SUPPLEMENTARY INFORMATION TO SUPPORT PLANNING

FOR KITCHEN VENTILATION SYSTEM

PREMISES REFERENCE

THE PARROT INN – BROADFORD RD, SHALFORD, GU4 8DW

GOVERNING DOCUMENTATION

'CONTROL OF ODOUR AND NOISE FROM COMMERCIAL KITCHEN EXHAUST SYSTEM' – 5-9-18

APPENDIX 2

Prepared for Kitchen Ventilation Services Ltd

Project Reference KVSD-103

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19-04-2024

1. INFORMATION ON PREMISES.

Premises is a long established country pub/restaurant/hotel which has recently been procured for a major re-development. This includes the conversion of a single storey area previously used for accommodation into a large kitchen.

Menu described as Modern & Traditional British with an emphasis on fresh fish.

Proposed hours of kitchen operation – Mon to Sun 09.00 to 23.00.

RISK ASSESSMENT – As Per Appendix 3

PREMISES – PUBLIC HOUSE

DISPERSION – Moderate – 10 pts – 1m above local eaves level with 10-15m/s efflux velocity

PROXIMITY OF RECEPTORS – Close – 10 pts – Adjacent residents less than 20m away.

SIZE OF KITCHEN – Medium – 3 pts – 30-100 covers.

COOKING TYPE – High – 7 pts – Reduced from 10 pts due to reduced level of fried goods on menu.

TOTAL SCORE = 30 pts

Impact Risk	Odour Control Requirement	Significance Score*
Low to Medium	Low level odour control	Less than 20
High	High level odour control	20 to 35
Very high	Very high level odour control	more than 35

This corresponds to a requirement for High Level Odour Control, identified within governing documentation as:-

High level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.2 - 0.4 second residence time).
2. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.

Our proposal is to use the following to give this level of control:-

- Shepherd Biodegradable Wool Pre-filters to capture a large percentage of initial grease and smoke.
- High-efficiency stainless steel baffle filters within the canopy for grease elimination.
- Controlled Ozone system to eliminate any residual grease and deal with odour.
- Although there is no 100% guarantee of eliminating every trace of odour, this proposal is considered to be of the highest standard to do the utmost to eliminate grease, smoke and odour within the exhaust from the kitchen.

2. PLANS AND DRAWINGS

See accompanying drawings:- KVSD-103-001, KVSD-103-001 and KVSD-103-003

3. PRE-FILTERS

There are 2 no. canopies within the kitchen.

For the main cookline canopy we would suggest a minimum of 9 no. 395x395x45 size baffle filters to reasonably accommodate an SEFR of 2.35m³/sec.

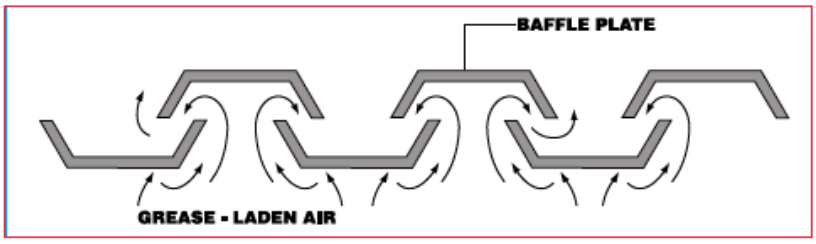
For the secondary cookline canopy we would suggest a minimum of 4 no. 395x395x45 size filters to reasonably accommodate an SEFR of 0.90m³/sec.

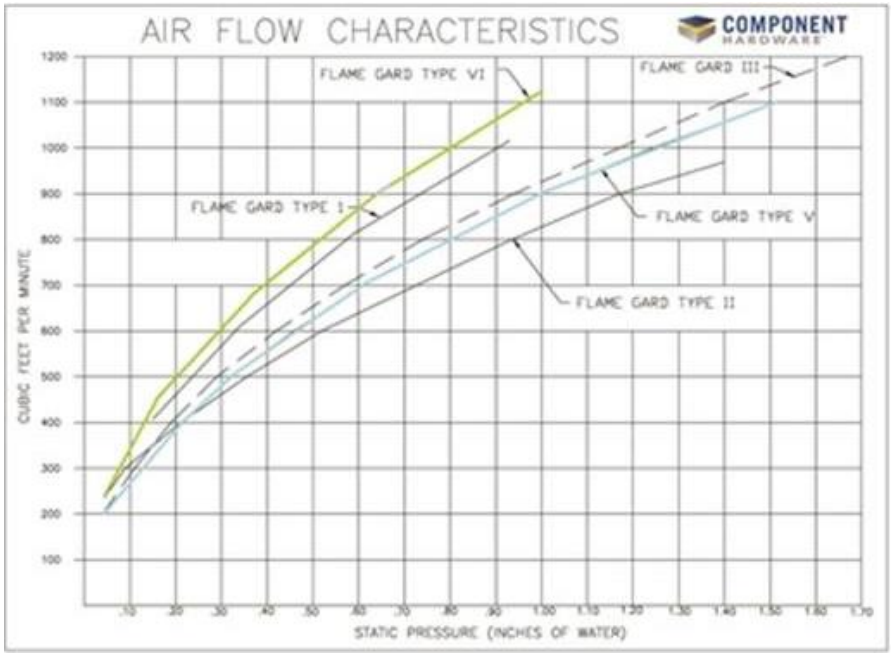
Stainless steel baffle filters – FLAME GARD TYPE III

The affluent from cooking processes contains aerosols of water vapor mixed with evaporated fat or oil. These are carried from the cooking surface by the moving air being drawn into the exhaust hood. Although small, each aerosol is much heavier than the air molecules surrounding it. Thus, when the air stream containing these aerosols strikes the Flame Gard® Baffle System, the inertial force of the moisture-grease aerosol is considerably greater than that of the air molecule. While the air molecule changes direction easily, the aerosol strikes the baffle with considerable force, causing it to "splatter" on the surface.

Whereas the heaviest aerosols, because of their greater inertial force, impinge on the surfaces of the baffles facing and perpendicular to the air flow, the lighter ones remain in the air stream. As the air stream is drawn through the baffle system, the restrictions in area created by the baffles cause the air to increase in velocity while changing direction by 180 degrees. Since the inertial force is a product of the mass and the square of the velocity, this increase in velocity serves to increase the inertial force of the remaining smaller aerosols, causing them to impinge on the inner surfaces of the baffles in the same manner in which the heavier aerosols impinged on the entering surfaces. The design of the baffle system provides several impingement surfaces and two rapid 180-degree direction changes. The grease slides down to the grease trough and then to the collection container.

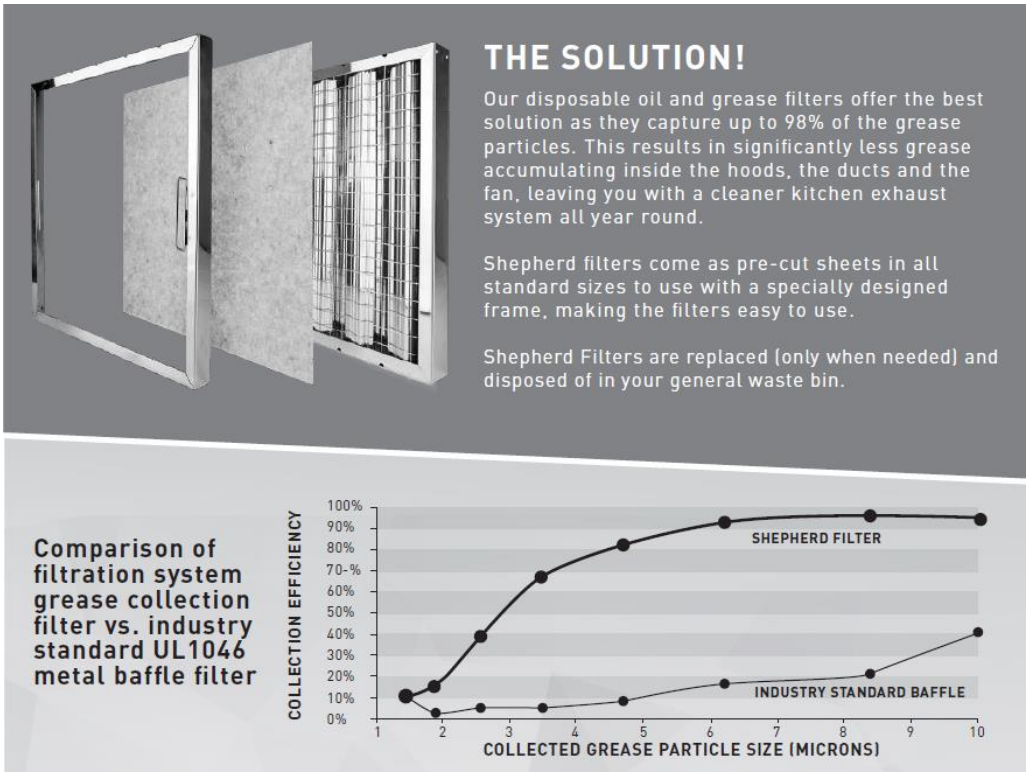
Because Flame Gard® removes grease aerosols from the air stream and drain them away instead of retaining them. There is no build-up of grease in the path of the air Flame Gard® therefore, insures a constancy of air never before achievable with mesh-type filters.





Recommended cleaning canopy filters 2 to 3 times a week.

Both canopies also to have Shepherd Filters fitted to the stainless steel baffle filters. These are combination filters utilising a lambswool media combined with a stainless steel baffle arrangement to give much higher grease and solids removal at the canopy.



4. <u>ESP</u>

We would not offer ESP filtration for this proposal, as the use of the Shepherd Filters fitted to higher efficiency stainless steel baffle filters will offer comparable grease and other solid removal with a well managed maintenance regime.

5. <u>CARBON FILTERS + PRE-FILTERS</u>

We would not offer carbon filtration for this proposal, as the use of the Controlled Ozone system will offer excellent odour control as an alternative with a reduced impact upon maintenance and ongoing operating costs.

6. <u>ODOUR COUNTERACTANT OR NEUTRALISING SYSTEM</u>

Not applicable

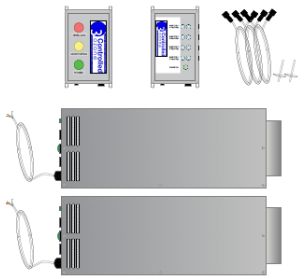
7. UV-C/OZONE SYSTEM

We are proposing an Ozone Generator rather than a UV-C system (which generates ozone via an alternative method)

Proposed system Ecovery CMS 400 system with accompanying control panel and ozone monitor.

This system will generate ozone to accommodate up to 4m³/sec of extract air flow. The system incorporates monitoring technology which adjusts the amount of ozone being generated during the cooking process such that the level measured at the exhaust stays within World Health Organization guidelines. As such this system can be used is low level discharge scenarios where other UV/Ozone systems would need a heavy downstream carbon filter load to 'mop-up' any excess ozone.

CMS400



1 x Control Panel
2 x 20g Injectors
1 x Ozone Monitor
1 x Cable Pack

CMS400 Controlled Ozone Injector

- 10-40 grams per hour (0.9 to 3.8 m³/s capacity)
- Injector dimensions: 2x 450 x 155 x 155mm
- Weight: 2x 4kg
- Stainless steel casement
- Control box dimensions: 250 x 155 x 105mm
- Monitor dimensions: 250 x 155 x 105mm

Our Controlled Ozone System comprises of 1 Control Panel and between 1 and 4 Co Injectors to match the demands of the extraction system. The level of ozone being called off is indicated by the LED bulbs illuminated on the control panel, for example, with LED A and B on Injector 1 delivery is 20grams; LEDs up to A on Injectors 3 = 50grams etc.

CMS200 Injector 1 on its own	A)	Up to 1 m³/s ozone delivery is 10 Grams
	B)	Up to 2 m³/s ozone delivery is 20 Grams
CMS400 Injectors 1 and 2 on	A)	Up to 3 m³/s ozone delivery is 30 Grams
	B)	Up to 4 m³/s ozone delivery is 40 Grams

CMS SYSTEM
The Completely Monitored System

The Safe Intelligent Way to Harness the Benefits of Ozone to Control Cooking Odours

Ozone has long been recognised as a very effective medium for the neutralising of cooking odours, and injection into the kitchen extraction system has proven to be effective in the control of odour emissions, however, ozone emissions must be within safe levels.

Working within the accepted industry guidelines of 1 gram per 0.09 m^3/s of air volume @ 1.5 seconds of dwell time within the ducts, to achieve neutralisation of 80% of cooking odours and maximum discharge levels of 0.3 ppm ozone concentration, the Controlled Ozone products are designed to be the first fully controllable, energy efficient, future proof units developed to reduce cooking odour emissions.

The monitoring processes of the CoRange start with the production levels of ozone being controlled via an electronic air-pressure sensor within the control panel, which controls the concentration ratio of air/ozone in the extract ducts.

To ensure the correct concentration the CoRange Injector will increase its output of ozone by 10 grams per every 1 m^3/s of air volume within the duct,

Should ozone emissions from the extract system exceed permitted levels a second stage of control via a discharge monitor situated at the end of the extract duct is an optional addition, this monitor is factory set at 0.3 ppm of ozone to comply with HSE guidelines for discharge to atmosphere within 10 metres of the closest habituated premise.

Benefits

- Fully controllable by information gathered from both electronic air pressure switch and if required by ozone monitor
- Will deliver correct concentration of ozone from 0.8 to 8 m^3/s of air flow
- Delivers low dwell times as it can inject active ozone into the system at the earliest possible opportunity
- Will not exceed permitted ozone discharge levels
- Can deliver ozone to multiple points within the extraction system to suit requirements ie. Plenum, ducts either before or after fans and inline filtration
- Easy to install
- Additional injectors can be added to the system easily
- Only uses power when it is required
- Control Panel can be sited away from injectors – in a position that is easy to view
- Outputs for Building Management Systems and Data loggers
- Two years warranty

ThMS System comprises of 1 off CMS\VM Control Panel and between 1 and 4 CMS Injectors to match the demands of the extraction system.

The level of Ozone being called off is indicated by the LED bulbs illuminated on the control panel, for example, with LED A and B on Injector 1 delivery is 20grams; LEDs up to A on Injectors 3 = 50grams etc.

Injector 1 on its own	A)	Up to 1 m³/s the ozone delivery is 10 Grams
	B)	Up to 2 m³/s the ozone delivery is 20 Grams
Injectors 1 and 2 on	A)	Up to 3 m³/s the ozone delivery is 30 Grams
	B)	Up to 4 m³/s the ozone delivery is 40 Grams
Injectors 1, 2 and 3 on	A)	Up to 5 m³/s the ozone delivery is 50 Grams
	B)	Up to 6 m³/s the ozone delivery is 60 Grams
Injectors 1, 2, 3 and 4 on	A)	Up to 7 m³/s the ozone delivery is 70 Grams
	B)	Up to 8 m³/s the ozone delivery is 80 Grams

To ensure that the levels of ozone being discharged are within guidelines the Co515 Monitor will cut the ozone production by 10g of ozone at a time until the monitor registers the desired ppm concentration of ozone at discharge.

CMS Ozone Injector

150 x 150 x 330 mm Stainless Steel Case
2x 10 Gram per Hour Gaseous Ozone Reactors
1x 5 Pin
1x Power on Indicator Lamp
1x Ozone Production Lamp

CMS / CoVM53 Control Panel

155 x 200 x 95 mm
LED Indicator Lamps
Electronic Air Pressure Sensor
4x 5 pin Monitor Output Sockets
1x 5 Pin CMS Output Socket
1x 5 Pin Data Logger Output Socket

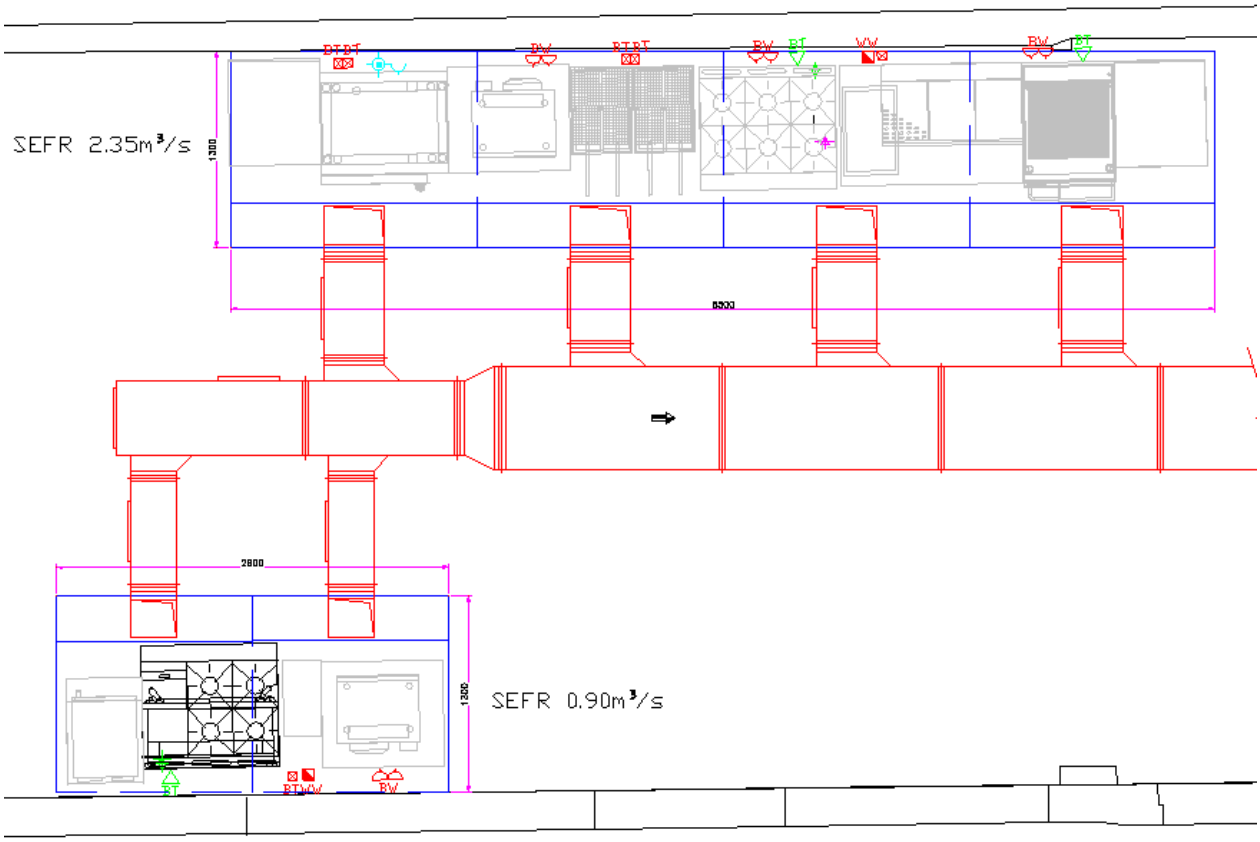
CMS / Co515 Ozone Monitor

155 x 200 x 95 mm
1x Power on Indicator Lamp
1x Monitoring Indicator Lamp
1x Dwell Indicator Lamp

8. COOKER HOODS

Main cookline canopy size 6500 x 1300 x 500/300. Secondary canopy 2600 1300 x 500/300.

Due to height restrictions canopies are proposed to be constructed with the extract filter bank being at the front rather than the rear edge. This offers no reduction in performance.



For the main canopy, the Specific Extract Flow Rate (SEFR) was calculated at 2.35m³/sec using the Thermal Co-efficient Method as advised by DW/172:2018. See accompanying SEFR calculation sheet.

For the secondary canopy, the Specific Extract Flow Rate (SEFR) was calculated at 0.90m³/sec using the Thermal Co-efficient Method as advised by DW/172:2018. See accompanying SEFR calculation sheet.

Canopies designed and manufactured to DW/172:2018 'Specification for Kitchen Ventilation Systems.

For main canopy, 9 No. 395w x 395h baffle filters/Shepherd filters give a face velocity at filters of 1.88m/sec. Should this be considered excessive, there is room within the canopy extract plenum to fit additional filters and thus reduce the face velocity.

For secondary canopy, 4 No. 395w x 395h baffle filters/Shepherd filters give a face velocity at filters of 1.63m/sec. Should this be considered excessive, there is room within the canopy extract plenum to fit additional filters and thus reduce the face velocity.

Filtered fresh air is mechanically introduced the kitchen to satisfy requirements suited to the level of gas fired appliances within the cooklines. This is shown on system proposal drawings.

9. SYSTEM OPERATION

TOTAL SPECIFIC EXTRACT FLOW RATE – 3.25m³/sec

DWELL TIME OF EXHAUST THROUGH CARBON FILTERS – N/A

VOLUME OF KITCHEN – 150m³ approx.

EFFLUX VELOCITY – 12m/sec minimum

10. FLUE DESIGN

See accompanying Drgs. KVSD-103-001, KVSD-103-001 and KVSD-103-003

All system design is to the governing BESA Design Guides DW/172:2018 + DW144 + TR/19

11. NOISE & VIBRATION

Kitchen extract fan is fully mechanically isolated within its acoustic enclosure via AV mounts and flexible connections.

Should further anti-vibration measures be required, gallows brackets supporting extract riser can be further mechanically isolated via AV mounts/anti-vibration material.

This design has been developed with the input of the appointed acoustician RBA Acoustics Ltd, and all recommended treatment to satisfy Local Authority conditions have been incorporated.

12. MAINTENANCE

Canopy pre-filters as below:-

Lambswool element to be replaced when soiled and baffle filter element to be cleaned 2-3 times a week.

Ozone system to be maintained by an approved contractor every 12 months.

Ductwork to be cleaned every 6 months as a minimum to recognised industry standards – BESA TR/19.

Maintenance of kitchen extract fan as per manufacturer's O&M information – every 6 months by approved specialist contractor. This can be amalgamated with the obligatory extract system full clean which is the operator's responsibility.

REFERENCED DOCUMENTATION

EMAQ+ 'CONTROL OF ODOUR AND NOISE FROM COMMERCIAL KITCHEN EXHAUST SYSTEM' – 2nd EMAQ EDITION 05-06-22

BESA 'SPECIFICATION FOR KITCHEN VENTILATION SYSTEMS DW/172 SECOND EDITION 2018'

BESA 'SPECIFICATION FOR SHEET METAL DUCTWORK DW/144 THIRD EDITION 2016'

BESA 'GUIDE TO GOOD PRACTICE. INTERNAL CLEANLINESS OF VENTILATION SYSTEMS THIRD EDITION 2019'