

INTRODUCTION

This supporting document has been prepared in readiness for an application for Change of Use and is based on the DEFRA Annex B – Guidance on the control of odour and noise from Commercial Kitchen Exhaust system. This document has also reviewed the feedback from various Local Authorities who use Annex B as a guide when referring to the extract system as part of their decision making process. Annex B provides a useful guide to ventilation/extraction and ensures that no nuisance, disturbance or loss amenity is caused by odour, fumes, food droplets or noise, to nearby properties. A suitably qualified and experienced person with specialist knowledge of ventilation schemes should undertake the design and installation of a ventilation system. Designing and installing appropriate ventilation systems may involve considerable expense. In circumstances where the end user of the premises is unknown, or where the specific type of food to be cooked is unknown, the installation should be designed to achieve the highest level of odour control in order to cater for a worst case scenario. There are many different types of odour abatement available (carbon filters, electrostatic precipitation, high dilution and high velocity extraction) however not all types are suitable for all cooking methods. In each case, grease filters must be installed. Please note that any reference to minimum standards within this document is for guidance only and more stringent controls may be deemed appropriate.

PREAMBLE

Please be advised that the proposed cooking operation produces very little grease and the extract system is predominately removing heat and gas combustion fumes. All work is carried out in accordance with the latest relevant British (or Irish regulations where applicable) 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, pipe 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. The duct will be fixed to the shell of the unit using anti-vibration fixing mounts and under no circumstances will flexible ductwork be used other than the fan connections

The HVAC contractor shall supply the client with system design drawings, prior to manufacture and installation. For projects in England and Wales, the HVAC contractor shall also demonstrate compliance with Building Regulations Approved documents L2A & L2B. This will include:

(a) Provision of details of the efficiency and controls of heating, cooling and ventilation systems in accordance with Non-Domestic Heating, Cooling and Ventilation compliance Guide (2006)

(b) Provision of commissioning certificates including air leakage tests on the ductwork Fire/smoke dampers shall be installed in all fire compartment walls to Building Control requirements. The HVAC contractor shall ensure that externally the ductwork conforms to the supplied drawings in terms of its route, height and termination. These drawings will have formed part of our Planning Approval and must not be deviated from without express permission from the Client. Upon completion of the installation, 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 and a record drawing of the complete mechanical services installation and copies of all Test Certificates. It shall contain a Maintenance Schedule based on the manufacturer's recommendations.

INFORMATION ON PREMISES & TYPE OF OPERATION

The following information should be supplied:

Number of meals to be served per day: - ***approximately 100 meals on average per day.***

Method(s) of preparation and cooking: - ***Hand preparation and dry baking.***

Type(s) of meal served: - ***Pizzas and associated side orders.***

Proposed hours of operation of the business and any ventilation plant: - ***Opening hours will be in accordance with the hours stated in the Change of Use Approval although staff will be in the premises outside of these hours to prepare for opening and to clean up after closing. With the exception of the cold room compressor, ventilation plant will generally be in use only whilst the store is open.***

PLANS AND DRAWINGS

A scaled plan showing the internal arrangement of the premises and the dimensions/location of the ventilation system must be provided. The drawings should include;

1. External elevations of the buildings showing the dimensions
2. Route and exhaust characteristics (appearance) of the ductwork in relation to the building: - ***Please see drawings***
3. The location of all filters and the fan should be clearly marked

Please note that where the location of a filter is shown the type must be clearly identified and cross-referenced to the detailed product specification: - ***A schematic drawing produced by the HVAC Designer will be provided at a later date.***

PRE-FILTERS

A copy of the manufacturer's product data sheet should be supplied clearly showing:

1. Manufacturer's name: - ***Jasun Filtration***

2. Filter name and product code: - **Type 90**
3. Dimensions of the pre-filter: - **45mm thick (rated airflow 2.0m/s) see data sheets**
4. Nature of the filter media: - **Disposable glass fibre media**
5. Manufacturer's recommendations on the frequency and type of maintenance of the pre-filter having regard to the conditions that it will be used under: - **Checked bi-monthly and changed 3 monthly**

ELECTROSTATIC PRECIPITATORS (NOT REQUIRED ON THIS SITE)

CARBON FILTERS

Particulars and type of carbon filter units should be identified. A copy of the manufacturer's product data sheet should be supplied that clearly shows:

Pre-Filters

1. Manufacturer's name: - **Jasun Filtration**
2. Pre-filters: - **For an airflow of 1.5 m/Sec two No 595 x 595 x 90 Type 90 G4 rated pre filters.**
3. Frequency of inspection: - **Monthly or bi-monthly inspections as required.**
4. Frequency of replacement: - **3 monthly maximum. Carbon Filters**
5. Manufacturer's name: - **Jasun Filtration**
6. Filter name and product code: - **AC207**
7. Dimensions of the filter panel: - **20 no panels, 10 each of models 1-224 and 1-2424, 10 no 292x594x20 + 10 no 594x594x20**
8. Total number of filter panels in the filter bed: - **20**
9. Nature of the carbon (including product type): - **Sutcliffe 207c 70% CTC**

Provide details on the frequency of replacement of the carbon units having regard to the conditions that it will be used under. The assumptions to this calculation should be clearly stated, including the frequency and duration of use. The manufacturer should provide recommendations on the frequency and type of maintenance required: -

Frequency of inspection of filter body – 3 monthly maximum. Frequency of inspection of carbon filters - annually. Frequency of replacement of carbon filters – annually or more frequently as required.

Total volume of carbon expressed in cubic metres: - **0.105m**

1. Total mass of carbon expressed in kilograms: - **46.9kg**
2. Total surface area of the panels exposed to the exhausted air: - **5.2m**

Dwell time of the gases in the filter compartment and the control setting at which this is achieved: - **In excess of 0.1 sec. This calculation is based upon the volume of carbon divided by the air volume to give the contact time.**

Or

Carbon Filters

1. Manufacturer's name: - **Purified Air**
2. Filter name and product code
3. Dimensions of the filter panel: - **Mini modules, each measuring 198x595x595mm**
4. Total number of filter panels in the filter bed: - **6 mini modules**

Nature of the carbon (including product type): -

Provide details on the frequency of replacement of the carbon units having regard to the conditions that it will be used under. The assumptions to this calculation should be clearly stated, including the frequency and duration of use. The manufacturer should provide recommendations on the frequency and type of maintenance required: - **Frequency of inspection of filter body – 3 monthly maximum. Frequency of inspection of carbon filters - annually. Frequency of replacement of carbon filters – annually or more frequently as required.**

Total volume of carbon expressed in cubic metres: - **0.22m**

Total mass of carbon expressed in kilograms: - **100kg**

Total surface area of the panels exposed to the exhausted air: -

Dwell time of the gases in the filter compartment and the control setting at which this is achieved: - **In the region of 0.15 sec. This calculation is based upon the volume of carbon divided by the air volume to give the contact time. The 100 kg mass of carbon will give an increased dwell time in the region of 0.15 sec. This has been improved in line with current carbon filter installation trends and in order to significantly reduce the danger of odour carry over. Purified Air has over 30 years of odour control experience. Each 198mm mini module will treat 0.35 m³/sec of foul air so the installation of 6 No mini modules (or 2 no 595mm x 595mm x 595mm blocks) will adequately treat 2.1 m³/sec @ 0.1sec dwell time. For an extract volume of 1.5 m/s the dwell time will be in the region of 0.145 sec.**

ODOUR COUNTERACTING OR NEUTRALISING SYSTEM (**NOT REQUIRED**)

COOKER HOOD

The following information on the characteristics of the cooker hood should be supplied that clearly shows the hood will be made of: - **Stainless Steel construction with all visible joints to be welded, ground and polished and incorporating a gutter around all edges with a plugged drain connection at the lowest point.**

1. Length that the cooker hood overhangs the appliances: - **Minimum 250mm all round**
2. Face velocity at the cooker hood, expressed in metres per second: - **0.25m³/sec**
3. Dimensions of the opening of the cooker hood: - **2m x 3m**

4. Hood filters: - Hood *is to include 6no mesh type grease filters. Aluminium frame with steel mesh inserts.*
5. Manufacturer's name: - *Jasun Filtration*
6. Filter name and product code: - *Model GF*

The proposed dry bake operation produces very little grease and the extract system is predominantly removing heat and gas combustion fumes. Mesh filters are much more efficient at removing any fine particles which may be caught in the airflow. There is no barrier to flame within the filter, and it is accepted that mesh filters cannot therefore be used on their own in applications where there is appreciable risk of fire. However this does not apply in this operation which only uses hot air for baking, with no oil or grease being used.

SYSTEM OPERATION

In addition to the specification of the components the following information must be provided about the system:

1. Extract rate (expressed as m/s) at the proposed rate of extract: - *Calculated in accordance with DW172 Kitchen Designer's Manual, using the velocity of air across the face of the canopy method as per appended extract from DW172, the extract rate will be 1.5m/sec*
2. Dwell time of the gases in the carbon filtration zone: - *In excess of 0.1sec*
3. Volume of the kitchen: - *based on average prep area size of 100 -150m*
4. Efflux velocity: - *12 to 15m/sec as per DW172 where possible but no lower than 11m/sec for a vertical discharge at high level or 6m/sec for horizontal discharge at low level via a louvred wall grille (whistling could occur at greater velocity but upturned louvres will be used to push the efflux in an upwards direction).* Note: The system performance is dependent upon the extract rate of the air. Where the rate can be adjusted by the use of dampers or a variable speed fan, then the conditions under which the extract rate can be achieved must be described. = *Single speed Vent Axia BSC500-14 fan – no adjustment. This fan is IP54 rated which is acceptable as the fan is installed internally*

FLUE DESIGN

The two important factors of the flue design are the height and velocity of the final discharge. Generally, the greater the flue height, the better the dispersion and dilution of odours. It is recommended that the discharge of air should be at a minimum height of 1m above the roof, especially if there are buildings nearby that may affect odour dispersion and dilution.

Where this is impractical for example, because of ownership or structural constraints, additional techniques will be required in order to reduce odours, such as an increase in efflux velocity and additional filters, etc. It is then recommended that the final discharge should be vertically upwards, unimpeded by flue terminals. The number of bends in the ducting should be minimised and the ducting should have a smooth internal surface. According to HVCA guidance (DW172) all ducting shall be low pressure Class A and be in accordance with HVCA specification number DW144.

In this particular case constraints imposed by the design and layout of the building preclude the provision of a high level ducted discharge. Instead it is proposed to run the 500mm diameter mm extract duct internally to pass through the side wall, towards the rear, terminating in a low level louvred wall grille.

NOISE

The following information should be provided in respect of the noise;

1. Data on the noise produced by the system as a whole
2. Sound power levels or sound pressure levels at given distances (the assumptions to this calculation must be clearly stated)
3. If possible, an octave band analysis of the noise produced by the system should also be provided.
4. Hours of operation of the ventilation system (where this differs from the hours of opening) = ***Hours of operation will be as the approved opening hours.***

The oven extract fan will be positioned internally to minimize noise break out and will be supported on antivibration mountings, high performance spring type vibration isolation hangers having a nominal static Deflection of a minimum of 15mm under the installed total weight of the fan, and connected with flexible couplings to the extract ducting either side. The vibration isolators must incorporate rubber or neoprene noise stop pads. Four isolators are normally required, one for each corner of the fan. The flexible couplings are to be “loose” (not taut) when installed and will typically be formed using rubber or neoprene sheet material (not canvas). The hangers or mounts should only take the weight of the fan –ductwork either side of the fan is to be mounted using separate proprietary rubber or neoprene mountings.

The Cold Room compressor is to be located internally within the rear area to minimize noise breakout. Compressors are to be mounted using proprietary rubber or neoprene turret type vibration isolators. The isolators should be selected to each have a static deflection of not less than 3mm under the load of the unit. Suitable turret type vibration isolators are approximately 25-30mm high and are available in various load capacities. The isolators are colour coded to indicate the load capacity and four isolators are required per unit (one to each corner). Ceilings between the A5 use and upper floors occupied by others are to be acoustically underlined, as noted on the drawings, to minimize noise transmission unless acoustic insulation has already been incorporated in the shell unit construction.

MAINTENANCE

A schedule of maintenance must be provided including details for:

1. Cleaning of washable grease filters: - Weekly.
2. Frequency of inspection and replacement of all filters (grease filters, pre-filters and carbon filters where proposed): - ***Monthly or bi-monthly inspections as required.***
3. Inspection and servicing of fans: - ***Bi-annually.***

4. Inspection and cleaning of ductwork: - ***Based on a light use (2-6 hours per day) ducting should be cleaned annually, increased to 6 monthly for moderate use (6-12 hours per day).***

If schedule is not based on manufacturer's instructions include the reasons why not: -

Please note that the HVAC contractor will provide 12 months spare filters at each new store.

ADDITIONAL NOTES FOR GUIDANCE

The air inlets must not permit pests to enter the kitchen. Fly screens are an example of how this can be achieved: - ***All air intake and extract louvre grilles are to be fitted with screens to prevent the ingress of insects, birds and vermin.***

Sufficient air must be permitted into the premises to replace air extracted. The method for supplying this make-up air should be detailed: - ***Fresh air is introduced via a louvred grille in the side wall, towards the rear of the property. The dedicated air handling unit (AHU) will be located internally to minimize noise break out and will supply 80% of the extracted air. The AHU will be supported on anti-vibration mountings, high performance spring type vibration isolation hangers having a nominal static deflection of a minimum of 15mm under the installed total weight of the AHU, and connected with flexible couplings to supply air ducts which will run internally from the AHU to all parts of the premises. The vibration isolators must incorporate rubber or neoprene noise stop pads. Four isolators are normally required, one for each corner of the AHU. The flexible couplings are to be "loose" (not taut) when installed and will typically be formed using rubber or neoprene sheet material (not canvas). The hangers or mounts should only take the weight of the AHU - ductwork either side of the AHU to be mounted using separate proprietary rubber or neoprene mountings. Fresh air filtered to EU4, tempered via a low pressure hot water coil, will be introduced via ceiling mounted diffusers to the preparation, store, office and wash-up areas.***

The route of the air into the kitchen must not result in its contamination, for example passage through a toilet. Separate provision must be made for ventilation of a toilet: - ***Toilets are separately ventilated and fresh air to the rest of the premises will not be drawn through the toilets.***

There must be sufficient access points to permit adequate cleaning of all the ductwork: - ***Access panels will be installed within the ducting at changes in direction and at maximum 3m intervals, but usually access door centres will be every 2 metres, as the ductwork cleaners find it difficult to access 1.5metres of ductwork. All access panels are to be grease-tight.***

TYPICAL COLD ROOM COMPRESSOR DETAILS

(typical unit) Karbox 2464

Dimensions

W 890 D 560 H 500

Weight 78 kg

Compressor	Model CAJ2464	34.5cm	9.7 MRA	38 LRA
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Refrigerant	Suction	15.9mm	Liquid	9.5mm
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Connections

Condenser Fan	220-1 Volts/Phase
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Motor	0.6 Amps each
	2800 m ³ /hr Air Flow

Watts	4-6kW
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Electrical Details	16 MRA
	38 LRA

Noise	34dBA @ 10m
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DATA SHEETS

Jasun Filtration PLC - Canopy Filters

Model GF mesh Grease Filters

Vent-Axia - Extract Fan

Black Sabre Slim case sickle fans

Extract Page 16 from DW172

Karbox 2464 Cold Room compressor

Jasun Filtration PLC - Carbon Filters

AC207 Activated Carbon Panels

Jasun Filtration PLC - Carbon Filters

V line panel filter

Carbon Filter Solutions brochure o Carbon Filter Details brochure

Carbon Filter Installations Generally the installation of carbon filters is undertaken as follows, the fan selection is changed to cater for the increased resistance given by the carbon filters, the area of carbon filter panels/ carbon weight has been calculated in conjunction with the supplier, In general terms for each cu/m of air moved for a dwell time of 0.1 sec 46.9kg of carbon will be required. The configuration of the filter housing ensures a minimum dwell time of 0.1 sec to ensure the necessary contact time with the vitiated air. The carbon filter granules are bonded together and formed in to panels which are contained in metal frames, a purpose made housing to contain the required number of panel has been designed and the panel are installed to form as vee section through the air must pass. The recommended carbon grade to be used is the Sutcliffe Carbon 207c. The life of the filter is dependent upon many factors use nature of air condition pre filtration is essential to prolong the life of the carbon panel and we recommend these are changed bi monthly. The fan selection altered from a cased axial fan to an in line mixed flow to overcome the additional resistance. In general terms the above describes the carbon filter installation and specification of materials employed.

CARBON FILTER MAINTENANCE SCHEDULE

IT IS IMPORTANT THAT YOU MAINTAIN YOUR FUME EXTRACT SYSTEM FOR THE FOLLOWING REASONS:

1. TO KEEP FLUE EMISSIONS TO A MINIMUM.
2. TO KEEP YOUR OVEN AND EXTRACT OPERABLE.
3. TO AVOID THE COSTLY REPLACEMENT OF THE CARBON FILTER CELLS.

WARNING! THE ACTIVATED CARBON FILTER CELL FILTRATION PACKAGE FITTED TO THIS EXTRACT INSTALLATION HAS A PRE-FILTER WHICH WILL ENSURE THAT GREASE AND SMOKE PARTICLES ARE PREVENTED FROM REACHING THE MAIN CARBON FILTER. FAILURE TO CARRY OUT THE FOLLOWING CHECKS WILL RESULT IN THE PREMATURE DETERIORATION OF THE FILTERS AND COULD LEAD TO PERMANENT DAMAGE TO THE FANS. THE INSTALLATION IS FITTED WITH A GAS SAFETY CUT OFF VALVE WHICH IS DEPENDANT ON THE DESIGNED AIRFLOW THROUGH THE SYSTEM. IF THE FILTER IS NOT MAINTAINED THE GAS SUPPLY TO THE OVENS WILL BE SHUT OFF DISABLING THE SYSTEM UNTIL THE FILTERS ARE REPLACED. TO ENSURE YOUR BRANCH CAN OPERATE WITHOUT INTERRUPTION IT IS ESSENTIAL THAT THE FOLLOWING CHECKS ARE CARRIED OUT

EVERY 14 DAYS. CHECK THE PRE FILTERS TO ENSURE THAT NO GREASE BUILD UP OCCURS AND REPLACE AS NECESSARY.

EVERY 3 MONTHS

CHECK THE MAIN FILTER BODY FOR A BUILD UP OF GREASE AND DUST

EVERY 12 MONTHS. THE FILTERS ARE TO BE CHECKED BY A QUALIFIED HVAC ENGINEER A REPORT ON THE FILTER CONDITION WILL BE ISSUED IN WRITING WITH A RECOMMENDATION FOR REPLACEMENT OR CONTINUATION TO THE NEXT SERVICE INTERVAL.