

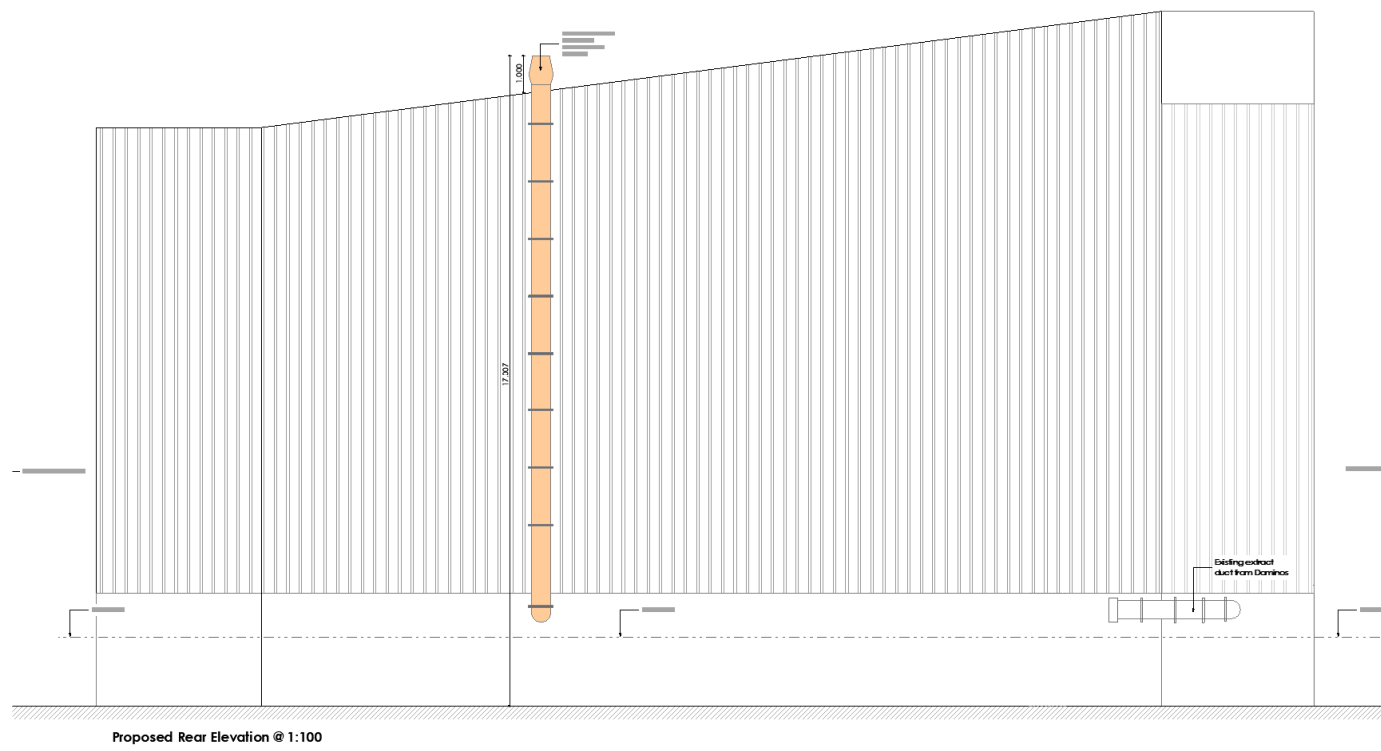
## Design and Specifications of Extraction Ventilation System

### Site Reference: 261 Tile Hill Lane, Coventry

The Following information provides the details the type and technical specifications of the extraction ventilation system and shows the system is within the limits of related planning requirements and Defra Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems 2005

### **Food processing and odour characteristics**

- The operator's food process will be primarily freshly prepared, fried and baked produce with grilling.
- The restaurant kitchen will consists one hob, one charcoal grill, two chip fryers.
- The takeaway section will consist



two gas fired open electrical grills, two chip fryers, one hob, one bain maries and one charcoal grill.- The odour and grease characteristics rising from operator's food processing would qualify as high concentration.

- The moisture load and grease/smoke content for these cooking types qualifies as high.

### **Kitchen extraction system**

The premises located at the ground floor of six storey building. The kitchen itself, takeaway section and extraction system will be fully located inside of the building and will be connected to external acoustical aluminium weather louvres to the ground floor, to the rear.

Kitchen smoke and odour will be filtered 90% with latest technology powerful extraction ventilation system. The concept is to filter kitchen extract and discharge 90% filtered air to the rear at ground floor level.

Until this report completed we have not been provided whether there is internal flue system fitted inside the sixth floor apartment where the sites located. Even if there is a flue fitted it would be extremely difficult to maintenance the flue would have high fire safety risk. Also, in mid and long term future it might course cooking smoke and smell leakage risk to the upper floor residential properties.

**Minimum ventilation rates** An internal ambient air temperature of 28° max. Max.humidity levels of 70% Internal noise level should be between NR40 – NR50. Dedicated make up air system to be approximately 85% of the extract flow rate. Minimum air charge rate of 40 per hour.

The proposed system meets noise criteria set within the **BS4142 method for rating industrial noise affecting mixed residential and industrial areas guidance** which indicates that levels at nearby noise sensitive receivers should be limited 5dB(A) below the local area background noise level.

## **Canopy Hood Details**

### Minimum requirements for

#### canopy Velocity requirements

Light loading – 0.25m/s (applies to steaming ovens, boiling pans, Bains Marie and stock-pot servers)

Medium loading – 0.35m/s (applies to deep fat fryers, bratt pans, solid and open top ranges and griddles)

Heavy loading – 0.5 m/s (applies to chargrills, mesquite and specialist broiler units).

## **Kitchen Section:**

- Canopy Size : 3.50mt stainless steel canopy.
- Canopy Dimensions : L:3500mm x W:1200mm D:1000mm x H:700mm
- Fitted washable baffle grease filters

Ventilation canopy constructed from 1.00mm thick satin finish stainless steel to comply with the food hygiene requirements. The canopy also constructed with 50mmX25mm perimeter condense channel completed with removable grease collection drawers.

- All joints and seams shall be liquid tight.
- The canopy should be cleaned on a weekly basis.

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### Electrostatic Precipitator:

Electrostatic precipitators are used to clean the airstream of grease and hydrocarbons (smoke).

This equipment works as; greased dirty air is drawn by the motor/blower through a washable metal mesh pre-filter which traps large dust particles. The remaining particles, some as small as 0.01 microns, pass into a strong electrical field (ionizing section) where the particulate receives an electrical charge. The charged particles then pass into a collector plate section made up of a series of equally spaced parallel plates. Each alternate plate is charged with the same polarity as the particles, which repel, while the interleaving plates are grounded, which attract and collect.

**1X ESP 4500E Electrostatic Precipitator.** (Please see attached brochure).

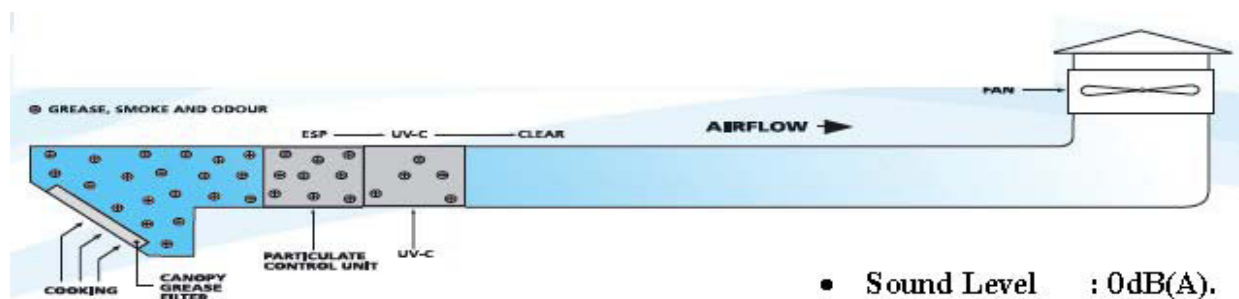
- Electrostatic Precipitator shall be mounted internally before the extract fan.
- These highly efficient units can remove particles small as 0.01 micron at an efficiency of 90%.
- Sound Level : 0dB(A).
- All above mentioned extractor ventilation system equipment shall be installed c/w anti-vibrating mounts as per manufacturer's recommendations.
- ESP module and other in line abatement should be cleaned every 2-6 months.

### 1 X UV-O 1000 UV Light Odour Neutraliser

#### Intended use

The product has been designed exclusively for the treating odours which are released during the most common cooking processes in commercial kitchens. Using the product for other purposes is considered contrary to its intended use. The UV-O 1000 unit uses UV-C technology to produce ozone and hydroxyl free radicals to oxidize cooking odours through a process of ozonolysis.

UV-C technology is based on the synergy, which occurs when ozone and ultra-violet light are combined. This specific modular systems feature six to eighteen high output UV-C lamps. These lamps act to oxidise odours and grease permanently destroying and altering the compounds. The majority of lamps are designed to produce UV light at 185nm, which converts ozone from the oxygen present in the air. Ozone is a highly reactive oxidant which interacts with most contaminants and allergens it encounters rendering them harmless, and at the same time removes odours.



- Sound Level : 0dB(A).

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• High efficiency UV-C technology</li> <li>• Grease altered to better managed compound</li> <li>• Minimum Twelve month lamp life</li> <li>• High security - UV-C lamps locked behind panels</li> </ul> | <ul style="list-style-type: none"> <li>- Cooking odour's reduced by up to 90%*</li> <li>- Robust, compact construction</li> <li>- Minimum maintenance</li> <li>- Optional self-diagnostic system</li> </ul> |
|---|---|

**Maintenance** (Please see attached manual for more important details) Clean UV lamps

every.....2 months Replace UV lambs

every.....12 months Replace Filter

every.....3months Clean the inside of the product and remove

dust/grease every.....3 months

## 2 X Multicarb Activated Carbon Discarb Unit

**Activated Carbon** filters to control grease, smoke and odour emissions from kitchens minimizing any impact they have on their surroundings.

**The type unit will be used in the system; MultiCarb Cells.**

These are fully disposable (discarb) multi panel modules which allow for simple integration into filter housings. The unit will be used for Elimination of Cooking Odours. It is also used for; Removal of kerosen exhaust fumes, general odour removal, smoke removal, neutralization of ammonia and its derivatives ,removal of formaldehyde, removal of airborne pollutants and contaminants , removal of acid gases (H2S, SO2, NOX, HCl).

<b>Application Cooking -General Café Shops</b>	<b>Recommended Dwell Time <i>0.1 to 0.2</i> Seconds</b>	<b>Grade Carbon grade Enhanced for improved performance for light catering odours</b>	<b>Suffix -ACO</b>
Cooking -Spicy, Indian	0.2 to 0.4 Seconds	Enhanced Carbon grade suitable for many applications 65% Minimum CTC	-AC

**Specification** : 7 celled activated carbon discarb unit will be used in the system.

**The product code no** : Carbon PA242424

**Actual size (h x w x d)** : 24x24x24(in inch) / 594x594x597(in mm).

The table below refers the recommended minimum dwell times required for different applications.

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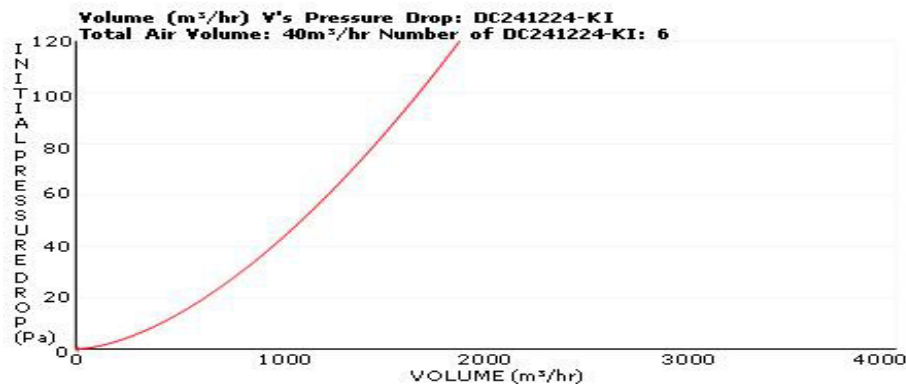
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**Purified Multicarb Activated Carbon Discarb Unit** (Please see attached brochure). **Rated Air Flow:** 3600m<sup>3</sup>/hr

Rated Airflow based on a dwell time 0.1 sec. **Sound Level : 0dB(A).**



Total Volume of air (m<sup>3</sup>/hr):40 Number of cells: 6 40m<sup>3</sup>/hr circulated through 6x DC24x24x24 K1 will result in pressure drop of **0.001pa**

## Multicarb Activated Carbon Panels

The disposable activated carbon filter panel can be used in odour reduction applications. They can be fitted into duct mounted casings to provide the required contact time and airflow.

To be used in air conditioning plants **for the removal of smells and odours in public buildings**, airports, offices and industrial premises. **Activated Carbon Panels mainly used in kitchen extract systems.**

These filters are designed for ease of installation and incorporated into air duct systems. They can be used on both supply for purifying incoming air and **can be used on the extract to remove toxic gasses and odours generated within a process.**

Brand: **Multicarb Activated Carbon Discarb Panels** (Please see attached brochure). **Specification** : 6 pcs disposable activated carbon filter panels will be used in the system. **Actualsize(hxwxh)** : 24x24x24(in inch) / 594x594x597(in mm). Maximum Operating Temperature: 40 Deg C / Maximum Operating Humidity 80% RH

## Fan Motor

Powerful box fans offering for high volumes and high pressure. A fully speed controllable boxed backward curved centrifugal fan range suitable for indoor or outdoor use rated IP55 (weatherproof) able to handle cooking grease and other airborne pollutants.

### Application:

500 mm fans are suitable for ventilating most spaces offering good volumes even with long duct runs whilst able to be used in line or with the outlet at right angles to the inlet. Can be either supply or extract fans for all applications including commercial kitchens, offices, workshops and retail units etc.

**The fan motor will be located inside of the building.**

### Specifications

**1 x Helios GBD 710/6/6 Gigabox Centrifugal Fan 710mm Ø** (Please see attached brochure Page;192).

A typical application where this fan is commonly used is in the catering industry where a high level of filtration is required, usually the result of fitting odour control via Pre-Carbon Filters. • Complete with 710 mm circular duct connections and flexible connections. • Fully speed controllable • High performance up to 890 m<sup>3</sup>/s. • Suitable in temperatures from -40°C to 50°C • Low to high air volumes and low to high static pressures • Powerful backward curved centrifugal fan ideal for all applications. • Can be changed from straight through to side outlet on site • **The efficiency and sound characteristics of the centrifugal fans are often restaurants, café shops and takeaways to discharge heavy and medium level exhaust air.**

- Centrifugal fans have the advantage of the compact design and straight-through airflow as well as the preferred acoustic characteristics and high pressure capability.
- They are high total efficiency, small energy consumption and low sound levels using high performance impellers.

Fan Type : Helios GBD 710/6/6 Gigabox Centrifugal Fan Extraction Motor  
Supply : Single phase 240 V/ 50Hz / 1ph  
Length.....: 1020mm overall square, type 900mm x 900mm inside frame  
Speed :890min<sup>-1</sup> r.p.m  
Motor Rating : 2.45Kw  
Motor Current : 4.7 Amps

Air flow volume FID : 3.47 m<sup>3</sup>/s @ 200Pa

2.48 m<sup>3</sup>/s @ 400Pa Maximum air flow temperature : 50+°C

Ambient Temperatur: -50°C to +50°C Suitable Controller : RDS 7 –Requires full motor protection unit

**Sound Level : 46dB(A) at 4m**

#### **Discharge & Noise Control:**

External aluminium exhaust stack will be vertically located at the rear of the premises.

- The extract will be taken through the rear light well and will discharge minimum 10m away from any window. Nearest residential window is +/-10 mt away from the exit point of the flue.
- The ductwork after the canopy; electrostatic precipitator, UV-O 1000 odour control mechanism, activated carbon filter, fan/motor unit will be fitted the inside of the building to minimise the noise level and provide conformity to existing environment.
- The extraction ventilation unit will be located inside to reduce to noise level. The noise level reduces in total: 35 dB (A) with the fitted silencer model detailed above.
- If required the applicant ready to cover the motor fan unit with ``Acoustic Mat`` or ``enclosure`` to lower the noise level.
- The (A3) use kitchen and (A5) takeaway section will operate during trade hours only: 09:00 to 23:30 on Monday to Thursday, 09:00 to 00:00 (midnight) Fridays and Saturdays and 09:00 to 23:00 on Sundays. Opening hours will be same on public holidays and bank holidays. Last serving will be 30 min before closure times; kitchen clean-up will be 30 min after closure times. Proposed operational hours match the hours conditioned in the decision notice served under the planning application EPF/2163/13 on 28 March 2014.

The management will ensure no noise nuisance will be generated during the operational hours to not effect neighbouring residents.

- Ventilation equipment is to be designed and installed to avoid noise and vibration nuisance affecting neighbours. As the fan and motor sited inside the building and fixed on anti-vibration mounts, joined to ductwork using flexible couplings preventing the transmission of vibrations to the structure minimising outdoor noise.
- Fan, motor and silencer cleaning and anti-vibe check to be carried out every 3 months.
- External aluminium louvre deep clean every 6 months after installations and every 9 months thereafter should be cleaned to maintain the maximum efficiency of the extraction system.

## **Silencer-1**

First silencer will be fitted after extraction fan. Type : Helios KSD 100/50 Size : 1020mm x 520mm Designed for connecting rectangular fans and accessories to ducting where the flange frames are made of

galvanized sheet steel. Leak proof Temperature resistance from -10°C to +80°C Sound Level of the Helios GBD 710/6/6 :46dB (A) at 4m Average Helios KSD 100/50 noise reduction : 11 dB (A) Overall average sound level : 35 dB (A)

## **Accessories:**

Helios DS 2 On/Off and speed reversing switch. For two speed 3Phase starter / delta motors c/w overload – Flanges -Mounting Feet -Flexible Connections Anti-vibration mounts –Silencers –Guards -Back draught dampers

## **Fresh Air Intake to the Ventilation System:**

In order to enable to extraction systems function at optimum level ``fresh air intake support `` is necessary. The extraction system will have long internal flue layout to extract both separate cooking facilities and canopies connected, without fresh air support to function properly. Fresh air support enables the cooking systems works efficiently with providing O2 in to the cooking areas. Fresh air support stops and prevents smoke, CO and CO2 and smell back in to the kitchen and cooking areas.

Fresh air intake system works with separate internal air supply flue installation connected to separate fan to absorb fresh air from outside to deliver cooking areas.

## **1 X Torin Sifan Dual Inlet Direct Drive 321mm Air Intake Fan**

- Curved fans are powered by controllable, highly efficient motors with integrated drive electronics. • Motor class B insulated and has maintenance free ball bearings • Operation temperature -40 to +50 Deg C
- Galvanized steel fan case • Fan impeller ISO 1940 Grade 6.3 • This type of high flow fans used for air handling units, air curtain, heat recovery and use especially where noise consideration is an important consideration. • Mains power input of 115 or 230V, 50 or 60Hz,
- Speed control without loss of efficiency by either 0-10Vdc or PWM input signals. • Soft start • A 10Vdc output integrated into the motor so speed can be controlled by a simple potentiometer without the need of an external signal • Motor rotation selection allowing for right or left hand motor position (as viewed looking into the fan discharge).

- Tacho output signal.
- EMC and EuP compliant. • Motor failure indicator. • Motor current limitation
- Locked rotor protection • Over temperature protection
- Passive power factor correction
- Shaft vertical or horizontal use.
- Lowest specific fan power and noise in its class
- Programmable constant flow.
- Networking via Modbus/RS48 interface for remote monitoring and control.
- IP 54 motor enclosure, for weatherproof applications

**Accessories:**

1Ph starter c/w overload –Flanges -Mounting Feet -Flexible Connections Suitable electronic speed controller described in fan catalogue. Outlet flanges-Anti vibration mounting feet-guards –Cubic frames

**Silencer-2**

Second silencer will be fitted after fresh air intake fan.

Acoustica brand silencer will be used. This silencer will be custom made according to the external sizes shown on the attached Torin Sifan Dual Inlet Direct Drive 321mm Air Intake Fan catalogue (please see attached) and will be fitted to reduce potential fan noise at . (Attached, we submit the specification brochure of the Acoustica silencers).

If required the applicant will cover the motor fan unit with ``Acoustic Mat`` or ``motor enclosure`` to lower the noise level.

**Maintenance (General)**

The business operator will comply with Defra Commercial Kitchen Guidance 2005; The proprietors have a duty to ensure that the ventilation system serving the respective premises are maintained and operated effectively. Good maintenance is a prerequisite for ensuring that a system complies with best practicable means under statutory nuisance provision and will form a key element of any scheme designed to minimize harm to the amenity under planning regulations. Good maintenance is required by the food hygiene regulations and will also minimize the risk of fire.

The recommended cleaning period for extract ductwork is:

- Heavy use 12-16 hours per day 3 monthly
- *Moderate use 6-12 hours per day 6 monthly*
- Light use 2-6 hours per day annually.