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Planning Consent Information

MECHANICAL VENTILATION & ENVIRONMENTAL CONTROL EQUIPMENT

KFC WATERLOOVILLE

ELETTRA AVENUE, WATERLOOVILLE, PO7 7XS



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SECTION 1 : KITCHEN EXTRACT SYSTEMS

- 1.1 GENERAL
- 1.2 OBJECTIVES
- 1.3 ODOURS
- 1.4 NOISE
- 1.5 LOCATION
- 1.6 SIZE
- 1.7 FIRE SUPPRESSION
- 1.8 CANOPY CONSTRUCTION
- 1.9 SPLASH BACKS
- 1.10 LIGHTING
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- 1.14 MAINTENANCE
- 1.15 PARTICULAR MAIN CANOPY ARRANGEMENT



1.1 General

This specification covers standards for the selection, supply, delivery, installation, testing and commissioning of Kitchen ventilation in accordance with HVCA Specification DW/172 for Restaurant developments. The cooking of food involves appliances releasing heat, steam, fumes and airborne grease.

The cooking process requires extract ventilation for the removal of fumes, smoke and vapours generated by the cooking activity.

1.2 Objectives

To provide an acceptable working environment for all kitchen staff by the extraction / removal of heated air, fumes, steam and cooking smells, as well as preventing condensation. The extract canopies are designed to enable ease of access for cleaning throughout the system and distribution ductwork and primary fan equipment.

1.3 Odours

All fumes and odours from the food preparation areas of the kitchens shall be mechanically extracted utilizing an extract canopy specifically designed and installed by a nominated specialist to remove all cooking odours. This will take into account the dimensions of the kitchens in question, the type of grease filters used in the application and the cooking equipment within the grouped cooking range.

1.4 Noise

All fan equipment, ductwork and filter housing shall be so mounted and installed so as not to give rise to a noise nuisance. Any noise generated by the extraction or supply systems as a whole shall not exceed the pre-existing hourly background noise level at nearby residential accommodation by more than 5dB(A). When measured and rated in accordance with BS 4142, entitled Method of Rating Industrial Noise Affecting Mixed Residential and Industrial Areas 2014.

1.5 Location

The canopies will be sited over the grouped cooking equipment, or any heat, steam or grease producing equipment.

1.6 Size

The canopies shall overhang the grouped cooking range by not less than 250mm and will be mounted at a height no lower than 2000mm from the finished floor level to the underside of the canopy.

1.7 Fire Suppression

Where specifically required or instructed, an automatic fire suppression system will be installed to protect the cooking appliances, extract canopies and associated distribution ductwork. Fire suppression systems will be of the "Amerex" type, tested and approved to UL 300 specification with automatic and manual activation. Fire suppression systems will be designed, installed and commissioned by LPC1204 approved installers.



1.8 Canopy Construction

The extract canopies shall be constructed from 18 swg (1.22mm thick) stainless steel type 304. All visible surfaces shall be ultra-fine grain satin polished to 280 grit, and Polythene protected during installation. All constituent parts must be suitable for use in a working kitchen environment.

The canopies shall be cut, punched and folded into sub sections of up to 6000mm in length and factory assembled by means of computer controlled seam welds, and non-visible mechanical fixings. All joints shall be formed to enable ease of cleaning with no cut edges or corners, which shall become an encumbrance to cleaning requirements. All metal edges shall be rolled smooth and shall be free from any sharp edges or projections.

The canopy lower edge at each end and the rear shall be formed into a condensation channel with inclined internal elevation to simplify cleaning requirements, the inner edges having crush folded safety finish.

When constructed, the canopies should be flush with sealing surface as should any ducting within the kitchen itself. This is to prevent the creation of a shelf which would permit the collection of dust etc. where this is not possible infill panels are to be.

1.9 Splashbacks

Stainless steel sheets of the same grade and polish finish should be fitted to the rear and side walls below the canopy. This should be, as a minimum, the width of the canopy and should be flush with the base of the canopy, the wall and down to the floor. All joints between the splashback, cooking equipment

and the canopy should be sealed with a silicone sealant. Silicone sealant should be applied only when absolutely necessary to joints in a neat finish not protruding the metal surface. Silicone joints will not be accepted as an alternative for a welded or poor constructed joint.

1.10 Lighting

The canopies shall be fitted with vapour proof lamps suitable for use in damp atmospheres. The lamps should have a diffuser, which can also withstand high temperature. Recess lighting is preferred to bulkhead fittings. Lighting within the canopies shall provide a minimum of 500 lux at the working surface.

1.11 Fan Equipment

All fans are to adequately sized to overcome the system resistance and to provide the required extraction/supply rate specified. Multiple fans rather than single units should be used to reduce noise in instances when the system resistance is inherently high.

All fan motors are to be totally enclosed, air cooled, class F rated, with motor protection IP55. All single phased motors are to have "sealed for life" bearings. The fan motor should have an operating temperature of -40 deg. Cent. to +50 deg. Cent.

All fans will be provided with suitably rated on/off variable speed controllers, and all fan equipment having local isolators and emergency stops fitted adjacent to the applicable equipment. Fans should be fitted with necessary resilient mounting to prevent noise and vibration transfer to the kitchen, other unit rooms and the external environment



The Contractor will ensure that the fans are capable of producing the required air volumes as specified. All fans and motors arrangements shall be capable of running at 10% over the maximum specified duty.

The Contractor shall ensure that fan motors are suitable for the electrical supply available to the building.

Casing mounted fans shall have internal vibration isolation. Duct mounted fans shall have flexible duct connections consisting of or be externally protected by material having a fire penetration time of at least 15 minutes when tested in accordance with BS 476 Part 8 and shall comply with BS 476 Part 7, Section 2, Clause 2.8 (Class 1 : surface of a very low flame spread properties).

Fans shall be selected to meet the specified noise criteria.

The construction of the fan shall be such that is capable of withstanding the pressures and stresses experienced under continuous operation.

Fan casings shall be constructed such that access can easily be gained to motors and impellers, and that these can be removed if required for maintenance or replacement.

1.12 Grease Filters

The canopies should be fitted with internal extract plenum(s) with grease filters cells across its length. The filters should be of a sufficient size and number to ensure that the velocity through them does not lead to grease "carry over" into the ductwork and onto the extract fan.

The grease filters should have rigid frames in stainless steel baffle filters of sufficient density to capture and hold airborne grease. Filters

shall fit correctly into holding frames to eliminate any extracted air passing around the filter.

The extracted fumes shall first be passed through these filters designed to remove the grease entrained in the fumes; the filters shall be removed and cleaned of their deposits at the end of each working day.

The grease filters should be easily removed and should be adequately sized to fit easily within dishwashers to facilitate easy cleaning.

The location of the filters should be such that it is not affected by the heat of wall mounted equipment, such as grills. This is particularly important with replaceable filter fittings, which carbonize at high temperature.

1.13 Distribution Ductwork

Kitchen canopy exhaust ductwork shall be constructed and installed in accordance with HVCA Specification DW/172 and HVCA Specification DW/144. Ductwork shall be routed to external source in the shortest possible route, without excessive use of bends and horizontal ductwork installation.

Ductwork shall be suitable for kitchen extract systems, with smooth internal surfaces that facilitate easy removal of grease deposits.

Ductwork, unless otherwise specified, shall be of galvanised mild steel construction in accordance with the requirements of DW/144 issued by the Heating and Ventilating Contractors Association

The Local Authority Building Control Officer is consulted to ensure compliance with the



Building Regulations and the Fire Precautions Act.

The interpretation of these statutes may vary according to the Local Authority and early consultation will clarify any special requirements with regard to fire resistant and smoke extract ductwork. A written record of all advice given should be recorded and retained.

1.14 Maintenance

The kitchen extract system is required to be maintained regularly to ensure the effectiveness of the system. It is recommended that maintenance is undertaken every 6 months. To ensure that the ductwork can be cleaned effectively, access doors are to be installed every 1.2m.

1.15 Particular Main Canopy Arrangements

The kitchen area shall have a mechanical forced air system, with a side-wall mounted canopy arrangement over the main grouped cooking equipment, and supply air system with spot coolers fitted to the underside of the canopy for the cooking operative's benefit. The extract system shall have an on/off speed controller sited away from the kitchen area to suit site and staff requirements. The canopy shall be a "Capture Jet" type canopy with 10% of the overall extract air from the canopy, supplied through an insulated plenum fitted integrally to the canopy.

The supply air shall then be discharged through personal spot ventilators, with each spot coolers having internal volume control. . The canopy shall constitute 45% (85% room total) of the extract air volume to achieve a

negative pressure within the kitchen area. The canopy shall be sited over the grouped cooking range of equipment as per tender drawings. The canopy arrangement shall be as follows:

- a) 4400 x 1500 x 500 (Dimensions to be checked prior to site start)
- b) Four sided outer valance casing.
- c) The canopy lower edge at each end shall be formed into a condensation channel with inclined internal elevation to simplify cleaning requirements.
- d) Full area horizontal ceiling plate, manufactured in tray form, fixed and sealed into the outer valance casing.
- e) Full length single sided extract plenum, fixed and sealed to the canopy outer structure and complete with: -
 - f) 4 No. 500 x 330 x 50mm stainless steel baffle filters
 - g) No. 500 x 300mm extract factory fitted duct connection collars.
 - h) 3 No. 2 x 58 w fluorescent recessed luminaries manufactured to IP65, steam heat and grease proof to give an average level of illumination of 500 Lux upon the working surfaces.
 - i) Grease collection tray's
 - j) Full Length stainless steel splashback, 3000mm x 2000mm and side splashbacks of 1500mm x 2000mm.

DUTIES: Canopy Extract volume 2.52 m3/sec.
at a constant pressure drop of 400 pascals



All duties to be checked against the manufacturers filter performance data.



TYPICAL CANOPY DESIGN

SECTION 2 : ODOUR ABATEMENT SYSTEM

- 2.1 GENERAL
- 2.1 ODOUR RISK ASSESSMENT
- 2.2 ODOUR EQUIPMENT PARTICULARS
- 2.3 SYSTEM DESCRIPTION
- 2.4 PREVENTATIVE MAINTENANCE
- 2.5 SUPPORTING DOCUMENTATION



2.1 General

As part of the commitment to the brand and the outcome of the risk assessment in section 2.2, an odour control system will be installed to serve the kitchen extract system on the project.

2.2 Odour Risk Assessment

The following 'Risk Assessment for Odour' has been derived from criteria outlined by EMAQ Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems Appendix 3.

Odour control must be designed to prevent odour nuisance in a given situation. The following score methodology is suggested as a means of determining odour control requirements using a simple risk assessment approach. The odour control requirements considered here are consistent with the performance requirements listed in this report.

Impact Risk	Odour Control Requirement	Significance Score
Low/Medium	Low Level Odour Control	Less than 20
High	High Level Odour Control	20-35
Very High	Very High Level Odour Control	More than 35

Based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type:

Criteria	Rating	Score	Details
Dispersion	Very Poor	20	Low level discharge, discharge into courtyard or restriction on stack
	Poor	15	Not low level but below eaves, or discharge at below 10 m/s.
	Moderate	10	Moderate 10 Discharging 1m above eaves at 10 -15m/s
	Good	5	Discharging 1m above ridge at 15 m/s
Proximity of Receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge
	Far	1	Closest sensitive receptor more than 100m from kitchen discharge
Size of Kitchen	Large	5	More than 100 covers or large sized take away
	Medium	3	Between 30 and 100 covers or medium sized take away
	Small	1	Less than 30 covers or small take away
Cooking Type (odour/grease loading)	Very High	10	Pub (high level of fried food), fried chicken, burgers or fish & chips
	High	7	Kebab, Vietnamese, Thai or Indian.
	Medium	4	Cantonese, Japanese or Chinese

	Low	1	Most pubs, Italian, French, Pizza or Steakhouse
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Below is an evaluation for the site based on the criteria on the previous page.

Criteria	Rating	Score	Details/ Comments
Dispersion	POOR	15	
Proximity of Receptors	FAR	1	
Size of Kitchen	MEDIUM	3	
Cooking Type	VERY HIGH	10	

Impact Risk	Odour Control Requirement	Significance Score
HIGH	High Level Odour Control	28



2.3 Odour Equipment Particulars

1no. UV-O 1000 ozone injection system as
Purified Air

1no. ESP4500 Electrostatic Precipitator as
Purified Air

2.4 System Description

The first stage of the odour control system would be the grease baffle filters actually located within the extraction hood, which remove the large particles of grease and water vapour.

The second stage of the odour control system would be the Controlled ozone injection system which is connected via ductwork to the kitchen extract ductwork and mounted as close to the canopy as possible. The UV-O range uses UV-C technology to produce ozone and hydroxyl free radicals to oxidise cooking odours through a process of ozonolysis. The system is interlocked with the extract fan power supply so that it can only operate whilst the extract fan is running. For optimum performance a dwell time of between 2 & 6 seconds is recommended to allow the ozone to work effectively upon the malodorous gasses within the duct.

The final stage of the odour control system would be the Electrostatic Precipitators which will be mounted in line with the air stream of the extract ductwork system. These remove small particles of grease and smoke as well as moisture from the exhaust air stream, thus reducing odours.

2.5 Preventative Maintenance

Work to be carried out is: -

Electrostatic Precipitators

1. Clean outside of unit with mild detergent – Every 6 months
2. Check the door sealing material – Every 12 months
3. Clean the inside of the unit and remove dust/grease from filter compartment – Every 3 months
4. Check the mesh pre-filter, ESP collector cell and the mesh post-filter – Every 3 Months

UV-O System

1. Clean UV Lamps – Every 2 months
2. Replace UV Lamps – Every 12 months
3. Replace Filter (Only applicable on UV-O 1000) – Every 2 Months
4. Clean the inside of the unit and remove dust/grease – Every 3 months

Service and maintenance manuals available on request.



2.6 Supporting Documentation

UV-O Range

Unlike other UV-C systems, our UV-O units are located outside of the kitchen extract duct and are connected via a spigot and spiral ducting.



KEY FEATURES

- Easy to install
- Can be retro-fitted into existing duct
- Virtually no pressure loss
- No monthly maintenance needed

Our UV-O range includes:-

- UV-O 500 which handles up to 1 m³/sec of air flow
- UV-C 1000 which handles up to 2 m³/sec of air flow

The UV-O 500 has been designed for smaller capacity commercial kitchens.

The UV-O range uses UV-C technology to produce ozone and hydroxyl free radicals to oxidise cooking odours through a process of ozonolysis.

Unlike other UV-C systems, our UV-O units are located outside of the kitchen extract duct and are connected via a spigot and small diameter ducting.

Although it is widely accepted that the best way to apply UV-C light is directly in-line with the air stream itself, performance will be impacted as the lamps get dirty.

With our UV-O units the air flow does not come from the exhaust duct but from the ambient air around the unit, which is filtered on entry. This means that it is able to provide a uniform supply of ozone and hydroxyl free radicals into the extract system with an extremely low pressure loss.

For optimum performance we would recommend between 2 & 6 seconds of dwell time to allow the ozone to work effectively upon the malodorous gasses within the duct.

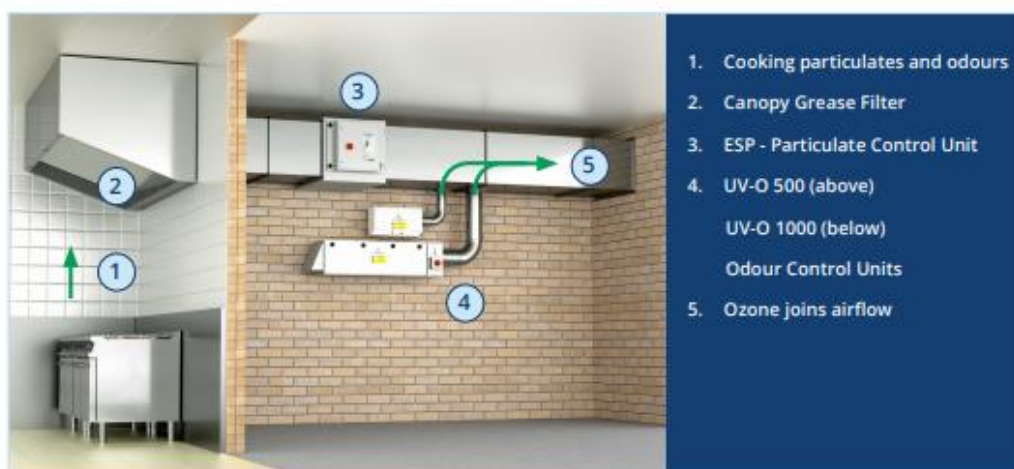


UV-O 500 Unit



UV-O 1000 Unit





1. Cooking particulates and odours
2. Canopy Grease Filter
3. ESP - Particulate Control Unit
4. UV-O 500 (above)
UV-O 1000 (below)
Odour Control Units
5. Ozone joins airflow

Technical Specification

	UV-O 500	UV-O 1000
Electrical Supply	220/240V 50Hz	220/240V 50Hz
Power Consumption	120 Watts	700 Watts
Max Air Volume	up to 1m ³ /sec	up to 2m ³ /sec
Dimensions	W 605mm H 300mm D 200mm	W 1568mm H 350mm D 363mm
Weight	10.5Kg	50Kg

This unit's tried and tested UV-C technology allows for the siting of commercial kitchens in locations such as residential areas and shopping centres, where previously planning permission may not have been granted. After extensive research and development Purified Air are able to devise the best combination of lamps to provide the most effective odour control.

Safety

Ultra-Violet band C light is the most powerful of the three bands, it is a very strong oxidant and as such exposure to UV-C light is dangerous. To ensure safety the UV-C lamps are secured behind locked panels and the system has been engineered to shut down automatically when these panels are unlocked. However, since the lamps typically have a minimum life of twelve months and with the system able to operate at optimum efficiency even if one lamp fails it is unlikely that, apart from routine servicing by experienced engineers, that the system will ever need to be opened.



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HOW IT WORKS



Our ESP units fit in-line with the kitchen ducting and can be configured modularly to cope with all extract volume requirements.

01 Cooking particulates and odours

02 Canopy Grease Filter

03 ESP - Particulate Control Unit

04 Airflow

OUR SERVICES



Design



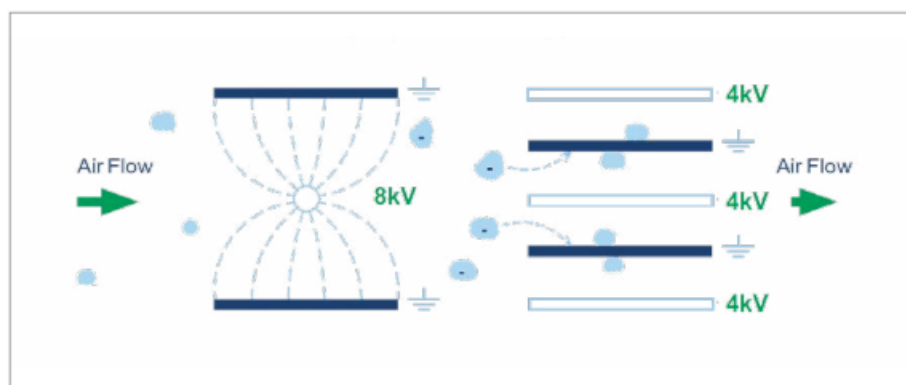
Manufacture



Maintain



THE ELECTROSTATIC PROCESS



The above diagram shows, in a basic visual, how an electrostatic precipitator works. As air passes into the combined ioniser / collector cell, the particulates in the air stream are polarised. As they continue through the ioniser and

between the collector cell plates, the polarised particulates are repelled away from the positively charged plates and attracted to the earthed plates where they stick and so are filtered out of the air flow.

THE BENEFITS OF ELECTROSTATIC TECHNOLOGY



Eliminates up to 99% of particles



Filters particles down to sub-micron levels



Modular design



Energy efficient

SECTION 3 : EXTERNAL PLANT NOISE CRITERIA

- 3.1 GENERAL
- 3.2 RESTAURANT ENVIRONMENTAL CONTROL SYSTEM DESCRIPTION
- 3.3 KITCHEN EXTRACT FAN EQUIPMENT PARTICULARS
- 3.4 KITCHEN SUPPLY FAN EQUIPMENT PARTICULARS
- 3.5 GENERAL EXTRACT FAN EQUIPMENT PARTICULARS



3.1 General

Restaurants have a common philosophy to provide a comfortable environment within restaurants for customers, with all areas having thermostatic control and adequate ventilation, which is further extended to their staff.

This section covers the technical information with respect to external plant equipment.

3.2 Restaurant Environmental Control System Description

The Trade Restaurant area shall be provided with its cooling and heating derived from a split refrigerant heat recovery air conditioning system. The indoor units mated to this system are ceiling cassette units operating on a vapour compression cycle, utilising refrigerant R32. The restaurant will also be ventilated via a heat recovery ventilation unit described in section 3.8.

The units shall operate on a re-circulated basis, with the minimum fresh air requirement

in conjunction with the specified occupancy level in accordance with Document F1 of Building Regulations. The specific fresh air requirement shall be in accordance with Building Regulations and CIBSE Guide relating to minimum fresh air requirements per individual occupant. The actual quantity of fresh air is indicated within this specification and associated tender drawing.

Temperature control of the area shall be sensed at room conditions utilising the return air sensor on the indoor unit and the mechanical refrigeration plant controlled accordingly.

The condensing unit shall be fully weather proofed and located in an agreed position. Allowances shall be made during the installation of the external condensing units to limit vibration.

The contractor shall be responsible for ensuring that the indoor and outdoor primary plant has the specified access space for maintenance and service around the packaged unit in accordance with the manufacturer's recommendations.



3.3 Kitchen Extract Fan Equipment Particulars

The main extract system within the kitchen shall serve the single wall mounted canopy arrangements as described in earlier sections of this document. The main extract fan shall serve the Main Canopy. Please refer to the drawings for the location of the fan.

The extract fan equipment shall be as follows: -

<u>Reference</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Duty (m³/s)</u>	<u>Control</u>	<u>Weight (Kg)</u>	<u>Dimensions (HxWxD)</u>	<u>Rating</u>
KEF01	Systemair	MUB/T 062 560D4	2.52	Speed Controller	103.5	840 x 840 x 840	IP55

Sound Power Level

		<u>63Hz</u>	<u>125Hz</u>	<u>250Hz</u>	<u>500Hz</u>	<u>1k</u>	<u>2k</u>	<u>4k</u>	<u>8k</u>
<u>Inlet</u>	dB	77	91	84	81	79	75	72	66
<u>Outlet</u>	dB	78	92	85	82	80	76	74	67
<u>Surrounding</u>	dB	56	75	56	49	48	46	39	31



3.4 Kitchen Supply Fan Equipment Particulars

The main supply air system within the kitchen serves the single wall mounted canopy arrangements as described in earlier sections of this document. The supply fan shall also serve both the Main Canopy and general areas via ceiling mounted diffusers. Please refer to the drawings for the location of the fan.

The supply fan equipment shall be as follows: -

<u>Reference</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Duty</u> <u>(m³/s)</u>	<u>Control</u>	<u>Weight</u> <u>(Kg)</u>	<u>Dimensions</u>	<u>Rating</u>
KSF01	Systemair	AR500E4	2.02	Speed Controller	18.6	500Ø x 205	IP54

Sound Power Level

		<u>63Hz</u>	<u>125Hz</u>	<u>250Hz</u>	<u>500Hz</u>	<u>1kHz</u>	<u>2kHz</u>	<u>4kHz</u>	<u>8kHz</u>
<u>Inlet</u>	dB	37	48	49	52	55	55	52	45
<u>Outlet</u>	dB	36	50	52	52	54	54	51	46



3.5 General Extract Fan Equipment Particulars

The general extract fan serves the toilet areas. The fan is mounted internally within the ceiling void. Details are included in this document for reference even though the equipment is not located externally

The extract fan equipment shall be as follows: -

<u>Reference</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Duty</u> <u>(m³/s)</u>	<u>Control</u>	<u>Weight</u> <u>(Kg)</u>	<u>Dimensions</u> <u>(HxWxD)</u>
EF01	Systemair	K150	0.06	Lights PIR	3.3	286Ø x 202

Sound Power Level

		<u>63Hz</u>	<u>125Hz</u>	<u>250Hz</u>	<u>500Hz</u>	<u>1kHz</u>	<u>2kHz</u>	<u>4kHz</u>	<u>8kHz</u>
<u>Inlet</u>	dB	74	72	65	61	58	56	54	43
<u>Outlet</u>	dB	67	70	59	59	57	54	52	41

