

Design Brief

for

Kitchen Ventilation Systems

at

**Ciaooo Pizza
Sky Gardens
Manchester**

for

**Ciaoo Pizzeria Ltd
62-64 Swan Street
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by

SWAN Projects

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1. Kitchen Ventilation Systems Description

1.1 Pizza Oven and Fryer Extract Ventilation System

The pizza oven manufacturers do not specify an extract air rate, so with the outlet size of 250mm dia, an extract rate of $0.287\text{m}^3/\text{s}$ has been calculated, which, along with a calculated extract rate of $0.213\text{m}^3/\text{s}$ for the fryer canopy,

The total extract volume is $0.5\text{m}^3/\text{s}$ with duct velocities, no higher than 6.75m/s

The DEFRA risk assessment for the pizza extract system, would indicate a high level of odour control, due to exhaust being at low level.

The pizza oven extract fan would be a Flakt Woods Estoc Targe (Powerbox) model 67-450-1, high temperature rated with the motor out of the airstream, and with an external pressure availability of 500pa, however, once the final ductwork route has been established/confirmed, the system pressure should be recalculated, if different from the design drawing layout,

The fan should have a high temperature rated sound attenuator at the inlet and the outlet of the extract fan.

The fan should have a speed controller.

Extract ventilation ductwork, would be stainless steel, double skinned with insulation between the 2 x skins.

The internal diameter of the ductwork from the fryer canopy should be 200mm diameter, increasing to 315mm dia when the pizza oven exhaust is joined to the system

The 2 x fryers will be positioned under a canopy/hood, manufactured from 20swg 304 grade stainless steel, with a continuous perimeter condense channel, standard baffle type grease filters to the rear elevation, and a high temperature rated LED strip light within

The open end of the extract ductwork, above the canopy, would also include a counterbalanced air-dilution inlet damper.

The ductwork should include sufficient access/cleaning doors or removable cap ends, for internal cleaning of the ductwork system

The stainless steel ductwork system should be supported via the brackets specified by the manufacturers of the stainless steel ductwork.

Odour Control will include 1 x UVO1000 module with a 150mm dia duct connection, 2 x ESP1500 modules in a 'double pass' configuration, and a carbon filter module, containing 6 x site safe carbon cassettes, each cassette measuring 600mm x 600mm x 200mm (nominal) and contained in a purpose built housing.

The odour control equipment should be manufactured by Purified Air Ltd

The exhaust terminal, should be an open duct, clamped to the inner face of the perforated wall cladding, should have an overall width of 300mm, and a height of 1350mm, to ensure an exhaust velocity of approx. 2.5m/s

1.2 Fresh (replacement) Air Ventilation System

As the pizza oven is gas fired, DEFRA guidelines call for fresh replacement air ventilation, at a rate of 80% of the extract air, so the fresh air volume is calculated at 0.4m³/s

The fresh air fan would be a Flakt Woods 31 Maxfan Compact. model 315mm dia with an external pressure availability of 180pa, however, once the final ductwork route has been established/confirmed, the system pressure should be recalculated, if different from the design drawing layout,

The fan should have a sound attenuator at the inlet and the outlet, and have a speed controller.

The fresh air ductwork would be manufactured and installed in accordance with the HVCA DW144 specification, with access doors at each item of equipment.

Air would be supplied to the kitchen via 2 x supply grilles, as shown on the design drawing No C705/1

The system should have an in-line electric heater battery, with fully integrated controls, that can raise 0.4m³/s of air by 21°C

The heater should have a temperature/air pressure probe, to allow the heater to be activated when there is proven airflow, and to stop the heater from operating when a set duct temperature of +20°C is measured.

A standard G4 filter module, to prevent ingress of insects/dust should be positioned between the intake louver and the electric heater.

The intake louver should be an open duct, clamped to the inner face of the perforated wall cladding, should have an overall width of 300mm, and a height of 1350mm, to ensure an intake velocity of approx. 2.0m/s

2. Gas Safety (interlock) system

As the pizza oven is gas fired, it is a legal requirement to have a gas safety system installed.

This will comprise a gas safety panel, with current sensing technology, and an emergency stop button on the panel.

The panel will be connected to both the extract and fresh air fans, and also to a gas solenoid valve, positioned in the main gas supply pipe to the pizza oven.

Once the extract and fresh air fans are activated, and proved by the current sensing panel, the gas solenoid valve will open, allowing gas supply to the oven.

Should either fan be switched off, or go into fault, the gas solenoid valve will close, prohibiting gas supply to the oven, until the fan(s) are switched back on, or the fault is rectified.

If the emergency stop button is pressed, then the gas solenoid valve will close, prohibiting gas supply to the oven, until the issue is resolved, and the emergency stop button is re-set.

The gas safety panel should be located at the exit door/area of the kitchen.

If the panel is located elsewhere, then an auxiliary emergency stop button must be added to the system, and positioned at the, or every exit door of the kitchen.

3. Extract and Fresh Air rates calculations

The Fryer Canopy extract air rate, has been calculated, in accordance with DEFRA Guidelines section 4.2.2 Thermal Convection Method.

The total cookline calculation is indicated on the flow rates data sheet

The above provides an extract airflow rate of $0.17\text{m}^3/\text{s}$

As the canopy is open at both ends and has a factor of 1.25

Therefore the total extract volume for the canopy is $0.213\text{m}^3/\text{s}$

The Pizza Oven Extract rate is not specified by the manufacturers (Vesuvio) however the exhaust connection is 250mm dia, so an extract volume of $0.287\text{m}^3/\text{s}$ has been selected

The fresh Air replacement rate is calculated as 80% of the extract air rate,

Therefore the fresh air replacement airflow rate is:-

$$0.5\text{m}^3/\text{s} \times 0.8 = 0.4\text{m}^3/\text{s}$$

System Static Pressure (in pascals) calculations are based on the design drawing, and are as per the following calculation sheets.

4.0 DEFRA Risk Assessment

A site survey was carried out on 27th June 2022, and all items on the DEFRA risk assessment form were investigated and assessed.

Pizza Oven Extract

Dispersion will be via a low level (3.0m afl) wall louvre, so scores **20**

Proximity of Receptors was assessed to be between less than 20m and receptors are both residential and commercial , it was subsequently scored **10**

Size of Kitchen falls into the medium size of kitchen, between 3 and 100 covers, so scores **3**

Cooking type is pizza etc, so was scored **1**

Total Score is **34** which falls into the 'high level' of odour control, so full odour control is required, with UV, ESP and Carbon filter modules

5. Fresh Air Ventilation Equipment details

Fresh Air Fan will be a Flakt Woods 31 MaXfan Compac

Data sheet enclosed, however system pressure estimated at 180pa, and will be re-calculated once final installation drawing completed.

Sound attenuators will be as manufactured by Northern Fans Ltd, and will be the equivalent to 2 x Diameter, (no internal pod) and indicated in the red box on the enclosed data sheets.

Heater Battery should be mains electrical powered, with integral controls, and capable of raising $0.4\text{m}^3/\text{s}$ by 25°C which will allow for an ambient of -5°C

Filter Module will be manufactured to accommodate G4 filter panels as manufactured by Camfil Ltd.

6. Extract Ventilation & Odour Control Equipment details

Pizza oven and Kitchen Extract Fan will be Flakt Woods Estoc Targe (powerBox 67-450-1)

Data sheet enclosed, however system pressure estimated at 500pa, and will be re-calculated once final installation drawing completed.

Sound attenuator will as manufactured by Northern Fans Ltd, and will be the equivalent to 2 x Diameter, (no internal pod) and indicated in the red box on enclosed data sheets.

UVO1000 module will be as manufactured by Purified Air Ltd

ESP1500 modules (2 off) in a 'double pass' configuration, will be manufactured by Purified Air Ltd,

Data sheet enclosed

Carbon Filter Module will be manufactured by Purified Air Ltd, and each 600mm x 600mm x 600mm cube will comprise 6 x 200 x 600 x 600 site safe carbons

2 x carbon cubes in total

Data sheet enclosed

7.0 Cookline Equipment Data

VESUVIO G -6 gas fired pizza oven
Silverlink 600, 6kW (2 x 3kW) twin fryer (electric)

8. Design Drawing

C705/1 Kitchen Ventilation Design