STANDARD SPECIFICATION FOR VENTILATION

AND AIR CONDITIONING SYSTEM

(Revision D 20.01.06)

PRE-AMBLE

The project includes all of the mechanical services works associated with the fitting out of an existing shell unit to create a fully operational pizza delivery operation.

All work shall be carried out in accordance with the latest relevant British and European Standards, Statutory Regulation and Byelaws together with the following publications:

CIBSE Codes and Guides to Current Practice
Water Authority By Laws
HVCA – DW143 Practical Guide to Ductwork Leakage Testing
HVCA DW144 Specification for Sheet Metal Ductwork
HVCA DW172 Guide to Good Practice for Kitchen Ventilation Systems
HVCA – RUAG70 Guide to Good Practice Refrigeration
The Building Regulations
Gas Safety (Installation and Use) Regulations 1998

All plant, ducts, pipes cables etc. shall be adequately protected against accidental damage, corrosion and external environment and shall be capable of safe decontamination and removal in the future without disturbing other services. Pipes and ducts shall be adequately sized, kept as short as practicable, leak-proof with a minimum number of joints and have provision for routine maintenance.

All facilities shall be designed to prevent the ingress or egress of rodents, vermin and insects.

VENTILATION - GENERAL

1) Supply and exhaust ventilation systems shall be installed in accordance with the standards and regulations listed and the requirements of the oven manufacturers.

2) All systems shall be low velocity in accordance with DW 144. Fire/smoke dampers shall be installed in all fire compartment walls to Building Control requirements.

CONSULTANTS IN ACOUSTICS

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29th June 2007

Bethany Arbery
Development Control Planning Service
London Borough of Camden
Town Hall
Argyle Street
London WC1H 8ND

Dear Ms Arbery

228 West End Lane – Application Reference 2007/1900

I write further to your letter of 25th April to Richard Unwin regarding the above, specifically with respect to your request for an acoustic report.

The plant proposed to be installed as part of the development consists of a kitchen extract fan and associated ductwork. The fan itself and associated attenuation would be located within the building. The discharge ductwork would however exit the rear of the premises, run up the back wall before discharging at roof level. This ductwork is shown on David Clarke Associates drawing 1666-04, an application drawing.

The floors above the application unit are in residential use. The windows nearest the discharge duct termination are 5m away, 1.5m below the duct discharge. The duct runs up the wall no closer than 4m from the nearest window. Other residences exist in Queens Mansions some 15m away, but clearly the residences above the unit represent the nearest ones.

The extract fan would operate during opening hours and would be turned off by midnight. In your letter of 25th April you explained that you were seeking that the plant noise be 5-10 dB below the background noise level at the nearest noise sensitive façade. This would be the windows as described above. The background noise levels need to be defined.

Background noise levels at the site will vary between daytime and evening periods, with the evenings being the quieter time. Therefore we undertook a 3 hour noise survey at the site over the period 2100-2400 hours, representing the most noise sensitive period.

Noise levels were recorded to the rear of the premises over period's of 15 minutes in each hour. The noise levels were recorded using a Norsonic 118 precision computing sound level meter fitted with windshield. The meter was calibrated before and after the survey using a Norsonic 1251 calibrator and found to have not drifted significantly.

The meter was set up so as to record L_{Amax}, L_{Aeq}, L_{A10} and L_{A90} noise levels (See attached Appendix A for explanation of noise units)

The results of the measurements are tabulated below, with the background L_{A90} noise levels high lighted.

	dB			
	L_{Amax}	L_{Aeq}	L_{A10}	L_{A90}
2100-2200	64	48	49	**46**
2200-2300	63	48	50	**44**
2300-2400	61	45	46	**44**

It can therefore be seen that background noise levels were in the range 44-46 dBA. The noise limit should be 5-10 dB below the minimum, therefore 34-39 dBA.

The details of the proposed fan are attached schedule 2007/2020/PNS1. In order comply with the derived noise limit (working to the lower figure) a 1500mm long silencer is required to be installed in the ductwork. The performance of this is as described in the attached schedule 2007/2020/AS1. The silencer would be located within the application demise so that noise breaking out from the ductwork is controlled as well as that from the duct termination.

I trust the above is clear and meets your requirements. However, if you have any queries please do not hesitate to contact me.

Yours sincerely

Neil Jarman
Cole Jarman Associates

3) An appropriately sized extract canopy located over the ovens shall be installed which shall be connected to a range of ductwork and be complete with an axial flow extract fan discharging to a convenient location at high level outside the building.

4) The noise level outside the building shall not exceed NR40 at a distance of 3m from the discharge point.

5) Where required, attenuators shall be suitable for use in a hot, catering extract environment.

6) The extract fan shall have a duty of at least 1m³/sec or as specified by the oven manufacturer, and be mounted on anti-vibration mountings, and be complete with flexible connections to the fixed ductwork.

7) **Under no circumstances may flexible ductwork be used on the extract system, other than the fan connections.**

8) The air resistance shall be calculated by the Contractor to suit his installation.

9) The fans shall be mounted in such a manner as to be easily accessible for maintenance purposes.

10) The system should be designed to allow the use of double stacked PS555 ovens. To allow for initial installation of PS200 ovens, speed controllers should be supplied and installed adjacent to both fans, **for engineers use only**, to enable the system to be tuned as required for either oven model.

11) The standard canopy dimensions shall be 2.5m long x 2.0m wide x 0.55m high and be constructed in Stainless Steel, such that all visible welds are ground and polished.

12) The hood shall incorporate a gutter around all edges with a plugged drain connection at the lowest point and be complete with at least 4No. removable mesh type grease filters.

13) The filters shall be of a size which will allow them to be cleaned in the sinks available in the kitchen

14) The filters shall be arranged within housings as part of a plenum system which provides balanced extract over the length of the oven.

15) **It is important with the big PS 555 and PS 570 ovens that the extract does not draw noticeably from only one end, or one side. The traditional filter bank running along the back edge only, has caused problems in this respect, so the preferred option, therefore, is a filter bank running front to back <u>at both ends of the canopy</u> and joined via suitable ductwork or plenum.**

16) NOTE: The parameters listed above are applicable to the Middleby Marshall PS 555 oven. This extract system should normally be installed irrespective of which oven is actually being installed, to allow for future upgrading. However, there will be some instances where the physical constraints of the building will restrict the size of oven, canopy or ductwork, in which case the canopy size is 2300mm x 1650 x 550, with 3No. filters for the PS 200/540 oven only..

17) The main electrician will be required to supply simple on/off switches and wire to isolators adjacent to each fan.

18) *The supply to each oven socket shall be independent* so that in the event that one circuit breaker trips, power is not lost to both ovens at the same time. Note also that although the PS 200 oven will run from a standard 13a S/S/O, the PS 555 will require 20A rated sockets (Reyrolle type)

19) The hood shall be completely covered with a decorative finish externally. Care should be taken to ensure that the hood is properly suspended from the structure of the building and not the decorative boxing frame.

20) Wherever possible the ductwork shall be arranged to run above the suspended ceiling. Where this is not possible, either the exposed section shall be constructed in stainless steel or painted with a heat resistant, washable, white paint system incorporating a suitable primer, undercoat and finish coat. The hood shall be installed to leave a clear 2.1m from finished floor.

21) The supply air installation shall take the form of a suitable inlet louvre with bird/rodent guard and which shall be sized on a minimum free area of 50% and maximum velocity of 2.5m per second. The system shall be complete with a fresh-air filter to EU4 standard, (located in an accessible position for the store staff to be able to change the filters), axial flow fan, and a range of ductwork terminating in ceiling mounted diffusers, with integral damper accessible through the diffuser face, where required, and finished in white. The fresh-air systems shall be designed to replace approximately 80% of the extract air volume.

22) As part of the initial installation, the HVAC contractor shall include 12 months supply of replacement fresh air filters.

23) The design of the system shall take into account the requirement for store personnel to be able to change the fresh air filters on a regular basis, without need for specialist equipment or contractors. Liaison with the main contractor to incorporate suitable future access will be required

24) Both exhaust ductwork outlet and fresh-air inlet points shall be located to minimise short circuiting and so that exhaust air cannot be drawn back into the building through openable windows etc.

25) At the conclusion of the installation, the HVAC contractor shall fully commission the entire system including both duct systems and the gas safety interlock, and shall check by measurement that the airflows are with the appropriate designed parameters.

26) The ventilation of internal toilets shall be controlled by the light switch, being interlinked with the extract fan timer. Internal offices shall have a further fresh air supply, either with independent control or as part of the supply air system.

GAS SAFETY INTERLOCK

Under the revised CORGI / HSE regulations for the UK, it is now essential that the gas supply to the ovens is interlocked in a failsafe manner with the ventilation system.

Specifically: There must be detection of <u>both</u> the extract airflow and the fresh air duct airflow, such that if either of these do not register positive

airflow, a gas solenoid valve immediately cuts off the gas supply to the oven. Additionally, the system should then cut off the power supply to both fans. The control box for this system must incorporate status indicator lights.

The control box will require an adjacent 13A fused spur, to be provided by the main contractor. The control box will also have 5No. cables feeding to it from the ceiling void above. These cables must be chased into the wall or otherwise neatly covered and protected.

The control panel supplier will also supply a suitable gas solenoid valve for installation in the oven supply pipe by the main contractors plumber. **It is the main contractors responsibility to ensure that the gas pipe is purged through the valve before hand-over of the system**. If this is not done and the oven installers are unable to complete their commissioning, any subsequent call backs will be charged to the main contractor.

It is the main contractor's responsibility to supply and fit this system using only specialist suppliers approved by DPG.

MECHANICAL VENTILATION TO TOILETS:

The mechanical extract ventilation of internal toilets shall be controlled by the light switch, being interlinked with the extract fan timer to give minimum 15l/s air change with 20 minute overrun.

All fittings to have anti-vibration mountings where appropriate.

MECHANICAL VENTILATION TO INTERNAL ROOMS:

All internal rooms to be provided either with forced fresh air via external supply air fan and ductwork, or by independent local wall mounted fans

All fittings to have anti-vibration mountings where appropriate.

AIR FILTRATION (as DW171)

GENERAL:

Filtration will be provided within the extract canopy by a washable mesh filter, which is usually positioned at the point of extract within a filter housing manufactured from the same material as the structure of the canopy. Disposable panel type filters should not be used for grease extraction.

MESH FILTERS:

The most economical filter is the mesh type which comprises a number of layers of a galvanised or stainless mesh material within a stainless or aluminium housing. The filter relies on the dirty air depositing particles onto the non-corrodable mesh. This type of filter is suitable for use in Domino's where the cooking is only of the dry bake-off type with no free oil or grease involved. Mesh filters that are thinner than 50mm are unlikely to be effective.

The performance of the filter varies with use and temperature and may need to be cleaned twice weekly to avoid a build up of debris which increases the resistance to air flow. When clean, these filters have the least resistance to air flow - typically 40 pascals.

There is no barrier to flame within the filter, and mesh filters can not therefore be used on their own in applications where there is appreciable risk of fire.

AIR CONDITIONING

'Comfort cooling' shall normally be provided in the form of a split system ceiling mounted cassette unit to provide both a cooling **and heating facility**. The equipment shall be supplied by a recognized reputable manufacturer and the HVAC contractor shall be responsible for selecting suitable and appropriate equipment for the purpose.

The system shall generally comprise an indoor cassette unit, outdoor wall/floor mounted condensing unit and all inter-connecting refrigerant pipework, insulation and associated power and control wiring from an isolator left by the electrical subcontractor. The unit shall be sized with regards to the size of the store and the operating conditions to be found therein.

The indoor unit shall be controlled by a wall mounted hard wired matching controller.

The outdoor condensing unit will be wall or floor mounted, as shown on the project drawings, at a position to give access for maintenance.

The main electrical contractor shall run a 30amp single phase supply to the position of the outdoor unit, terminating in a suitable outdoor weathered, lockable isolator.

Condensate from the indoor unit shall be run to a suitable drain position, in concealed pipework.

Refrigeration pipework and wiring shall be neatly clipped to the structure and fixed to cable tray as appropriate. Insulation shall be a cellular foam product using CFC – free blowing agents, such as by Armaflex. All external insulation shall be protected by two coats of the appropriate protective paint.

Refrigeration medium shall be R407C or other approved and suitable gas.

Testing and Completion

Upon completion of the installations, **all** shall be fully tested and proved including airflows. The Contractor shall produce an Operating and Maintenance Manual which shall contain details of all equipment supplied, a record drawing of the complete mechanical services installation and copies of all Test Certificates. It shall also contain a Maintenance Schedule based on the manufacturer's recommendations.

The contractor shall provide 12months spare filters for mechanical supply air installations.

TYPICAL AIR CONDITIONING AND COLD ROOM COMPRESSOR DETAILS

AIR CONDITIONING		COLD ROOM

Model (typical unit)	Fujitsu AUY30R		Model (typical unit)	IMI Cornelius Ltd Silensys H49Z-1ph
Dimensions	W 900mm D 350mm H 900mm		Dimensions	W 1018mm D 392mm H 615mm
Weight	85 kg		Weight	81 kg
Airflow	1200 cu.m/h		Compressor	Model CAJ4519Z 1.5HP motor 15.4 MRA 31 LRA
Current	Start 80 A Running 16.5 A		Refrigerant Connections	Suction 15.9mm Liquid 9.5mm
Capacity	Cool 8.8 kW Heat 9.1 kW		Condenser Fan Motor	220-1 Volts/Phase 0.6 Amps each 2800 m3/hr Air Flow
Noise	55 dBA @ 1m		Watts	4-6kW
			Electrical Details	16 MRA 32 LRA 2215 P.abs
			Noise	35 dBA @ 10m

REVISION A Cold room compressor details amended. 23.7.02

REVISION B A/C compressor details updated. 24.2.03

REVISION C Filters amended. 17.6.03