expansion® electronic

BETTER AIR FOR A BETTER QUALITY OF LIFE

ACTIVE ELECTROSTATIC FILTER
FEL SYSTEM

INDUSTRIAL SOLUTIONS

DESCRIPTION

Building on the reliability and the success of the FE SYSTEM range, thanks to our experience in the applications of particular food-agricultural processes, we have been able to conceive and develop the FEL SYSTEM range. This is a new range of active electrostatic filters with built-in electronics, for oil and oily vapour applications.

FEL SYSTEM represents a revolutionary development and a valid alternative to traditionalfilters. It was conceived to facilitate the use of electrostatic oil filters for specific processes. Itsuse in agricultural-food plants ensures consistent filtration efficiency.

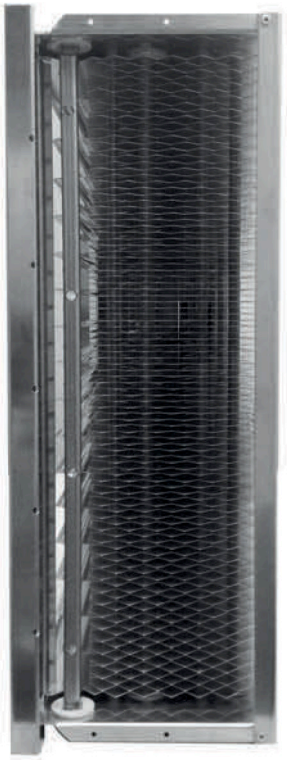
Thanks to high separation and oil accumulation capabilities, because of low load losses, it also provides important energy saving. Its multipole connection system means that several filters can be connected at the same time, depending on the air flow and filtration requirements. In addition, electrostatic filters can be installed and removed by simply sliding them across the equipment filter frame support.

The built-in electronic power input circuit is equipped with LED to notify the user that the filter is working correctly. A customized range of electrostatic filters without built-in electronics is also available for oil and oily vapor applications,

ELECTROSTATIC FILTER

FEL SYSTEM

CHARACTERISTICS



FEL filters are particularly suited for the abatement of polluting substances such as oily vapours and mists, with and without particulate. The main distinguishing characteristic of this filter is the bottom section of the capture blades, the shape of which has been purposely conceived to enable the dripping of high quantities of oily pollutants, with reduced formation of electric discharges between the plates. In addition, the special mechanical construction ensures, also in the presence of emulsifying oils, that no electric discharges occur on the insulator, therefore providing high reliability in the long term.

The open bottom part makes it possible to collect, in appropriately conceived containers, the condensation formed during the filtration process. The high separation performance together with a high capability of capturing particulate, also makes it possible to obtain compact abatement systems with low load losses virtually consistent across time and with high levels of efficiency. It is therefore possible to obtain a reduction in electric consumption when compared with other systems using mechanical filters.

From an operating point of view, the FEL600 filter is capable of condensing hundreds of grams of oil every day. Furthermore, this filter is certified for the Ozone emissions, which are significantly lower than the maximum set by the legislation.

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.

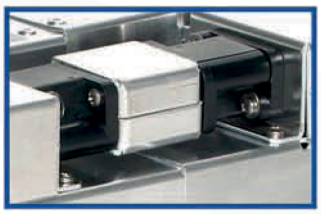
EASY INSTALLATION

The FEL SYSTEM represents an alternative to the common pocket filters and it is conceived to simplify the use of electrostatic filters.

Its adoption within ventilation systems in general, and more specifically in the air conditioning plants, does not imply any variation regarding constructive and dimensional characteristics of the plants themselves.

Thanks to its multipolar connection system, the installation of FEL electrostatic filters becomes simple, then it's enough to slide in and out the filtering units inside the filter frame support.

PSC - POWER SUPPLY CONNECTOR



JC - JUNCTION CONNECTOR

FCC - FINAL COVER CONNECTOR

APPLICATION SECTOR

FOOD: Control of airborne contamination during food processes

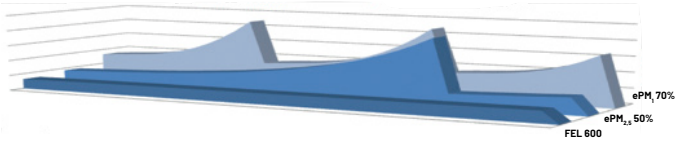
ENERGY SAVING

In the active electrostatic filter FEL SYSTEM, the initial pressure drop increases slowly while the filter gets dirty. This characteristic, combined to an extraordinary capacity of pollutants accumulation, allows the filter to have a long operation time between maintenance and the other one.

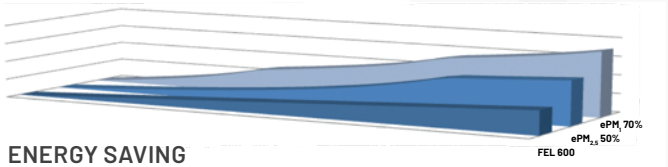
In a traditional pocket filter the initial pressure drop is higher than in a FEL SYSTEM, and it increases considerably during its clogging. The pocket filter must be replaced when it reaches the maximum pressure drop of 300 Pa.

Comparing the FEL SYSTEM with two other different filtering systems, operating at the same contaminated indoor air conditions and at the same air flow capacity, we can observe that the FEL SYSTEM has a pressure drop that grows very slowly, while a pocket filter ePM2,5 50% (ex F7) reaches the max pressure drop of 300 Pa before the filter is saturated. Even more evident is the operation time of a pocket filter ePM1 70% (ex F9) that needs to be replaced three times in the same period of operation compared to FEL SYSTEM.

A higher flow restriction means merely higher energy consumption for the pocket filters. Compared with an electrostatic filter FEL SYSTEM, we can estimate a double energy consumption using an ePM2,5 50% and three times more using an ePM1 70%.



AIR PRESSURE DROP



ENERGY SAVING

COMPLETELY REGENERABLE

The electrostatic filter FEL is embedded with a rigid rugged aluminum frame which gets dirty by attracting and holding airborne particles of pollutants which remain accumulated on collector plates. When the filter is saturated, it is sufficient to wash it with water and detergent to remove dirt and regenerate the filter without removing the electronics as it is completely resined and watertight. (Waterproof). This avoids disposal and replacement costs.

An adequate filter cleaning guarantees efficiency and long-lasting performance, equal to the life of the machine in which it is installed (Long Life Cycle).

INCORPORATED ELECTRONIC

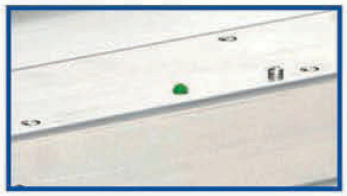
The electronic circuit permits to generate the necessary voltage directly in the filter.

Through the multipolar connectors PSC, JC, FCC, it is possible to carry the power supply to the filter with power voltage of 230V-50Hz, combine multiple filters in a row and give out alarm signal.

Efficient watertight solutions allow the electronic box to be bathed with the filter during the maintenance instead of being removed.

The circuit is also equipped with a thermal sensor which automatically blocks the operation of the filter when too high temperatures are reached, guaranteeing a thermal protection.

ELECTRONIC CIRCUIT



LED

TECHNICAL DATA

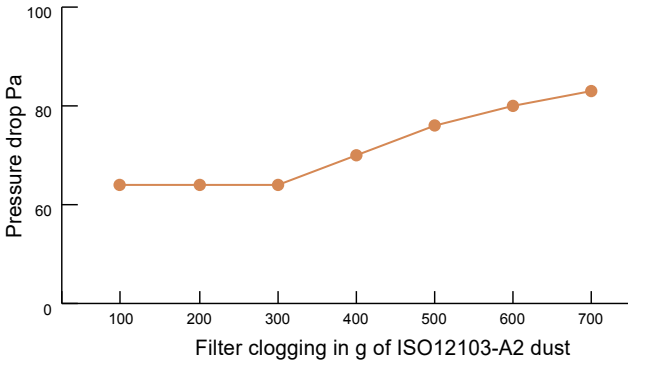
Model	Dimensions	Weight Kg	Energy consumption W	Accumulation capacity g	Air flow capacity m³/h					Annual energy consumption (KWh/Y)	
FEL150RV	287x287x218	4,5	9	140	200	400	550	625	700	150	A+
FEL250RV	490x287x218	8	9	216	380	480	600	720	800	170	A+
FEL250	287x490x218	8	9	216	470	600	750	900	1200	256	A+
FEL300RV	592x287x218	9	9	240	250	500	630	720	1000	213	A+
FEL300	287x592x218	10	9	280	600	800	1000	1200	1600	341	A+
FEL450	490x490x218	14	16	378	820	1050	1310	1570	2100	448	A+
FEL500	490x592x218	16	16	494	1070	1400	1730	2100	2770	590	A+
FEL550	592x490x218	16	16	460	990	1270	1590	1910	2550	544	A+
FEL600	592x592x218	19	16	600	1300	1700	2100	2550	3400	702	A+

FILTRATION CLASS ACCORDING TO UNI EN ISO 16890	ePM%	ePM$_1$ 95%	ePM$_1$ 95%	ePM$_1$ 90%	ePM$_1$ 80%	ePM$_1$ 70%
Filtration class according to UNI 11254	(A, B, C, D)	A	B	C	D	-
Filtration class according to EN 1822	(E10 - E11)	E11	E10	-	-	-
Air speed passage on the filter	m/s	1	2	2,5	3	4
Percentual of max air flow capacity	%	40%	50%	65%	75%	100%
Pressure drop according to ISO 16890	Pa	10	17	24	37	64
Filtration class according to old EN 779	(F7 - F8 - F9)	-	-	F9	F8	F8

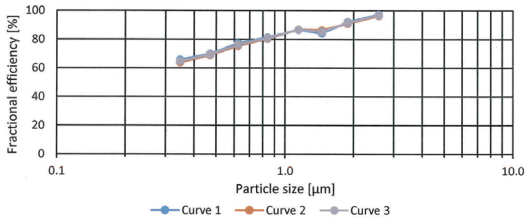
FRAME material: aluminium - PREFILTER material: metal mesh

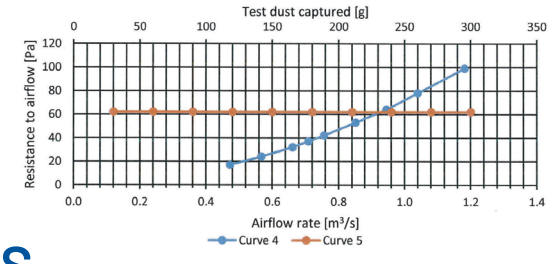
CHARTS

Pressure drop as a function of air flow rate (clean filter)



Test performed at 3400 m3/h - Speed air passage 4m/s





Curve 1
Initial fractional efficiency E_i
(ISO 16890-2)

Curve 2
Conditioned fractional efficiency $E_{D,i}$
(ISO 16890-4)

Curve 3
Average fractional efficiency $E_{A,i}$
(ISO 16890-1)

Curve 4
Pressure differential as a function of the airflow rate (Clean filter)
(ISO 16890-2)

Curve 5
Pressure differential as a function of the test dust captured
(ISO 16890-3)

COMPANY CERTIFICATIONS

ILH BERLIN INSTITUT FÜR LUFTHYGIENE · BSRIA · CETIAT ensemble, innover et valider · Consiglio Nazionale delle Ricerche · SP · POLITECNICO DI TORINO · IRAM Instituto Argentino de Normalización y Certificación · CE · ISO 16890 · c UL us LISTED

expansion® electronic
BETTER AIR FOR A BETTER QUALITY OF LIFE

EXPANSION ELECTRONIC SRL
Via delle Industrie, 18 . 36050 Cartigliano (VI) . ITALY
T. +39 0424 592400 . +39 0424 827058 . +39 0424 827059 . F. +39 0424 827061
www.expansion-electronic.com . info@expansion-electronic.com