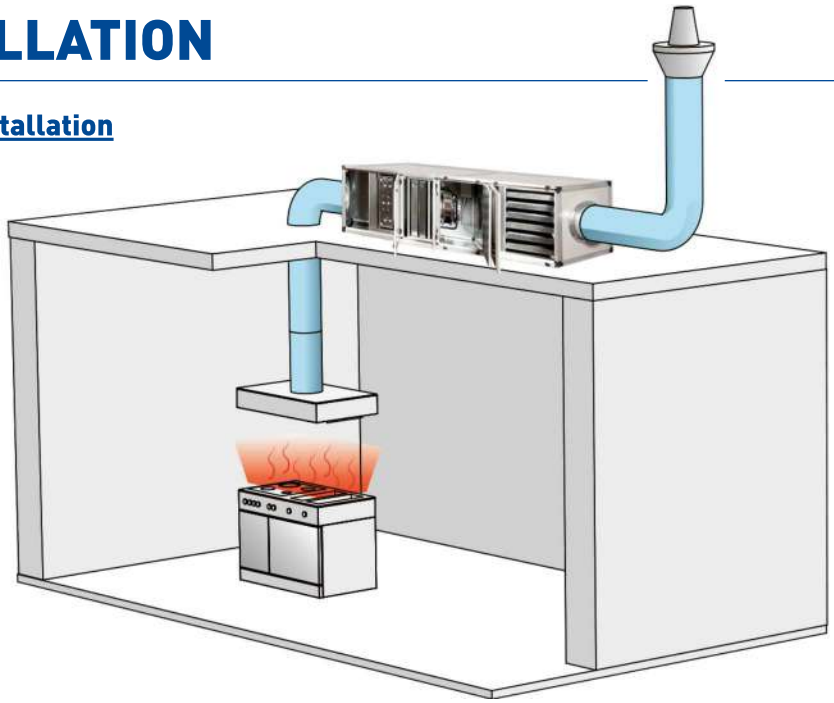
## A COMPLETE SYSTEM

Expansion Electronic exhaust filtration unit has the following functions:

1. Eliminate the odor without any release of molecules or chemical gases;
2. Has an overall particulate removal efficiency greater than 95% if equipped with a single electrostatic filtration battery, or greater than 99% if bi-stage;
3. Reduces the costs of filter replacement service to a minimum (washing only, no replacement);
4. It is available in customized and modular designs;
5. The FI and/or FX module is optional for microbial sterilization;
6. Allows easy maintenance and installation with simple double opening panels and access doors.

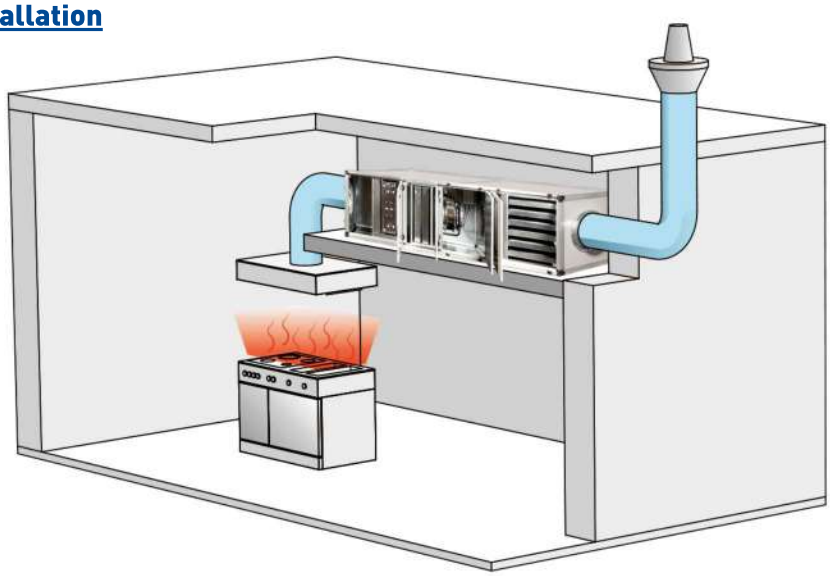
# INSTALLATION

## External installation



Kitchen

## Internal installation



Kitchen

# CRITERIA FOR SIZING A FILTRATION SYSTEM

**A According to the health regulation, the calculation to be made is as follows:**

Formula: Hood surface $m^2$ x air speed between 0,25 and 0,3 m / s x time (3600 s)

Or

Formula: Hood surface $m^2$ x minimum 900 $m^3$ / h - Max. 1800 $m^3$ / h

**B According to the cooking machines:**

| | |
|---|---|
| Grill, sauteuse, plate | 1500 $m^3$ |
| Convection ovens | 1000 $m^3$ |
| Steam ovens | 1500 $m^3$ |
| Static fires | 300 $m^3$ |
| Naked fires | 200 $m^3$ |
| Fryer | 1000 $m^3$/10 l of oil |

**C According to the air speed passage on the suction section (hood perimeter):**

Formula: Surface ($m^2$) x Speed (0.4m / s) x Time (3600 s)

# MAIN CERTIFICATIONS

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BETTER AIR FOR A BETTER QUALITY OF LIFE

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# ECOKITCHEN


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# TECHNICAL DESCRIPTION - DESCRIZIONE TECNICA

## EXHAUST FILTRATION UNIT

The new filtration unit implemented by Expansion Electronic is designed specifically for the removal of smoke and grease particles from the air stream of commercial kitchen exhaust systems and for the elimination of odour.
The filters inside the module guarantee a constant efficiency of filtration and, thanks to a high ability of separation and accumulation of oil, allow a remarkable energy saving and low drop pressure, guaranteed by the electrostatic filters FEL system certified according to UL867.

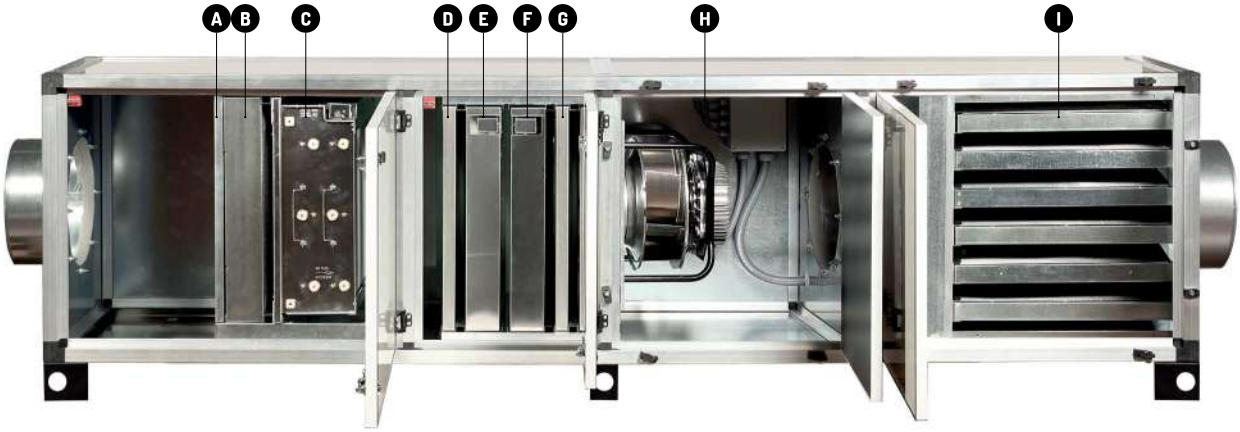
## UNITÀ DI FILTRAZIONE

La nuova unità filtrante implementata da Expansion Electronic è stata creata specificatamente per il trattamento di particelle inquinanti come vapori oleosi e grassi prodotti nelle cucine industriali provenienti dai condotti di scarico e per eliminare gli odori.
I filtri all'interno del modulo garantiscono un'efficienza di filtrazione costante e, grazie ad un'elevata capacità di separazione ed accumulo d'olio, consentono un notevole risparmio energetico e basse perdite di carico garantiti dai filtri elettrostatici FEL system certificati UL867.

| MODEL<br>MODELLO | DIMENSIONS (DxWxH)<br>DIMENSIONI (PxLxH) | N° OF ESP ELECTROSTATIC FILTER<br>N° DI FILTRI ELETTROSTATICI | AIRFLOW (speed passage 3 m/s)<br>PORTATA D'ARIA (velocità passaggio 3 m/s) | EXTERNAL STATIC PRESSURE<br>PRESSIONE STATICA | FAN<br>VENTILATORE |
|---|---|---|---|---|---|
| ECO 0,5 | 545 x 1800 x 810 | 1 FEL 300 | 1300 $m^3/h$ | 500 Pa | DDMP7/7T |
| ECO 1 | 658 x 2550 x 715 | 1 FEL 600 | 2500 $m^3/h$ | 500 Pa | RAD 310 |
| ECO 2 | 1250 x 2550 x 715 | 2 FEL 600 | 5000 $m^3/h$ | 500 Pa | RAD 310 |
| ECO 2,5 | 1650 x 2550 x 715 | 2 FEL 600 + 1 FEL 300 | 6000 $m^3/h$ | 600 Pa | RAD 355 |
| ECO 3 | 1950 x 2550 x 715 | 3 FEL 600 | 7650 $m^3/h$ | 800 Pa | RAD 400 |
| ECO 4 | 1350 x 2650 x 1460 | 4 FEL 600 | 10500 $m^3/h$ | 1000 Pa | RAD 450 |
| ECO 5 | 1650 x 2650 x 1460 | 4 FEL 600 + 2 FEL 300 | 13000 $m^3/h$ | 800 Pa | 2 x RAD 355 |
| ECO 6 | 1950 x 2650 x 1460 | 6 FEL 600 | 15000 $m^3/h$ | 800 Pa | 2 x RAD 400 |
| ECO 9 | 1950 x 2650 x 2000 | 9 FEL 600 | 22500 $m^3/h$ | 1000 Pa | 4 x RAD 400 |

NB: THE DIMENSIONS ARE: **D = Depth • W = Width • H = Height** - LE DIMENSIONI SONO: **P = Profondità • L = Larghezza • H = Altezza**

# FILTRATION SECTIONS - SEZIONI FILTRANTI




**A**

**Metal filter** made with galvanized wire mesh and galvanized frame, filter class EN 779 G2

**Filtro in maglia metallic**a composto da rete metallica zincata e telaio zincato, classe filtro EN 779 G2

**B**

**Sponge filter** of 30 PPI, able to filtrate large quantities of fat and oil.
Fast and easy maintenance.

**Filtro in spugn**a da 30 PPI in grado di filtrare grandi quantità di olii e grassi.
Facile e veloce manutenzione.

**C**

**Electrostatic precipitator** for oil and fat.
FEL SYSTEM model, high efficiency performance with 230V electrical supply.

**Filtro elettrostatico** per olii modello FEL SYSTEM ad alta efficienza. 230V.

**D**

**Labyrinth filter** that guarantees the blockage of further possible drops of oil. It is placed before and after the ionizing filter FI. (optional)

**Filtro a labirinto** che garantisce il blocco di ulteriori possibili gocce d'olio. Viene posto prima e dopo il filtro ionizzante FI. (optional)

**E**

**Ionization filte**r ensures better sterilization and reduction of odours.
**(optional)**

**Il filtro ionizzante** FI garantisce una maggiore sterilizzazione e riduzione degli odori.
**(optional)**

**F**

**Ozonisation filter FX**, with plates.
**(optional)**

**Filtro ozonizzante FX**, a piastre.
**(optional)**

**G**

Inox Steel **Turbulator** to increase air, ions and ozone combination.
**(optional)**

**Turbolatore** in acciaio inox per aumentare la miscelazione aria, ioni e ozono.
**(optional)**

**H**

Electric **fan** with power control.

**Ventilatore** elettronico con controllo elettronico della potenza.

**I**

Granular **activated carbon filter** with galvanized metal frame sheet.
Labyrinth disposition.

**Filtro a carboni attivi** granulari con telaio in lamiera zincata, disposti a labirinto.

**EXPANSION ELECTRONIC S.R.L.**

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# ECOLIGHT


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BETTER AIR FOR A BETTER QUALITY OF LIFE

# HIGHLIGHTS

1. COMPACT SIZE
2. ELECTRONIC FILTER FEL SYSTEM STANDARD
3. ELECTRONIC ENGINE STANDARD
4. NEW PREFILTRATION WITH 3 WASHABLE STAGE
5. GRANULAR COCONUT/BAMBOO ACTIVATED CARBON
6. GUARANTEED HYGIENIC AND ANTIBACTERIAL EFFECT

**Expansion Electronic** offers the new range of exhaust filtration units for kitchens with **compact size**, especially suitable for installation in small kitchens in historic centers: **ECOLIGHT.**

The **FEL System filter** installed as standard has been specifically designed for the removal of pollutants such as oil mist and vapors thanks to pointed collection blades that allow the capture and drop down high quantities of oily pollutant downwards.

**Energy Saving** is guaranteed as energy consumption is 3 times lower than that of a mechanical filter with equal filtration efficiency: this is mainly due to the **low pressure drops** almost constant over time, 62 Pa even when the filter is completely dirty.

The low energy consumption of the **ECOLIGHT** units is also guaranteed by the use of an **electronic motor** instead of a belt motor.

They are equipped with a new **3-stage prefiltration** completely removable and **washable.**

The possibility of installing before the activated carbon the combination of an **ionization cell FI** and an **ozonation cell FX** provides a hygienic and **antibacterial effect** and at the same time reduces odors.

Expansion Electronic uses active labyrinth carbons with low pressure drops and high performance. It consists in **granular coconut/bamboo carbon.**

The **ECOLIGHT** can be supplied to be wired or **fully wired** ready for use, **including an electrical control panel.**

The structures are presented i**n self-supporting aluminum profiles,** with external 25 mm sandwich panels. Their body is made up of a **single block** that contains all the components inside it.

The **ECOLIGHT** units can be **installed on the wall**, on the **ceiling** or on the **floor** and are equipped with a folding, flag or removable door.

The installer will not have to provide any drainage system since the units are equipped with a **removable tray** designed tray to collect the oil captured by the electronic filter.

# HIGHLIGHTS


1 DIMENSIONI COMPATTE

2 FILTRO ELETTRONICO FEL SYSTEM DI SERIE

3 MOTORE ELETTRONICO DI SERIE

4 NUOVA PREFILTRAZIONE A 3 STADI LAVABILE

5 CARBONE ATTIVO DI COCCO/BAMBU' GRANULARE

6 EFFETTO IGIENICO ED ANTIBATTERICO GARANTITO

**Expansion Electronic** presenta sul mercato la nuova gamma di unità filtranti per cucine con dimensioni compatte, adatta soprattutto all'installazione nelle piccole cucine dei centri storici: **ECOLIGHT**.

Il **filtro FEL System** installato di serie è stato progettato appositamente per l'abbattimento di inquinanti quali nebbie e vapori oleosi grazie a lame di captazione appuntite nella parte inferiore che permettono la cattura e lo scorrimento di elevate quantità di inquinante oleoso verso il basso.

L'**Energy Saving** è garantito in quanto i consumi energetici risultano essere 3 volte inferiori rispetto a quelli di un filtro meccanico con pari efficienza di filtrazione: questo soprattutto grazie alle **basse perdite di carico** pressoché costanti nel tempo, 62 Pa anche a filtro saturo.

Il basso consumo energetico delle unità **ECOLIGHT** è garantito anche dall'utilizzo di un **motore elettronico** anziché a trasmissione.

Sono dotate di nuova **prefiltrazione a 3 stadi** completamente smontabile e **lavabile.**

La possibilità di installare prima dei carboni attivi la combinazione di **cella ionizzante FI** e **cella ozonizzante FX** garantisce **effetto igienico ed antibatterico** e riduce allo stesso tempo gli odori.

Expansion Electronic utilizza carboni attivi a labirinto con basse perdite di carico ed alte performance. Si tratta di **carbone di cocco/bambù granulare.**

Le **ECOLIGHT** possono essere fornite da cablare o **totalmente cablate** pronte per l'uso, **comprensive di quadro elettrico di gestione**.

Le strutture si presentano in **profilati d'alluminio autoportanti,** con pannellature esterne a sandwich da 25 mm. Il corpo delle **ECOLIGHT** è costituito da un **blocco unico** che contiene tutti i componenti al suo interno.

Le unità **ECOLIGHT** possono essere **installate a muro,** a **soffitto** o a **pavimento** e sono dotate di porta apribile a ribalta, a bandiera o removibile.

L'installatore non dovrà prevedere alcun sistema di drenaggio dal momento che le unità sono provviste di una **vaschetta estraibile** predisposta per raccogliere l'olio catturato dal filtro elettronico.

# TECHNICAL FEATURES

As you can see from the table below, Expansion Electronic provides different models based on:

- Airflow required
- Overall dimensions
- Components installed inside according to customer needs.

| **MODEL**<br>MODELLO | **DIMENSIONS (MM)**<br>DIMENSIONI (MM) | **AIRFLOW ($m^3/h$)**<br>PORTATA D'ARIA ($m^3/h$) | **EXTERNAL STATIC PRESSURE (Pa)**<br>PRESSIONE STATICA (Pa) |
|---|---|---|---|
| ECO 0,5 A | 458 x 1350 x 715 | 1500 | 400 |
| ECO 0,5 B | 458 x 1700 x 715 | 1500 | 400 |
| ECO 0,5 C | 458 x 2100 x 715 | 1500 | 400 |
| ECO 0,5 D | 458 x 2100 x 715 | 1500 | 400 |
| ECO 0,5 E | 458 x 1850 x 715 | 1500 | 400 |
| ECO 0,5 F | 458 x 1500 x 715 | 1500 | 400 |
| | | | |
| ECO 1 A | 693 x 1350 x 715 | 2500 | 500 |
| ECO 1 B | 693 x 1700 x 715 | 2500 | 500 |
| ECO 1 C | 693 x 2100 x 715 | 2500 | 500 |
| ECO 1 D | 693 x 2100 x 715 | 2500 | 500 |
| ECO 1 E | 693 x 1850 x 715 | 2500 | 500 |
| ECO 1 F | 693 x 1500 x 715 | 2500 | 500 |
| | | | |
| ECO 2 A | 1285 x 1350 x 715 | 5000 | 700 |
| ECO 2 B | 1285 x 1700 x 715 | 5000 | 700 |
| ECO 2 C | 1285 x 2100 x 715 | 5000 | 700 |
| ECO 2 D | 1285 x 2100 x 715 | 5000 | 700 |
| ECO 2 E | 1285 x 1850 x 715 | 5000 | 700 |
| ECO 2 F | 1285 x 1500 x 715 | 5000 | 700 |
| | | | |
| ECO 3 A | 1877 x 1500 x 715 | 7650 | 500 |
| ECO 3 B | 1877 x 1850 x 715 | 7650 | 500 |
| ECO 3 C | 1877 x 2100 x 715 | 7650 | 500 |
| ECO 3 D | 1877 x 2100 x 715 | 7650 | 500 |
| ECO 3 E | 1877 x 1850 x 715 | 7650 | 500 |
| ECO 3 F | 1877 x 1500 x 715 | 7650 | 500 |

**PF METAL:** Metal mesh prefilter
**FEL:** Electrostatic filter FEL system
**FAN:** Fan
**LAB:** Labyrinth filter
**FI:** Ionization cell
**FX:** Ozonation cell
**CARBOPACK:** 2,5/5kg Active carbon filter
**CARBOX:** Box with active carbon filters 26/52 kg

# CARATTERISTICHE TECNICHE

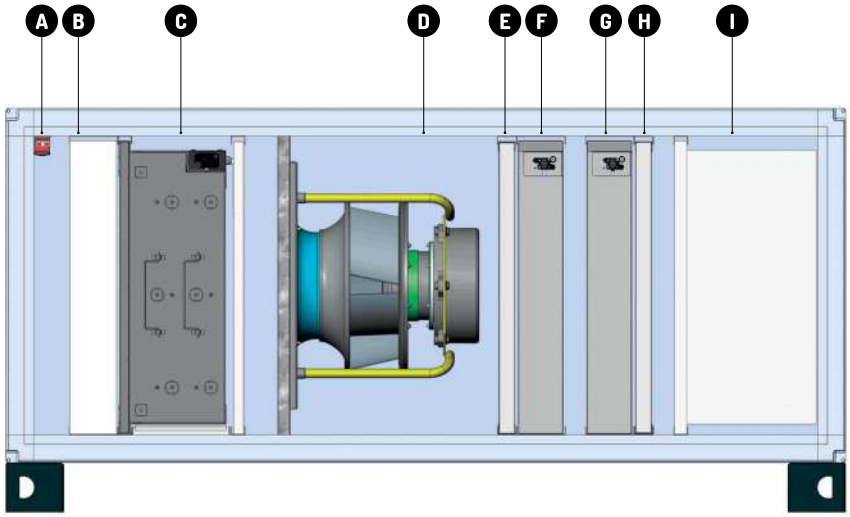
Come potete vedere dalla tabella sottostante, Expansion Electronic fornisce diversi modelli in base a:

- Portata d'aria richiesta
- Dimensioni d'ingombro
- Componenti installati all'interno in base alle necessità del cliente.

| **FAN**<br>VENTILATORE | **CHARACTERISTICS**<br>CARATTERISTICHE | **MODEL**<br>MODELLO |
|---|---|---|
| 7/7 TIG | PF METAL + 1FEL300 + FAN + CARBOPACK 2,5 KG | ECO 0,5 A |
| 7/7 TIG | PF METAL + 1FEL300 + FAN + LAB + FI + FX + CARBOPACK 2,5 KG | ECO 0,5 B |
| 7/7 TIG | PF METAL + 1FEL300 + FAN + LAB + FI + FX + CARBOX 26 KG | ECO 0,5 C |
| 7/7 TIG | PF METAL + 1FEL300 + FAN + LAB + FI + CARBOX 26 KG | ECO 0,5 D |
| 7/7 TIG | PF METAL + 1FEL300 + FAN + LAB + CARBOX 26 KG | ECO 0,5 E |
| 7/7 TIG | PF METAL + 1FEL300 + LAB + FI + FX + CARBOX 26 KG | ECO 0,5 F |
| | | |
| RAD 310 | PF METAL + 1FEL600 + FAN + CARBOPACK 5 KG | ECO 1 A |
| RAD 310 | PF METAL + 1FEL600 + FAN + LAB + FI + FX + CARBOPACK 5 KG | ECO 1 B |
| RAD 310 | PF METAL + 1FEL600 + FAN + LAB + FI + FX + CARBOX 52 KG | ECO 1 C |
| RAD 310 | PF METAL + 1FEL600 + FAN + LAB + FI + CARBOX 52 KG | ECO 1 D |
| RAD 310 | PF METAL + 1FEL600 + FAN + LAB + CARBOX 52 KG | ECO 1 E |
| RAD 310 | PF METAL + 1FEL600 + LAB + FI + FX + CARBOX 52KG | ECO 1 F |
| | | |
| RAD310 | 2PF METAL + 2FEL600 + FAN + 2CARBOPACK 5 KG | ECO 2 A |
| RAD310 | 2PF METAL + 2FEL600 + FAN + 2LAB + 2FI + 2FX + 2CARBOPACK 5 KG | ECO 2 B |
| RAD310 | 2PF METAL + 2FEL600 + FAN + 2LAB + 2FI + 2FX + 2CARBOX 52 KG | ECO 2 C |
| RAD310 | 2PF METAL + 2FEL600 + FAN + LAB + 2FI + 2CARBOX 52 KG | ECO 2 D |
| RAD310 | 2PF METAL + 2FEL600 + FAN + 2LAB + 2CARBOX 52 KG | ECO 2 E |
| RAD310 | 2PF METAL + 2FEL600 + 2LAB + 2FI + 2FX + 2CARBOX 52KG | ECO 2 F |
| | | |
| RAD400 | 3PF METAL + 3FEL600 + FAN + 3CARBOPACK 5 KG | ECO 3 A |
| RAD400 | 3PF METAL + 3FEL600 + FAN + 3LAB + 3FI + 3FX + 3CARBOPACK 5 KG | ECO 3 B |
| RAD400 | 3PF METAL + 3FEL600 + FAN + 3LAB + 3FI + 3FX + 3CARBOX 52 KG | ECO 3 C |
| RAD400 | 3PF METAL + 3FEL600 + FAN + 3LAB + 3FI + 3CARBOX 52 KG | ECO 3 D |
| RAD400 | 3PF METAL + 3FEL600 + FAN + 3LAB + 3CARBOX 52 KG | ECO 3 E |
| RAD400 | 3PF METAL + 3FEL600 + 3LAB + 3FI + 3FX + 3CARBOX 52KG | ECO 3 F |

**PF METAL:** Prefiltro in maglia metallica
**FEL:** Filtro elettrostatico FEL system
**FAN:** Ventilatore
**LAB:** Filtro a labirinto
**FI:** Cella ionizzante
**FX:** Cella ozonizzante
**CARBOPACK:** Filtro a carbone attivo da 2,5/5kg
**CARBOX:** Box con filtri a carbone attivo 26/52 kg

# FILTRATION SECTIONS SEZIONI FILTRANTI




**A**

**Safety microswitch**
with separate actuator.

**Microinterruttore di sicurezza**
con attuatore separato.

**B**

**Metal filter** made with galvanized wire mesh and galvanized frame, filter class EN 779 G2

**Filtro in maglia metallica** composto da rete metallica zincata e telaio zincato, classe filtro EN 779 G2

**C**

**Electrostatic precipitator** for oil and fat. FEL SYSTEM model, high efficiency performance with 230V electrical supply.

**Filtro elettrostatico** per oli modello FEL SYSTEM ad alta efficienza. 230V.

**D**

Electric **fan** with power control.

**Ventilatore** elettronico con controllo elettronico della potenza.

**E**

**Labyrinth filter** that guarantees the blockage of further possible drops of oil. It is placed before and after the ionization filter FI.

**Filtro a labirinto** che garantisce il blocco di ulteriori possibili gocce d'olio. Viene posto prima e dopo la cella ionizzante FI.

**F**

**Ionization cell FI** ensures better sterilization and reduction of odours.

La **cella ionizzante FI** garantisce una maggiore sterilizzazione e riduzione degli odori.

**G**

**Ozonation cell FX**, with plates that eliminates viruses and bacteria.

**Cella ozonizzante FX**, a piastre che è in grado di eliminare virus e batteri.

**H**

Inox Steel **Turbulator** to increase air, ions and ozone combination.

**Turbolatore** in acciaio inox per aumentare la miscelazione aria, ioni e ozono.

**I**

**Carbox:** Granular **activated carbon filters** with galvanized metal frame sheet. Labyrinth disposition. 26/52 kg.

**Carbox: Filtri a carboni attivi** granulari con telaio in lamiera zincata, disposti a labirinto. 26/52 kg.

**Carbopack:** plated active carbon mechanical filter. 2,5 / 5 kg.

**Carbopack:** filtro meccanico plisettato a carbone attivo. 2,5 / 5 kg.

# ELECTROSTATIC FILTER FEL SYSTEM

The **FEL System electrostatic filter** has been specifically designed for the removal of pollutants such as fumes, oil mist and vapors. It is characterized by:

- ✓ **Pointed capture blades** in the lower part that allow the capture and the dropping of high quantities fumes, oil mist and vapors pollutant downwards.
- ✓ **Multi-polar connection** system and installation by simple sliding on a filter holder frame.
- ✓ **Standard ASHRAE dimensions** that allow the retrofit with classic pocket filters according to the EN 15805.
- ✓ **Low pressure drops** almost constant over time, 62 Pa even when the filter is completely dirty.
- ✓ **Thermal protection** that automatically blocks the filter functioning when temperatures are too high.
- ✓ **Energy Saving** guaranteed as energy consumption is 3 times lower than that of a mechanical filter with equal filtration efficiency.
- ✓ **FEL system electrostatic filters are certified according to UNI EN ISO 16890** which has replaced the old and obsolete EN 779: high filtration efficiency on 0.3-0.4 micron particles, comparable to classes E10, E11 according to EN 1822: 2009 and classes ePM1, ePM2.5, ePM10 according to EN ISO 16890.
- ✓ **FEL system electrostatic filters subjected to the tests of the UL867 standard** have passed the tests and achieved the UL certification, a US standard that relates to the safety of equipment and specifically deals with the Safety of Electrostatic Air Filters.

# FILTRO ELETTRONICO FEL SYSTEM

Il **filtro elettronico FEL System** è stato progettato appositamente per l'abbattimento di inquinanti quali fumi, nebbie e vapori oleosi. Esso è caratterizzato da:

- ✓ **Lame di captazione appuntite** nella parte inferiore che permettono la cattura e lo scorrimento di elevate quantità di inquinanti quali fumi, nebbie e vapori oleosi verso il basso.
- ✓ **Sistema di connessione multipolare ed installazione per semplice scorrimento su telaio portafiltro.**
- ✓ **Dimensioni standard ASHRAE** che permettono il retrofit con i classici filtri a tasche seconde EN 15805.
- ✓ **Basse perdite di carico** pressoché costanti nel tempo, 62 Pa anche a filtro saturo.
- ✓ **Protezione termica** che blocca automaticamente il funzionamento del filtro al raggiungimento di temperature troppo elevate.
- ✓ **Energy Saving** garantito in quanto i consumi energetici risultano essere 3 volte inferiori rispetto a quelli di un filtro meccanico con pari efficienza di filtrazione.
- ✓ **I filtri elettrostatici FEL system sono certificati secondo la UNI EN ISO 16890** che ha sostituito la vecchia ed obsoleta EN 779: elevata efficienza di filtrazione su particelle 0,3-0,4 micron, paragonabile alle classi E10, E11 secondo la normativa EN 1822:2009 e alle classi $ePM_1$, $ePM_{2,5}$, $ePM_{10}$ secondo la EN ISO 16890.
- ✓ **I filtri elettronici FEL system sottoposti alle prove della normativa UL867** hanno superato i test e conseguito la certificazione UL, standard Statunitense che riguarda la sicurezza delle apparecchiature e nello specifico tratta la Sicurezza dei Filtri Elettrostatici d'Aria.

BETTER AIR FOR A BETTER QUALITY OF LIFE

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# Filter sequence in Ecokitchen units


expansion® electronic

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# MAIN CERTIFICATIONS OF FEL SYSTEM ELECTROSTATIC FILTER

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# Filter sequence in Ecokitchen system

The filters installed in the Ecokitchen system guarantee a reduction of the particulate and of the odorous components that are emanated in the air during the cooking process.

The problems associated with the odors caused by the fumes of cooking equipment are very common, particularly in urban areas and represent a problem for residents close to such emissions.

In fact there are often commercial establishments such as pubs, restaurants, take aways and craft workshops such as delicatessens, bakeries etc. bordering the houses and often the emission of cooking fumes and odors starts from the early hours of the morning.

The responsible substances mainly include fatty acids, aliphatic and aromatic hydrocarbons, aromatic amines and aldehydes.

The type and amount of pollutants emitted mainly depends on the cooked products, the cooking modes and the fuel used for cooking.

The filtration system must be designed, built and maintained efficient to ensure good performance.

The system lay-out must comply with the system load conditions: for example, a high presence of fumes and odors caused by frying or cooking on the grill requires a higher filtering system compared to other cooking methods.

The factors influencing the control of odors coming from cooking activities include:

1. The size of the kitchen: this influences the intensity of the odor and the necessary ventilation;
2. The type of cooked food: this influences the chemical composition of the environment air;
3. The type of cooking and the equipment used: this influences the quantity of grease, of water drops and the temperature inside the environment;
4. The characteristics of the suction hood;
5. The presence of a fume purification system;
6. smoke evacuation duct;
7. height and structure of the chimney;
8. territorial context of the emission and specifically the proximity to settlements and the location in the old city centers.

# The cooling and treatment systems of fumes and cooking vapors

The technological evolution has allowed the realization of various systems of cooking fumes treatment, in some cases specifically directed to a specific product, in which the emissions are subjected to filtration and abatement of the smells, of the grease and of any unburnt powders.

Such systems are in particular proposed when it is not possible to move away the fumes from the roof due to problems related to the building conformation, to aspects of architectural protection of the building or due to the objective impossibility of obtaining any authorization from other condominiums.

The material is widely and exhaustively treated by the "Operational Guide for the prevention of combustion vapors and fumes in living environments" of the Tuscany Region, 2012 edition.

In the technical document the technical conditions for the realization of this type of system are represented and examined, with all the constraints related to this particular mode of intervention.

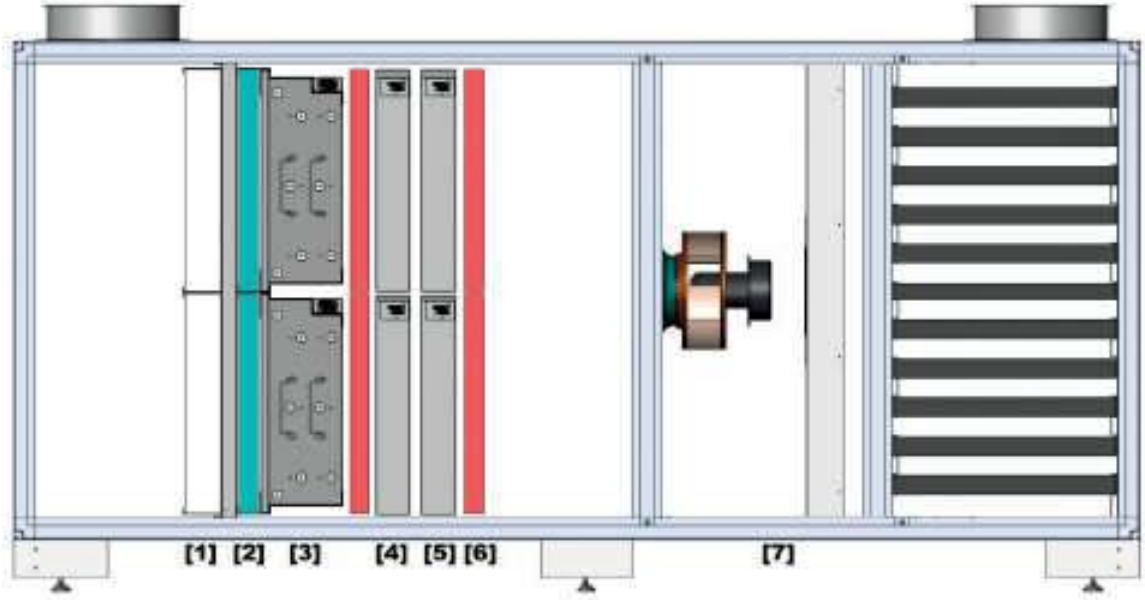
In general, the technical reference for this fume's treatment line is represented by the UNI EN 13779:2008 standard, now replaced by the EN16798-2018 Standard, which allows the direct discharge of fumes to the wall only if the emission deriving from cooking is declassified from EHA4 to EHA2, through filtration and abatement of pollutants.

The Paragraph III.2.2 of the guide contains all the technical information related to the main fume abatement systems.

The transition from EHA4 to EHA2 is possible using the most up-to-date filtration and deodorizing systems on the market today.

The filters installed in Ecokitchen systems produced by Expansion Electronic Srl guarantee a reduction of the particulate and the odorous components that develop in the air during the cooking process.

# Filters installed in Expansion Electronic srl Ecokitchen Units




A first stage, usually placed directly on the hood, is the classic labyrinth filter which, through an inertial action, allows to retain the fumes and the considerable quantities of water and oil vapor emitted during the initial cooking phases.

After this first filtration phase, the particulate and odorous pollutants are conveyed to the abatement system, where a series of filters with progressive efficiency have the purpose of retaining the particulate produced by cooking food [1], [2], [3].

The filters [1] and [2] are mechanical filters made essentially of metal or synthetic fiber matrices crossed by the fluid to be purified that retain the coarser particles by exploiting the interception and collision mechanisms.

The level of filtration of this stage is equal to G4 according to the old classification EN779 or ISO Coarse [90%] for particles larger than 10µm according to the new ISO EN 16890.

The filter [3] is an electrostatic finishing filter of the FEL series produced by Expansion Electronic Srl, which works at 70% of the maximum capacity on this type of systems.

On this filter the air for which the coarse particles have been pre-filtrated enters a set of wires and lamellae with different potential, that ionize the particles and capture them exploiting the attraction force generated by an electric field.

The filtration level certified according to the old EN779 classification is F9 or ePM1[80%] - ePM2,5[90%] according to the new ISO EN 16890.

If the system is equipped with a double electrostatic filtration battery, the filtration level is equal to an absolute filter with E11 classification according to EN1822 with a separation efficiency of 96%.

In this way the heavier pollutants which compromise the subsequent odor treatment steps are removed from the air. In addition, the Expansion Electronic electrostatic filters subjected to the tests of the UL867 standard have passed the tests and achieved the UL certification, a US standard that relates to the safety of equipment and specifically deals with the Safety of Electrostatic Air Filters.

The next stage of filtration of Ecokitchen systems is the treatment of odors [4], [5], [6], [7].

Here, the potential of chemical deodorizing by absorption is exploited by passing the air through an ionization battery [4], which charges the air with negative ions.

Subsequently, the pretreated air passes through an ozonation module [5], which enriches it with Ozone. Thanks to the super oxidants created by this treatment and to the turbulator system [6], the smells are oxidized obtaining a first and a high reduction of the same.

The oxidation process is followed by a battery of activated carbon [7], for the final deodorization and to remove any non-oxidized substances by adsorption.

The active carbons are arranged in a labyrinth to maximize the amount of activated carbon equal to 22g/m3 of treated air, to increase the passage surface area, to limit the speed of crossing in the carbons to obtain a longer stay of the air in the activated carbon and get a higher deodorizing than a normal cartridge system, where are usually employed from 6.5g/m3 to 13g/m3.

The result is that the air of the kitchens treated in this way passes from EHA4 to EHA2 or even EHA1 making it possible to expel it directly to the wall.

Any recirculation in the air environment so treated must consider the regulations in force in the country where the system is installed and the adoption of automatisms on the shutters that control the recirculation.

In this way, in the case of inefficiencies in the treatment system, there is the expulsion of the unfiltered air to the outside, safeguarding the health of the rooms for the operators.

# Exhaust filtration unit

The new filtration unit implemented by Expansion Electronic is designed specifically for the removal of smoke and grease particles from the air stream of commercial kitchen exhaust systems and for the elimination of odour.

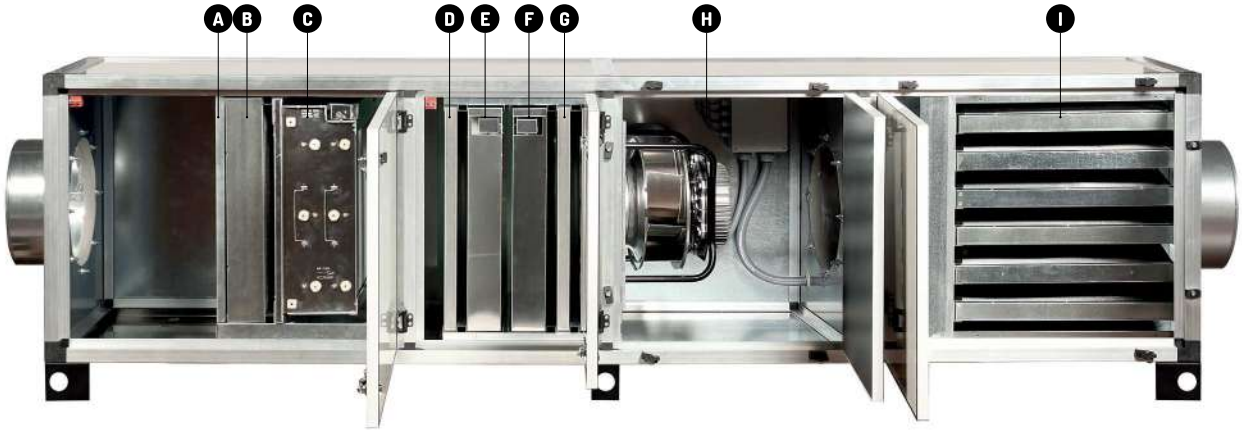
The filters inside the module guarantee a constant efficiency of filtration and, thanks to a high ability of separation and accumulation of oil, allow a remarkable energy saving and low drop pressure.

The module is produced in galvanized iron and painted with epoxy dusts colour RAL 7035.

| MODEL | DIMENSIONS (DxWxH) | N° OF ESP ELECTROSTATIC FILTER | AIRFLOW (speed passage 3 m/s) | EXTERNAL STATIC PRESSURE | FAN |
|---|---|---|---|---|---|
| ECO 0,5 | 545 x 1800 x 810 | 1 FEL 300 | 1300 $m^3/h$ | 500 Pa | DDMP7/7T |
| ECO 1 | 658 x 2550 x 715 | 1 FEL 600 | 2500 $m^3/h$ | 500 Pa | RAD 310 |
| ECO 2 | 1250 x 2550 x 715 | 2 FEL 600 | 5000 $m^3/h$ | 500 Pa | RAD 310 |
| ECO 2,5 | 1650 x 2550 x 715 | 2 FEL 600 + 1 FEL 300 | 6000 $m^3/h$ | 600 Pa | RAD 355 |
| ECO 3B | 1950 x 2550 x 715 | 3 FEL 600 | 7650 $m^3/h$ | 800 Pa | RAD 400 |
| ECO 3H | 658 x 2550 x 1850 | 3 FEL 600 | 7650 $m^3/h$ | 800 Pa | RAD 400 |
| ECO 4 | 1350 x 2650 x 1460 | 4 FEL 600 | 10500 $m^3/h$ | 1000 Pa | RAD 450 |
| ECO 5 | 1650 x 2650 x 1460 | 4 FEL 600 + 2 FEL 300 | 13000 $m^3/h$ | 800 Pa | 2 x RAD 355 |
| ECO 6 | 1950 x 2650 x 1460 | 6 FEL 600 | 15000 $m^3/h$ | 800 Pa | 2 x RAD 400 |
| ECO 9 | 1950 x 2650 x 2000 | 9 FEL 600 | 22500 $m^3/h$ | 1000 Pa | 4 x RAD 400 |

NB: THE DIMENSIONS ARE: **D = Depth • W = Width • H = Height**

# Filtration Sections




**A** 

**Metal filter** made with galvanized wire mesh and galvanized frame, filter class EN 779 G2

**B** 

**Sponge filter** of 30 PPI, able to filtrate large quantities of fat and oil. Fast and easy maintenance.

**C** 

**Electrostatic precipitator** for oil and fat. FEL SYSTEM model, high efficiency performance with 230V electrical supply.

**D** 

**Labyrinth filter** that guarantees the blockage of further possible drops of oil. It is placed before and after the ionizing filter FI. (optional)

**E** 

**Ionization filter** ensures better sterilization and reduction of odours. **(optional)**

**F** 

**Ozonisation filter FX**, with plates. **(optional)**

**G** 

Inox Steel **Turbulator** to increase air, ions and ozone combination. **(optional)**

**H** 

Electric **fan** with power control.

**I** 

Granular **activated carbon filter** with galvanized metal frame sheet. Labyrinth disposition.

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