

SUPPLEMENTARY INFORMATION TO SUPPORT PLANNING  
FOR KITCHEN VENTILATION SYSTEM

PREMISES REFERENCE

46 Market St, Eastleigh Hants SO50 5RB

GOVERNING DOCUMENTATION

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

APPENDIX 2

Prepared for Fernandes Elnety

Project Reference FE-001

Dave Hayman B.Eng (Hons.)

Independent Commercial Kitchen Ventilation Consultants

03-11-2022

## 1. INFORMATION ON PREMISES.

Premises is an end of terrace commercial concern on a busy shopping street with a public access alley way beside it....with no vehicular access.

It has a first floor residential dwelling above the current shopfloor area and a large single story rear extension to accommodate new commercial kitchen ventilation plant.

Client is looking to remodel the current ground floor shopfloor area to become an Oriental restaurant.

All ventilation plant will be external.

Proposed hours of operation – 11.00 to 22.00 Mon to Sat. 11.00 to 20.00 Sun

### **RISK ASSESSMENT – As Per Appendix 3**

#### **PREMISES – ORIENTAL RESTAURANT**

DISPERSION – Poor – 15 pts – Not low level but below eaves at 10-15m/s

PROXIMITY OF RECEPTORS – Close – 10 pts – Neighbours less 20m away

SIZE OF KITCHEN – Medium – 3 pts – 35 to 40 Covers

COOKING TYPE – High – 7 pts – Oriental/Noodle House

**TOTAL SCORE = 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 utilise the rear extension for the kitchen extract filtration and supply plant with 'noisy' plant located as far as practicable from the first floor residential.

The client has retained the services of an acoustic specialist so due diligence has been recognised in developing the ventilation design to minimise impact of noise and vibration.

We propose a filtration system utilising ESP filtration followed by carbon filtration with pre-carbon protection.

## 2. PLANS AND DRAWINGS

See accompanying drawings – Drg. Nos. FE-001-0001 and FE-001-0002

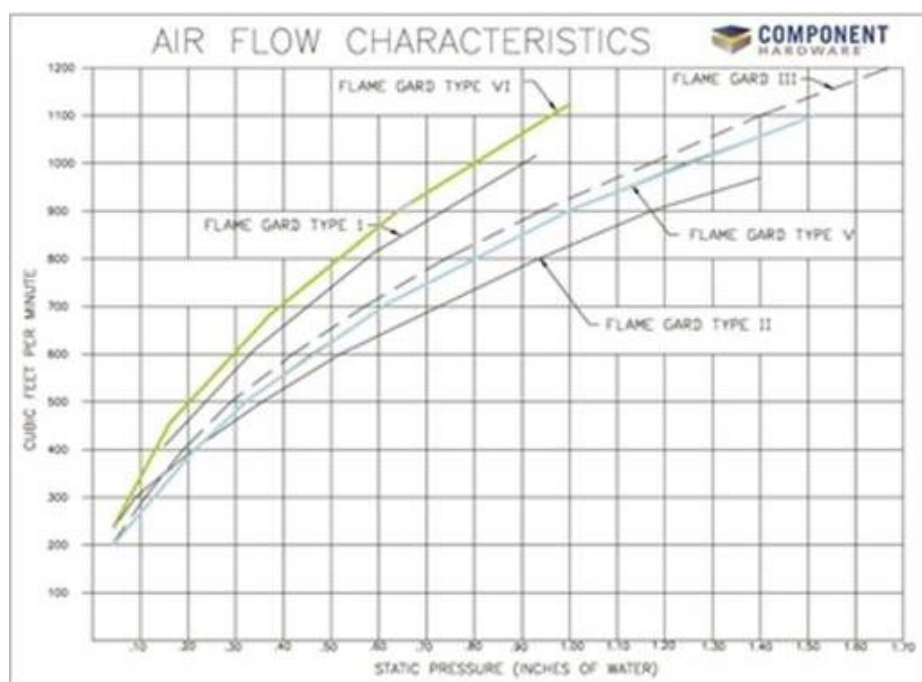
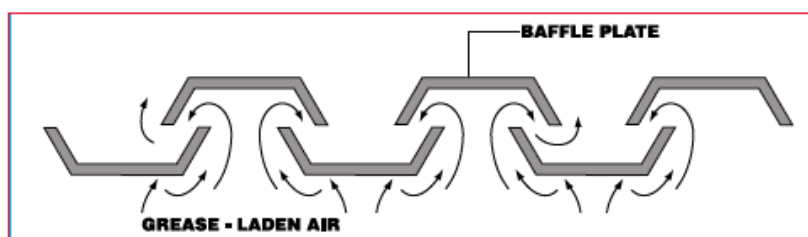
### 3. PRE-FILTERS

#### 5 No. stainless steel baffle filters – FLAME GARD TYPE III – size 495x495x45

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 2 to 3 times a week.

#### 4. ESP

2 No. Purified-Air ESP 3000E units stacked in a single pass arrangement with a nominal combined air flow rate of 2.8m<sup>3</sup>/sec. This unit is preferred due to the inclusion of a dedicated oil sump for grease collection.

See accompanying Purified Air literature.

## Electrostatic Precipitation (ESP) Filter Unit



### ESP 3000

|                       |                              |
|-----------------------|------------------------------|
| <b>Max Air Volume</b> | up to 1.4m <sup>3</sup> /sec |
| <b>Dimensions</b>     | W900mm   H630mm   D640mm     |
| <b>Weight</b>         | 85KG                         |
| <b>Power</b>          | 30W                          |

### KEY FEATURES

- Eliminates up to 98% of smoke, oil and grease particles
- Filters particles down to sub-micron levels
- Produces Ozone to help reduce malodours
- Designed with an integral sump
- Modular in design
- Specifically designed for commercial kitchen application
- Energy efficient: – uses no more than 50W
- Greatly reduces grease build-up within the duct run.

Our Electrostatic Precipitators or ESP's have been specifically designed for kitchen extract systems and have integral sumps to collect the oil, grease and smoke particles filtered out of the exhaust.

This not only simplifies servicing but eradicates potentially dangerous spillage from the bottom of the units and greatly cuts down on buildups of grease within the ducting.

The ionisation voltage has been designed to run at a negative potential which enhances the ionisation of particles and also produces more ozone which is helpful in reducing cooking odours.

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

## 5. PRE-CARBON FILTERS & CARBON FILTERS

Pre-Carbon Filters – 6 No. Purified Air - VL4-2020 – Size 594x594x95

### V Line Panel Filter Economy Pleated Intrepid Media

#### General Description

The V Line pleated Panel filter is a standard capacity disposable product offering a better than basic level of filtration, or pre-filtration in HEVAC applications. This product is made using patented Kimberly Clark media which delivers a constant level of filtration over its life.

#### Construction

This product is constructed by bonding a pleat pack of Intrepid V Line media into a water repellent AquaKote card frame

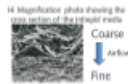
#### Features

The Frame is made from AquaKote card which has

- Superior tear resistance when wet
- Great dry tear resistance and
- Manufactured from a renewable source.

#### Kimberly Clark Patented Intrepid Media

- Has a Graduated Density for even dirt loading, resulting in greater dust holding
- Hydrophobic – so will not load with moisture in the air
- Has a constant efficiency due to its extra electrostatic charge
- Superior Efficiency Vs Particle size (see table)
- Has a low pressure drop
- Is made from continuous fibres so will not shed



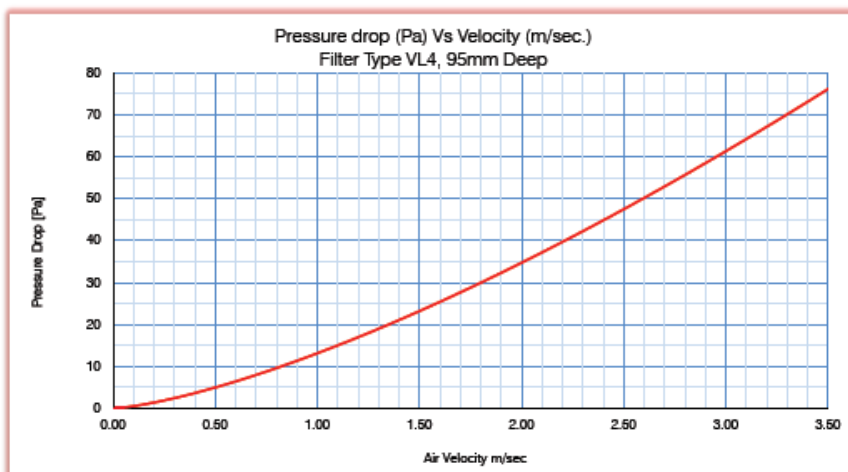
#### Operating Temperature

Continuous 80 °Centigrade

Test Comparing Filtration efficiency V's different sized particles. Intrepid Media V's Cotton Polyester Filters

| Particle Size Range(mm) | Initial Fractional Efficiency(%) |                                    |
|-------------------------|----------------------------------|------------------------------------|
|                         | V Line Intrepid                  | The "best" Cotton Poly Alternative |
| 0.3-0.4                 | 7                                | 2                                  |
| 0.4-0.55                | 15                               | 6                                  |
| 0.55-0.7                | 28                               | 11                                 |
| 0.7-1.0                 | 41                               | 19                                 |
| 1.0-1.3                 | 52                               | 24                                 |
| 1.3-1.6                 | 58                               | 28                                 |
| 1.6-2.2                 | 63                               | 32                                 |
| 2.2-3.0                 | 67                               | 36                                 |
| 3.0-4.0                 | 70                               | 37                                 |
| 4.0-5.5                 | 71                               | 38                                 |
| 5.5-7.0                 | 72                               | 38                                 |
| 7.0-10.0                | 73                               | 39                                 |

| Filter Class<br>EN 779:2012     |               | G4                    |
|---------------------------------|---------------|-----------------------|
| Filter Depth                    | Rated Airflow | Initial Pressure Drop |
| 20mm                            | 1.5m/sec      | 45Pa                  |
| 45mm                            | 2.0m/sec      | 45Pa                  |
| 95mm                            | 2.7m/sec      | 53Pa                  |
| Final Recommended Pressure Drop |               | 200Pa                 |



Carbon Filters – 18 No. Purified Air Sitesafe PA240824 – 594x196x597 – giving dwell time of 0.288sec

We manufacture Sitesafe carbon filters, these innovative carbon units measure 594x196x597mm, three combining to 594x594x597mm, directly replacing our original carbon blocks whilst providing exactly the same filter performance as an existing full size cell.

Their advantage is that they only weigh 18kg each against the 68kg of our original blocks. This takes the strain out of fitting and servicing, allowing only one engineer to complete the task where two had been previously required.

Our Sitesafe carbon filters use panels of activated carbon to remove the malodorous gases within the commercial kitchen extract duct through the process of chemical adsorption. By installing our ESP units before our Sitesafe filters, the carbon life span is greatly increased, allowing it to nullify malodours at optimum efficiency for much longer.

|                                                                                    |                          |
|------------------------------------------------------------------------------------|--------------------------|
|  |                          |
| Sitesafe PA240824                                                                  | Sitesafe 3 x PA240824    |
| Size 594x196x597                                                                   | Size 594x594x597         |
| Gross Weight 17.95kg                                                               | Gross Weight 53.85kg     |
| Carbon Weight 16.6kg                                                               | Carbon Weight 50.00kg    |
| Rated Airflow 1200m³/hr*                                                           | Rated Airflow 3600m³/hr* |
| Pressure Drop 120Pa                                                                | Pressure Drop 120Pa      |

6. ODOUR COUNTERACTANT OR NEUTRALISING SYSTEM

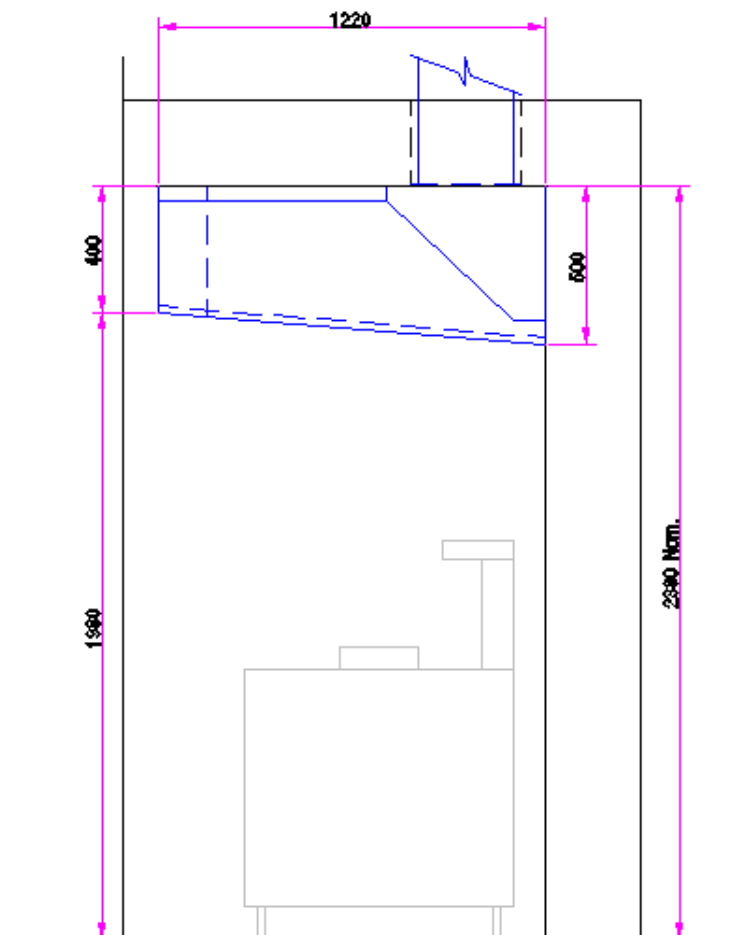
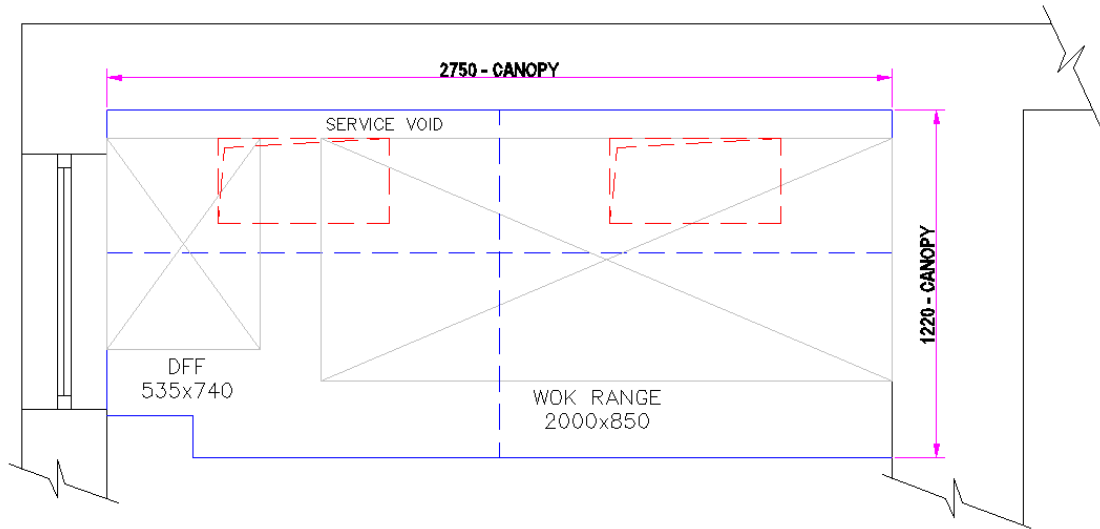
Not applicable

7. UV-C SYSTEM

Not proposed

## 8. COOKER HOOD

Proposed canopy size 2750x1220x500/400.



Designed and manufactured to BESA Specification DW/172:2018 'Specification for Kitchen Ventilation Systems.

Specific Extract Flow Rate (SEFR) calculated at  $2.16\text{m}^3/\text{sec}$  using the Thermal Co-efficient Method as advised by DW/172:2018.

See accompanying SEFR calculation sheet for proposed cooking appliances.

Extract via canopy with minimal overhangs for appliances below hood as dictated by DW/172:2018.

An accompanying mechanical fresh air system has been proposed.

Face Velocity at canopy filters –  $2.07\text{m}/\text{sec}$ .

## 9. SYSTEM OPERATION

SPECIFIC EXTRACT FLOW RATE –  $2.16\text{m}^3/\text{sec}$

CARBON DWELL TIME – 0.288sec

VOLUME OF KITCHEN –  $77\text{ m}^3$

EFFLUX VELOCITY –  $12\text{m}/\text{sec}$

## 10. FLUE DESIGN

All details shown on accompanying Drg. Nos. FE-001-0001 and FE-001-0002

This design is dependent upon the client using exactly the cookline equipment as shown in these drawings.

## 11. NOISE

Design incorporates full recommendations from Qt Acoustics and their schedule Ref. 11827.

## 12. MAINTENANCE

Recommended maintenance involves regular changing of carbon pre-filters (every 3 to 4 months) and carbon filters (every 6 to 12 months). Checks should be made after 3 months and 6 months respectively to assess cleanliness of filters and the regime of replacement can be curtailed to actual usage.

System should always be run with both sets of extract filters in place - carbon filters must always be protected by pre-filters.

ESP should be serviced every 6 months by approved specialist contractor.

Maintenance of kitchen extract fan and supply fan as per manufacturer's O&M information.

Canopy filters should be deep cleaned 2 to 3 times a week.

Fresh air filter media should be changed every 4 to 6 months.