

Name:
12 Mackets Lane
Liverpool
L25 0LQ

Kitchen Ventilation Report

Friday, March 18, 2022

Site Address:
12 Mackets Lane
Liverpool
L25 0LQ

Reference: 12 Mackets Lane 18/03/22

The client had invited us to propose the extraction ventilation system design for the site addressed 12 Mackets Lane, Liverpool, L25 0LQ.

It is understood where the existing florist establishment will become a café/restaurant incorporating a mix of traditional English and Chinese meals which are prepared in the rear of the property. A new canopy and associated extraction ventilation system are therefore proposed. The client advised that the cooking activities in the new kitchen would include two deep fat fryers, a small Chinese Wok Range, Mild Steel Griddle and Open-Top Range & Oven. The canopy and extraction design are based upon this information.

General Notes:

- Canopy to be manufactured in stainless steel to comply with DW172 regulation guidelines.
- Extraction system designed and developed in accordance with the canopy assembly containing 8 of: 500 x 500 x 50 mm baffle style grease filters. Any other filters will invalidate both plant and ducting selection.
- All building and first fix electrical works shall be carried out before ventilation system works.
- All works shall be undertaken by qualified and competent professionals.
- The drawings attached represents the ventilation design according to the equipment as listed in the calculation included within the document.
- Gas monitoring equipment shall be installed in accordance with current gas safe regulations.

Specifications and Calculations for Extraction Canopy Unit:

Table 1: Calculations for Extraction Canopy Unit

HVCA Drawing Reference Code	DW/172 Item Description	Input Source	Specifications for Extraction Canopy Unit					
			Plan Size		Area	Coefficient	Flow Rate	Surface Temperature
			Length (mm)	Width (mm)	m ²		m ³ s ⁻¹	°C
	Deep Fat Fryer	Gas	700	400	0.28	0.5	0.14	190
	Deep Fat Fryer	Gas	700	400	0.28	0.5	0.14	190
	Chinese Wok Range	Gas	700	900	0.63	0.9	0.57	280
	Mild Steel Griddle	Gas	400	700	0.28	0.3	0.08	190
-	Open-Top Range & Oven	Gas	800	900	0.72	0.40	0.29	190
						Total	1.22	
	Canopy Type		Overhead Wall Open One End			Canopy Factor	1.20	
			Specific Extract Flow Rate Required					1.46
			Specific Supply Flow Rate Required					1.24

The cooking equipment specified from the client is a Chinese Wok Range using natural gas as the input source. The canopy design is an overhead wall mounted canopy with a single open end. For example, the Deep Fat Fryer has a plan size of 700 x 400 mm which equates to a 0.28 m² area with an extraction coefficient of 0.5 giving the calculated flow rate 0.14 m³s⁻¹. The remaining values are calculated in **Table 1**. The flow rate is the total for the equipment in the wall mounted extraction canopy, which has a canopy factor of 1.20 due to the single open end. Specific extract flow rate required is calculated to be 1.46 m³s⁻¹ and thus the ventilation plant selection has been selected to fulfil and exceed the requirement.

Plant Selection:

The recommended extract fan unit is a Systemair MUB 042 500EC Multibox. With notable features such as:

- Acoustic box fan which manages to be low noise and low vibration.
- Low sound pressure level at 3 m free field of 30 dB(A) at required power level (1.46 m³s⁻¹).
- Maximum airflow of 1.76 m³s⁻¹ (exceeding the specified extract flow rate by >20%).
- The double skin panels are manufactured from galvanized steel with 20 mm mineral wool insulation.

It should be noted that the client shall confirm with the supplier with the fan selection. 3 phase electric supply can be achieved, for example via a Danfoss inverter with supply from a single phase.

Recommended Attenuation:

A single 500 mm 1D acoustic silencers to be installed directly inline on both the input and output face of the box fan resulting in a total of 2 acoustic silencers. After the output face box fan 1D silencer there will be a high velocity discharge top hat to enable the free-flowing discharge of the odour-controlled extraction air.

Additional noise reduction may be achieved by the installation of anti-vibration mounts between the fan fixings and mounting brackets.

Odour Control:

Purified Air were consulted on the odour control requirements which follow the specifications in the EMAQ guide. This is to ensure that odour control proposal will be in line with local authority requirements and with the system maintained correctly the site will not exhaust nuisance odours leading to complaints from nearby residents. A risk assessment was carried out with the total score of 40 (very high level odour control required). The very high level odour control can be achieved by ESP (Electrostatic Precipitator) followed by carbon filtration (carbon filters are rated with a 0.4 residence time).

The odour control system consisted of two distinct areas. The first stage of control will be ESP with grease and smoke particles filtered out of the exhaust through the filter and an integral sump to collect the oil, grease, and smoke particles. The ESP also ionises at a negative potential which enhances the ionisation of the particles and produces ozone which is chemically oxidizing the inorganic and organic materials in the air which enable the gaseous materials to decompose.

The second stage of the system is 18 carbon filters with a 0.4 second dwell time. With the activated carbon removing the malodorous gases within the commercial kitchen exhaust through chemical adsorption.

More detailed technical specifications are to be found in the Purified Air report.



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Extraction System Plan Drawings:

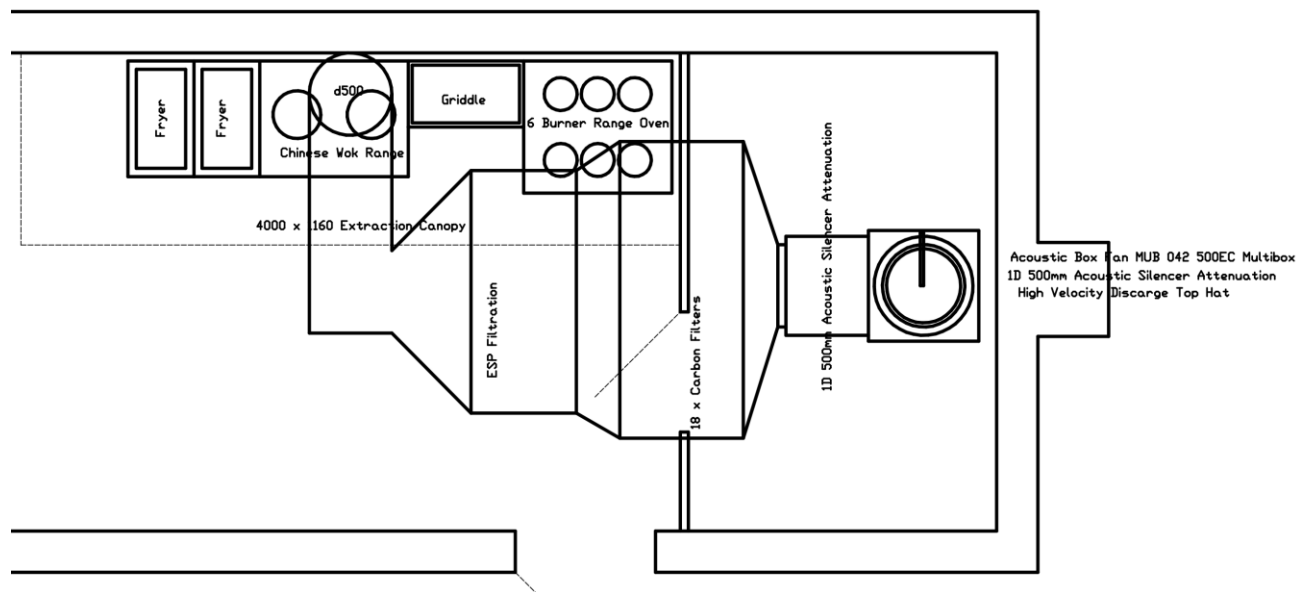


Figure 1: Top-Down View of Ventilation System



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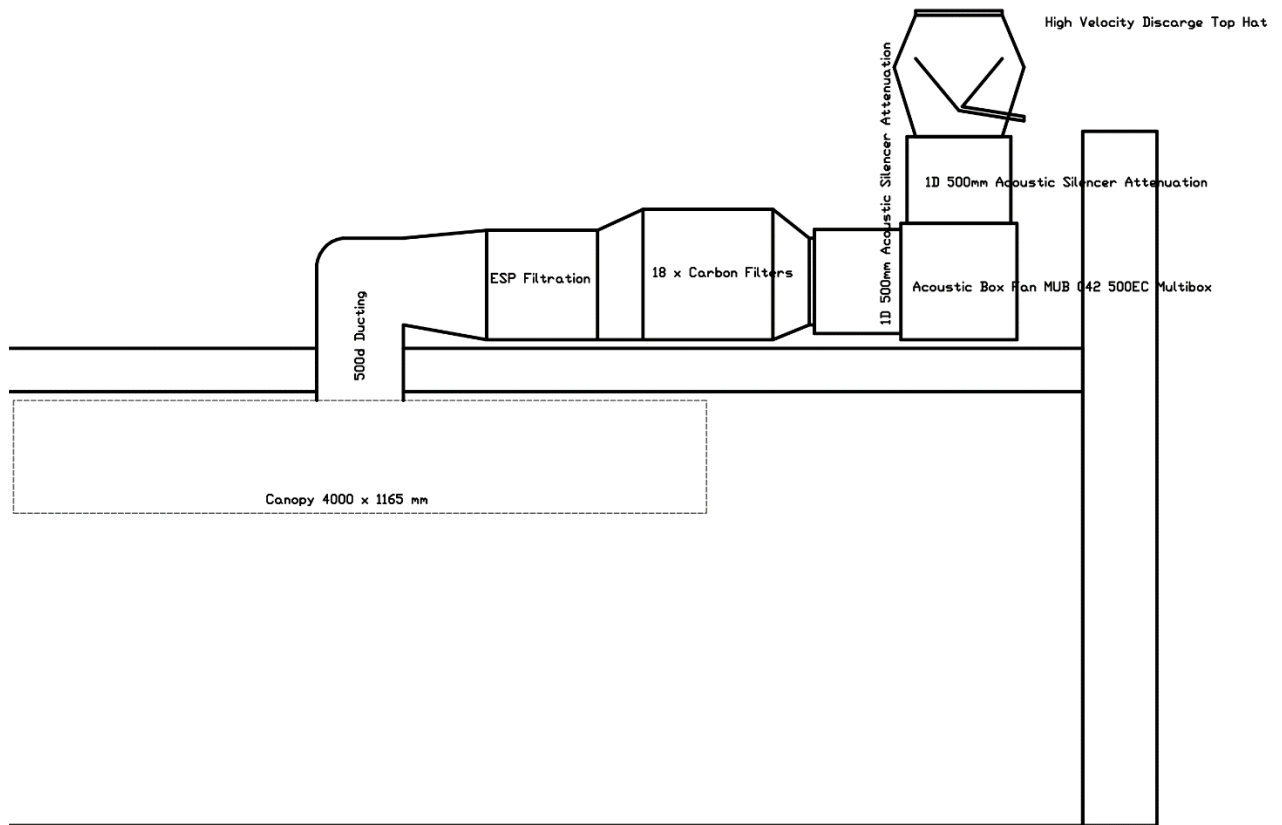


Figure 2: Side View of Ventilation System