

## Extraction Ventilation System Design Criteria

Site Reference: Units B, C and D Landmark House, The Broadway, Loughton, Essex IG10 3SP

The applicant is intending to establish on the ground floor of 63 West Street, Boston, Lincs. PE21 8QN into a hot food takeaway.

Food processing and odour characteristics

The operator's food process will be primarily freshly prepared, fried and baked produce with light grilling consisting of:

two gas fired open electrical grills

two chip fryers,

one hob,

one bainmaries

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 three storey building. The kitchen itself, takeaway section and extraction system will be fully located inside of the existing ground floor extension to the main building. building and will be connected to external extract system located on the existing flat roof.

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.

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 change 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:

0 Canopy Size | 3.50mt stainless steel canopy.

0 Canopy Dimensions : L:3500mm x W: | 200mm D: | 000mm 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.

Canopy Size 5.90m stainless steel canopy.

Canopy Dimensions : L:5900mm 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.

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The canopy should be cleaned on a weekly basis.

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.

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

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 (H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>x</sub>, HCl).

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 1 6 pcs disposable activated carbon filter panels will be used in the system.

Actual size (h x w x d) : 24x24x24(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.

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 I/I.

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.

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

Powerfull 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

Size : Duct diameter : 710 mm

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 Temperature: -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 horizontally located at the rear of the premises.

The extract will be taken through the existing flat roof and will discharge minimum 10m away from any window. Nearest residential window is +/-10 m away from the exit point of the flue.

The ductwork after the canopy, 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 will be able to cover the motor fan unit with "Acoustic Mat" or "enclosure" to lower the noise level.

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 -1-80°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)

#### Silencer-2

Second silencer will be fitted after fresh air intake fan.

#### 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:

0 Heavy use 12-16 hours per day 3 monthly

0 Moderate use 6-12 hours per day 6 monthly

0 Light use 2-6 hours per day annually.

#### Summary

For the sake of clarity, the proposed extract ventilation system to include all items identified above.

#### Takeaway Opening Hours

It is the intention for the new take away to have the following opening hours:

Monday – Sunday 12:00 Noon to Midnight