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# Prior Approval Information

## Mechanical Ventilation & Environmental Control Equipment



KFC Restaurant  
Kings Cross

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## SECTION 1 : KITCHEN EXTRACT SYSTEM DETAILS

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## 1.01 GENERAL

This specification covers standards for the selection, supply, delivery, installation, testing and commissioning of Kitchen ventilation in accordance with HVCA Specification DW/172 for Restaurant developments. The cooking of food involves appliances releasing heat, steam, fumes and airborne grease.

The cooking process requires extract ventilation for the removal of fumes, smoke and vapours generated by the cooking activity.

## 1.02 OBJECTIVES

To provide an acceptable working environment for all kitchen staff by the extraction / removal of heated air, fumes, steam and cooking smells, as well as preventing condensation. The extract canopies are designed to enable ease of access for cleaning throughout the system and distribution ductwork and primary fan equipment.

## 1.03 ODOURS

All fumes and odours from the food preparation areas of the kitchens shall be mechanically extracted utilizing an extract canopy specifically designed and installed by a nominated specialist to remove all cooking odours. This will take into account the dimensions of the kitchens in question, the type of grease filters used in the application and the cooking equipment within the grouped cooking range.

## 1.04 NOISE

All fan equipment, ductwork and filter housing shall be so mounted and installed so as not to give rise to a noise nuisance. Any noise generated by the extraction or supply systems as a whole shall not exceed the pre-existing hourly background noise level at nearby residential accommodation by more than 5dB(A). When measured and rated in accordance with BS 4142, entitled Method of Rating Industrial Noise Affecting Mixed Residential and Industrial Areas 1997

## 1.05 LOCATION

The canopies will be sited over the grouped cooking equipment, or any heat, steam or grease producing equipment.

## 1.06 SIZE

The canopies shall overhang the grouped cooking range by not less than 250mm and will be mounted at a height no lower than 2000mm from the finished floor level to the underside of the canopy.

## 1.07 FIRE SUPPRESSION (NOT APPLICABLE ON FREE STANDING BUILDINGS)

Were specifically required or instructed, an automatic fire suppression system will be installed to protect the cooking appliances, extract canopies and associated distribution ductwork. Fire suppression systems will be of the "Amerex" type, tested and approved to UL 300 specification with automatic and manual activation. Fire suppression systems will be designed, installed and commissioned by LPC1204 approved installers.

## 1.08 CANOPY CONSTRUCTION

The extract canopies shall be constructed from 18 swg (1.22mm thick) stainless steel type 304. All visible surfaces shall be ultra fine grain satin polished to 280 grit, and Polythene protected during installation. All constituent parts must be suitable for use in a working kitchen environment.

The canopies shall be cut, punched and folded into sub sections of up to 6000mm in length and factory assembled by means of computer controlled seam welds, and non visible mechanical fixings. All joints shall be formed to enable ease of cleaning with no cut edges or corners, which shall become an encumbrance to cleaning requirements. All metal edges shall be rolled smooth and shall be free from any sharp edges or projections.

The canopy lower edge at each end and the rear shall be formed into a condensation channel with inclined internal elevation to simplify cleaning requirements, the inner edges having crush folded safety finish.

When constructed, the canopies should be flush with sealing surface as should any ducting within the kitchen itself. This is to prevent the creation of a shelf which would permit the collection of dust etc. where this is not possible infill panels are to be fitted so there are no dust traps. All infill panel requirements shall be constructed from the same material as the canopy.

## 1.09 SPLASHBACKS

Stainless steel sheets of the same grade and polish finish should be fitted to the rear and side walls below the canopy. This should be, as a minimum, the width of the canopy and should be flush with the base of the canopy, the wall and down to the floor. All joints between the splashback, cooking equipment and the canopy should be sealed with a silicone sealant. Silicone sealant should be applied only when absolutely necessary to joints in a neat finish not protruding the metal surface. Silicone joints will not be accepted as an alternative for a welded or poor constructed joint.

## 1.10 LIGHTING

The canopies shall be fitted with vapour proof LED lamps suitable for use in damp atmospheres. The lamps should have a diffuser, which can also withstand high temperature. Recess lighting is preferred to bulkhead fittings. Lighting within the canopies shall provide a minimum of 500 lux at the working surface.

## 1.11 FAN EQUIPMENT

All fans are to adequately sized to overcome the system resistance and to provide the required extraction/supply rate specified. Multiple fans rather than single units should be used to reduce noise in instances when the system resistance is inherently high.

All fan motors are to be totally enclosed, air cooled, class F rated, with motor protection IP55. All single phased motors are to have "sealed for life" bearings. The fan motor should have an operating temperature of -40 deg. Cent. to +50 deg. Cent.

All fans will be provided with suitably rated on/off variable speed controllers, and all fan equipment having local isolators and emergency stops fitted adjacent to the applicable equipment. Fans should be fitted with necessary resilient mounting to prevent noise and vibration transfer to the kitchen, other unit rooms and the external environment.

The Contractor will ensure that the fans are capable of producing the required air volumes as specified. All fans and motors arrangements shall be capable of running at 10% over the maximum specified duty.

The Contractor shall ensure that fan motors are suitable for the electrical supply available to the building.

Casing mounted fans shall have internal vibration isolation. Duct mounted fans shall have flexible duct connections consisting of or be externally protected by material having a fire penetration time of at least 15 minutes when tested in accordance with BS 476 Part 8 and shall comply with BS 476 Part 7, Section 2, Clause 2.8 (Class 1 : surface of a very low flame spread properties).

Fans shall be selected to meet the specified noise criteria.

The construction of the fan shall be such that is capable of withstanding the pressures and stresses experienced under continuous operation.

Fan casings shall be constructed such that access can easily be gained to motors and impellers, and that these can be removed if required for maintenance or replacement.

### 1.12 GREASE FILTERS

The canopies should be fitted with internal extract plenum(s) with grease filters cells across its length. The filters should be of a sufficient size and number to ensure that the velocity through them does not lead to grease "carry over" into the ductwork and onto the extract fan.

The grease filters should have rigid frames in stainless steel baffle filters of sufficient density to capture and hold airborne grease. Filters shall fit correctly into holding frames to eliminate any extracted air passing around the filter.

The extracted fumes shall first be passed through these filters designed to remove the grease entrained in the fumes; the filters shall be removed and cleaned of their deposits at the end of each working day.

The grease filters should be easily removed and should be adequately sized to fit easily within dishwashers to facilitate easy cleaning.

The location of the filters should be such that it is not affected by the heat of wall mounted equipment, such as grills. This is particularly important with replaceable filter fittings, which carbonize at high temperature.

### 1.13 DISTRIBUTION DUCTWORK

Kitchen canopy exhaust ductwork shall be constructed and installed in accordance with HVCA Specification DW/172 and HVCA Specification DW/144. Ductwork shall be routed to external source in the shortest possible route, without excessive use of bends and horizontal ductwork installation.

Ductwork shall be suitable for kitchen extract systems, with smooth internal surfaces that facilitate easy removal of grease deposits.

## 1.14 PARTICULAR MAIN CANOPY ARRANGEMENT

The kitchen area shall have a mechanical forced air system, with a side-wall mounted canopy arrangement over the main grouped cooking equipment, and supply air system with spot coolers fitted to the underside of the canopy for the cooking operatives benefit. The extract system shall have an on/off speed controller sited away from the kitchen area to suit site and operatives requirements. The canopy shall be a "Capture Jet" type canopy with 10% of the overall extract air from the canopy, supplied through an insulated plenum fitted integrally to the canopy.

The supply air shall then be discharged through personal spot ventilators, with each spot coolers having internal volume control. The supply air to the canopy shall be from the primary packaged unit, with the remaining supply air to the kitchen also supplied by the packaged roof top unit. The supply directly to the canopy shall constitute 45% (85% room total) of the extract air volume to achieve a negative pressure within the kitchen area. The canopy shall be sited over the grouped cooking range of equipment as per tender drawings. The canopy arrangement shall be as follows:

- a) 5000mm Long x 1500mm Wide x 600mm High. (Dimensions to be checked prior to site start)
- b) Four sided outer valance casing.
- c) The canopy lower edge at each end shall be formed into a condensation channel with inclined internal elevation to simplify cleaning requirements.
- d) Full area horizontal ceiling plate, manufactured in tray form, fixed and sealed into the outer valance casing.
- e) Full length single sided extract plenum, fixed and sealed to the canopy outer structure and complete with: -
  - 8 No. 500 x 330 x 50mm stainless steel baffle filters
  - 3 No. 500 x 300mm extract factory fitted duct connection collars.
- f) 1 No. full length insulated integral make-up air plenum to introduce make-up air into the canopy and into the kitchen area, comprising:-
  - 9 No. 250 diameter supply factory fitted duct connection spigots
  - Vertical discharge personal spot ventilators & Induction Slots
  - Insulation to all internal surfaces of the supply plenum.
- g) Grease collection tray's
  - All duties to be checked against the manufacturers filter performance data.



TYPICAL KFC CANOPY DESIGN



## SECTION 2 : ODOUR ABATEMENT SYSTEM

- 2.01 GENERAL
- 2.02 ODOUR EQUIPMENT PARTICULARS
- 2.03 SYSTEM DESCRIPTION
- 2.04 PREVENTATIVE MAINTENANCE
- 2.05 SUPPORTING DOCUMENTATION

## 2.01 GENERAL

As part of the KFC commitment to the brand, an odour control system will be installed to serve the kitchen extract system on the project.

## 2.02 ODOUR EQUIPMENT PARTICULARS

2no. UV-O 1000 UV-C ozone injection system as supplied and commissioned by Purified Air Limited.

Mr Andrew James  
Purified Air Limited  
Lyon House  
Lyon Road  
Romford  
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RM1 2BG  
Tel. 01708 755414

## 2.03 SYSTEM DESCRIPTION

The first stage of the odour control system would be the grease baffle filters actually located within the extraction hood, which remove the large particles of grease and water vapour.

The 2<sup>nd</sup> stage of the odour control system would be the UV-O ozone injection system which is mounted on the extract ductwork located externally in the rear area. The system is interlocked with the extract fan power supply so that it can only operate whilst the extract fan is running.

Under its own control, the UV-O system draws in fresh air from the immediate area, this passes through the unit and across the UV-C lamps, and injects ozone directly into the negative side of the extract fan ductwork. The ozone then breaks down any odour particles prior to discharge through the final duct outlet.

The treated & filtered air is then discharged at as high level as is practical at high velocity to ensure as much throw of the extract air is possible from the occupied areas.

## 2.04 PREVENTATIVE MAINTENANCE

A maintenance contract will be taken out directly between the Occupier and the Odour Control equipment manufacturer, namely, Purified Air Ltd.

Work to be carried out is :-

### UV-O System

1. Clean lamps and check operation
2. Replace Filter
3. Check operation and air flow filter switch

### Frequency

1. Clean UV-O lamps 4 weekly
2. Change UV-O Filter Quarterly
3. Change UV-O lamps Annually

## UV-O 1000 - INTRODUCTION

Reduction of cooking odours from commercial kitchens is an increasingly important issue, different combinations of product are required to do this.



## HOW IT WORKS

The Purified Air UV-O 1000 unit uses UV-C technology to produce ozone and hydroxyl free radicals to oxidise odours through a process of Ozonolysis.

Unlike other UV-C systems, the UV-O 1000 is located outside the kitchen extract duct and connects via spigots and small diameter ducting. It is widely accepted that the best way to apply UV-C is in the airstream itself. However, the lamps quickly become dirty and the effectiveness is greatly reduced. By applying the lamps outside of the airstream we are able to fully control the condition of the lamps which provides for a uniform output, the air entering the UV-O 1000 does not come via the extract and is filtered on entry, the system allows a uniform delivery of clean treated air to enter the extract system. A further advantage is that the pressure loss exhibited when the unit is installed is low and uniform.

## INSTALLATION

Simple to install, with low maintenance and running costs, the system is designed to be located on a wall in the kitchen or plant room or can be fitted to the ducting itself. The fact that it is located external to the ducting makes the unit ideal for retrospective installations.

## TECHNICAL AND SAFETY CONSIDERATIONS

The unit must always be installed on the negative side of the fan and the system should be switched via an interlock both connected to the fan and an airflow switch connected to the unit itself which will ensure that in the event the unit is disconnected from the duct or if the extract system is switched off the system will be isolated. The unit can only discharge into duct which is going to atmosphere the unit must not discharge into an enclosed space.

The unit comes as standard with six lamps but a further rack can be added to make a total of twelve lamps. Dependant on the type of cooking the maximum each set of six lamps will be capable of handling will be 0.5 m<sup>3</sup>/sec.

UV-C technology cannot remove smoke or other particulate, for instance where there is a lot of smoke produced due to the cooking style, for example char-grilling.

## OPTIONS

Lamp indicator remote or attached.

Airflow Switch

Installation of grease smoke and odour equipment must be made on the negative side of the fan and the systems must be switched via an interlock to ensure they are only operational when the extract fan is operational. If there is ductwork inside the premises on the positive side of the fan please ensure that it is completely sealed so as not to let fumes or odour control compounds back into the premises. In certain instances some equipment can be installed on the positive side of the fan but please discuss this with our technical department and ask them to provide a design statement to confirm that it can be done.



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## SECTION 3 : EXTERNAL PLANT NOISE CRITERIA

- 3.01 GENERAL
- 3.02 RESTAURANT ENVIRONMENTAL CONTROL SYSTEM DESCRIPTION
- 3.03 RESTAURANT ENVIRONMENTAL CONTROL SYSTEM PARTICULARS
- 3.04 KITCHEN & STAFF AREA ENVIRONMENTAL CONTROL SYSTEM DESCRIPTION
- 3.05 KITCHEN & STAFF AREA ENVIRONMENTAL CONTROL SYSTEM PARTICULARS
- 3.06 KITCHEN EXTRACT FAN EQUIPMENT PARTICULARS
- 3.07 KITCHEN SUPPLY FAN EQUIPMENT PARTICULARS
- 3.08 GENERAL EXTRACT FAN EQUIPMENT PARTICULARS
- 3.09 FOSTER REFRIGERATION LTD COLDROOM PLANT PARTICULARS

NOTE: Items detailed within this section are external plant items only.

### 3.01 GENERAL

KFC's have a common philosophy to provide a comfortable environment within restaurants for customers, with all areas having thermostatic control and adequate ventilation, which is further extended to their staff.

This section covers the technical information with respect to external plant equipment.

### 3.02 RESTAURANT ENVIRONMENTAL CONTROL SYSTEM DESCRIPTION

The Trade Restaurant area shall be provided with its cooling, heating and ventilation requirements via a mechanically forced air movement system, derived from a split air conditioning unit. The ceiling cassette unit shall be an air-to-air reverse cycle heat pump, operating on a vapour compression cycle, utilising refrigerant R410A.

The unit shall operate on a re-circulated basis, with the minimum fresh air requirement in conjunction with the specified occupancy level in accordance with Document F1 of Building Regulations, set and locked on the fresh air intake opposed blade volume control damper. The specific fresh air requirement shall be in accordance with Building Regulations and CIBSE Guide relating to minimum fresh air requirements per individual occupant. The actual quantity of fresh air is indicated within this specification and associated tender drawing.

Supply and return air distribution shall be through fabricated galvanised steel ductwork, routed generally as per the tender drawings, with air terminal devices situated within the false ceiling structure, dissipating air in the specified patterns.

Temperature control of the area shall be sensed at room conditions with a high level room mounted zone temperature sensor, and the mechanical refrigeration plant controlled accordingly.

The heat rejection plant in the rear yard shall be fully weather proofed, treated and situated on Tico pads between unit and base with levelling shims fitted where necessary. Allowances shall be made during the installation of the external condensing units to limit vibration.

The unit base shall be secured to the concrete floor finish using proprietary masonry anchor fixings.

The contractor shall be responsible for ensuring that the indoor and outdoor primary plant has the specified access space for maintenance and service around the packaged unit in accordance with the manufacturer's recommendations.

### 3.03 RESTAURANT ENVIRONMENTAL CONTROL SYSTEM PARTICULARS

The units serving the Trade Restaurant area shall be as follows: -

#### AC1

Mitsubishi PLA-ZRP140BA ceiling cassette  
W 840 X D 840 X H 258 mm  
24KG  
28-30-32-34DBA



#### CU1

Mitsubishi PUHZ -ZRP140YKA  
W 1050 x D 330 x H 1338 mm  
132KG  
Weight 132KG  
52 DBA





### 3.04 KITCHEN & STAFF AREA ENVIRONMENTAL CONTROL SYSTEM DESCRIPTION

The Trade kitchen area shall be provided with its cooling, heating and ventilation requirements via a mechanically forced air movement system, derived from a split air conditioning unit. The under ceiling unit shall be an air-to-air reverse cycle heat pump, operating on a vapour compression cycle, utilising refrigerant R410A.

The unit shall operate on a re-circulated basis, with the minimum fresh air requirement in conjunction with the negative pressure level in the kitchen area in association with the extract volumes from the exhaust canopy, set and locked on the fresh air intake opposed blade volume control damper. The specific fresh air requirement shall be at the least, in accordance with Building Regulations and CIBSE Guide relating to minimum fresh air requirements per individual occupant.

Supply and return air distribution shall be through fabricated galvanised steel ductwork, routed generally as per the tender drawings, with air terminal devices situated within the false ceiling structure, dissipating air in the specified patterns.

Temperature control of the area shall be sensed at room conditions with a high level room mounted zone temperature sensor, and the mechanical refrigeration plant controlled accordingly.

The heat rejection plant in the rear yard shall be fully weather proofed, treated and situated on Tico pads between unit and base with levelling shims fitted where necessary. Allowances shall be made during the installation of the external condensing units to limit vibration.

The unit base shall be secured to the concrete floor finish using proprietary masonry anchor fixings.

The contractor shall be responsible for ensuring that the indoor and outdoor primary plant has the specified access space for maintenance and service around the packaged unit in accordance with the manufacturer's recommendations.

### 3.05 KITCHEN AND STAFF AREA ENVIRONMENTAL CONTROL SYSTEM PARTICULARS

The unit serving the Trade Kitchen including Staff Room/Managers Office & Dry Goods area shall be as follows:-

#### AC2

Mitsubishi PCA – RP71HAQ under ceiling stainless steel  
W 1139 X D 660 X H 280 mm  
41kG  
56DBA



#### CU2

Mitsubishi PUHZ –ZRP140YKA  
W 950 x D 330 x H 943 mm  
67KG  
Weight 132KG  
48 DBA



### 3.06 KITCHEN EXTRACT FAN EQUIPMENT PARTICULARS

The main extract system within the kitchen shall serve the single wall mounted canopy arrangements as described in earlier sections of this document. The main extract fan shall also serve both the Main Canopy and Chip Fryer Canopy. The fan is mounted externally in the rear yard area.

The extract fan equipment shall be as follows: -

#### EF1

Elta Fans Limited  
 Model SCPP 500/4-3 Compact Power Plus Contra-rotating 2 stage fan  
 Motor : 1500 watts 4 pole 1350rpm  
 Duty : 2.00 cu.m/sec @ 240 pascals  
 Sound Level : 63dBA@3 metres  
 Controller : Inverter  
 Electrical : 415 volt / 3 phase / 50 Hz  
 Weight : 60kg  
 Dimensions : 500mm diameter x 500mm long



### 3.07 SUPPLY FAN EQUIPMENT PARTICULARS

The main supply air system within the kitchen serves the single wall mounted canopy arrangements as described in earlier sections of this document. The supply fan shall also serve both the Main Canopy and general areas via ceiling mounted diffusers. The fan is mounted internally within the kitchen ceiling void. Details are included in this document for reference even though the equipment is not located externally

The supply fan equipment shall be as follows: -

#### SF1

Elta Fans Limited  
 Model SCPP 450/4-3 Compact Power Plus Contra-rotating 2 stage fan  
 Motor : 1100 watts 4 pole 1350rpm  
 Duty : 2.00 cu.m/sec @ 200 pascals  
 Sound Level : 58dBA@3 metres  
 Controller : Inverter  
 Electrical : 415 volt / 3 phase / 50 Hz  
 Weight : 52kg  
 Dimensions : 450mm diameter x 500mm long



### 3.08 GENERAL EXTRACT FAN EQUIPMENT PARTICULARS

The general extract fan serves the toilet and staff area toilets and general areas. The fan is mounted internally within the staff area ceiling void. Details are included in this document for reference even though the equipment is not located externally

The extract fan equipment shall be as follows: -

#### EF2

Elta Fans Limited

Model SJ250A in line centrifugal tube fan.

Motor : 180 watts 2 pole 2450rpm

Duty : 0.24 cu.m/sec @ 100 pascals

Sound Level : 53dBA@3 metres

Controller : WC lighting circuit

Electrical : 230 volt / 1 phase / 50 Hz

Weight : 5.5kg

Dimensions : 335mm overall diameter x 230mm long



3.09 FOSTER REFRIGERATION LTD COLDROOM PLANT PARTICULARS

There are three coldrooms serving the KFC unit. The heat rejection condensers serving the coldrooms are to be situated on the flat roof surface and one separate condenser serves each coldroom unit.

**Chiller Room:**

Split Refrigeration System

Prefix	-	Chiller Room
Model	-	Duet Range Eco
Condenser Model	-	DCU2-1H ECO
Dimensions	-	820 x 427 x 390mm high
Weight	-	43 Kgs
Electrical Supply	-	230-1-50 Hz
Main Fuse Rating	-	20
Net noise level	-	60dBa



**Freezer Room:**

Split Refrigeration System

Prefix	-	Freezer Room
Model	-	Duet Range Eco
Condenser Model	-	DCU4-3L ECO
Dimensions	-	820 x 427 x 427mm high
Weight	-	78 Kgs
Electrical Supply	-	400-3-50 Hz
Main Fuse Rating	-	25
Net noise level	-	61Ba

