Ventilation of kitchens in catering establishments.

Introduction

This guidance provides the information a caterer will need to assess whether existing ventilation installations are adequate, as well as guiding caterers and building Advisers on management as well as design and Performance issues, specific to catering.

The importance of kitchen ventilation

The Health and Safety in Catering Liaison Committee considers the lack of adequate kitchen ventilation to be a major problem in catering. Based on their widespread experience of kitchens, and industry surveys, around 65% of kitchens may have inadequate ventilation. It considers that adequate ventilation is fundamental to achieving control of health and safety risks in kitchens as well as general hygiene control and food safety. Until now no suitable guidance has been available; hence the Committee considers this information sheet to contain some of the most important guidance it has ever produced.

The guidance is particularly important when using gas-fired appliances because of the risks from incomplete Combustion and inadequate flueing, but most aspects also apply when other energy sources are used.

Ventilation Objectives

Catering brings an exceptional concentration of heat and fumes into a small area. There are particular objectives which the ventilation has to achieve. Problems occur all too often in catering because these objectives are not met. The objectives include the following:

- The general ventilation through the kitchen has to introduce sufficient clean, cool air and remove excess hot air for the occupants to breathe adequately and remain comfortable. The stressful working conditions caused if this is not achieved can contribute to safety systems of work not being followed, as well as high staff turnover.

- The general ventilation has to provide sufficient air for complete combustion at burning appliances, otherwise chronic debilitating carbon monoxide poisoning could occur.

- The general and local ventilation has to dilute and remove products of combustion from gas and oil fired appliances.

- The general and local ventilation has to dilute and remove odours, vapours and steam from the cooking processes. Local ventilation has to protect against particular hazards to health arising from some cooking fumes, such as those involving direct application of heat to the food.

- The Local ventilation has to be capable of being kept clean from fat residues to avoid loss of efficiency and fire risks.

- The system has to be quiet and vibration free and have clean incoming air which is neither too hot nor too cold for the staff to keep it switched on.

Overall, the caterer has to match the ventilation to the cooking load, to the amount of equipment used and to the number of staff and customers. The caterer and installer have to know how to utilise the information on ventilation requirements which suppliers now have to give with new gas appliances.

Features of an effective kitchen ventilation system

Existing systems should be assessed and new systems planned to meet these ventilation objectives. The guidance given below indicates the design features and criteria which have been found suitable and effective in catering kitchens.

Canopies: design

Air needs to be removed at a constant rate from cooking and subsidiary areas, to take away combustion fumes and cooking odours as close to source as possible.

It is advisable that the bulk of extraction from the kitchen is via hoods above gas fired and all other appliances capable of generating heat, water vapour, fumes and odours.

The plan dimension of the canopy is recommended to exceed the plan area of cooking appliances. An overhang of 250 -300mm all round for island canopies is normally adequate.
Wall mounted canopies normally have a front overhang of 250mm at the front and 150mm at the ends. Greater overhangs may be required at some appliances. Canopies should not be so low as to form an obstruction.

Canopies and ductwork needs to be constructed from non-combustible material and fabricated so as not to encourage accumulations of dirt or grease, nor allow condensation to drip from the canopy. The ductwork needs suitable access for cleaning and grease filters need to be readily removable for cleaning/replacement. Experience will indicate how frequently cleaning is needed.

The design and performance of canopies needs to be effective in removing cooking fumes from source and, as far as possible, preventing them from passing through the breathing zone of the cook.

**Canopies: performance**

The amount of air to extract via the canopies is best calculated from the information supplied with the appliances within the kitchen, and not by simply using general advice on air changes alone. For example, the air velocities over the hood face specified for individual items can be added up to give the total air movement.

Where the ventilation requirements of cooking equipment are not available, an approximate air flow rate in litres per second (L/S) can be calculated from the total hood size and the following minimum hood face velocities: 0.25m/s, for light; 0.4m/s for medium and 0.5m/s for heavy duty cooking.

Ventilation rates are best specified as air velocities into the canopy rather than standard air changes per hour. Where canopies are not used (e.g. ventilated ceilings) the ventilation rates needed can be calculated by a competent designer talking account of room sizes and usages. As a guide, a ventilation rate of not less than 17.5 L/S per square metre of floor area and not less than 30 air changes per hour (ACH) is advisable. A lower ACH figure (e.g. 10) may be needed to avoid discomfort from draughts where the kitchen is subdivided into separate rooms (e.g. wash-ups, vegetable preparations).

**Replacement air**

Air to replace that extracted and used by combustion needs to be replaced. Typically 85% of the air needed is supplied by a mechanical ventilation system together with 15% make up air drawn from adjoining areas. This arrangement keeps the kitchen under negative pressure to prevent escape of cooking odours.

In smaller kitchens sufficient replacement air may be drawn in naturally via ventilation grilles in walls, doors or windows.

Where such incoming air is drawn in naturally some means of control over pest entry is usually required. If a fine mesh grille is used this will restrict the ventilation, but a large overall grill size can compensate.

However, for large installations this would require a grille so large that a mechanical system using a fan and filter would be more suitable.

The air needs to be drawn from an adequate area where it is clean. Where smoking is allowed (e.g. in an adjoining dining room) it is advisable not to draw this air into the kitchen as make up air.

Where make up air is drawn via serving hatches or counters it is recommended the air velocities do not exceed 0.25m/s to avoid complaints of draughts. However, higher velocities may be tolerated or desirable at hot serving counters. The incoming air from the ventilation system needs to be arranged so as not to adversely affect the performance of the flue at any open flued gas appliances.

The make up air can be drawn in through permanent grilles, but they need to allow for between 1.0 and 1.5m/s air flow velocity.

**Cooling air**

The effective balancing of incoming and extracted air, together with removal at source of hot vapours as above should help prevent the kitchen becoming too hot. The replacement air inlets from any mechanical ventilation systems can be positioned to provide cooling air over hot work positions.

If this is still not enough, some form of overhead air outlet discharging cool air or air conditioning may be required.

Local free standing fans are not recommended. They may spread micro-organisms or set up air currents or turbulence affecting the effecting the efficiency of the designed ventilation system. They also introduce other hazards such as tripping the electric shock hazards from the trailing cable. As part of a balanced ventilation system fans fixed to the structure could be considered.
**Discharge**

High level discharge of extracted air with discharge velocities of about 15m/s are often needed to prevent nuisance to neighbouring properties. “Chinaman’s hats” on discharge stacks are not recommended as they encourage down draughts and re entry of fumes into the building.

**New ventilation systems**

**The Caterer**

Changes in catering processes will probably require ventilation changes or systems. Competent advisors will often be needed and the caterer will need to provide detailed information for the designer and the installer.

The caterer can tell them the maximum demands likely to be placed on the ventilation (e.g. to cope with peaks of activity): the amount and type of kitchen equipment; the menu; the number of meals; the number of staff.

The caterer should take all reasonable steps to ensure those appointed as advisors, suppliers and installers are competent with respect to health and safety. The caterer can check to see they will take the factors identified in this guidance into account and that they will refer to the technical guidance available (see later section) when designing the system.

The caterer should also consult with the safety or employee representatives in good time about any significant changes.

Finally, after installation, the caterer is advised to keep records of design criteria, performance test, maintenance requirements and test and inspection.

These can facilitate future maintenance, modification and testing against the original specification.

**The building owner or controller**

In some cases the owner or controller of the building provides the facilities such as equipment and ventilation which the caterer uses. In some cases they can follow the above advise in respect of ensuring adequate ventilation is provided. They can see the caterer provides the usage information and selects a competent design team as below.

**The design team/designer team**

The redesign of a kitchen will require a range of information, specialist knowledge and skills to ensure the interactions between usage, equipment, premises, ventilation and installation are fully taken into account. The various parties (owner, caterer, designer, supplier, installer etc.) will need to fully discuss their respective information needs and what information they can supply. This forms the design team.

The building services or ventilation design engineer will need to take account of:

- kitchen usage information (as above) from the caterer;
- equipment usage information from the caterer or supplier, e.g. cleaning requirements, and the amount of air required for complete combustion and the performance of the existing installation;
- the requirements or specifications for air cleaning systems, e.g. for grease removal at the canopy and also before final discharge to outside atmosphere;
- the limitations of the building, e.g. the available room may influence the sites and routes for the air inlets or discharges;
- food hygiene requirements, e.g. identify a suitable source for clean make up air, prevent pest entry, avoid grease accumulations and ensure easy cleaning of the system.
- heat control and waste energy recovery to maximise energy efficiency;
- consider interlocking the ventilation power supply to the gas supply to ensure it will be used in practice.

Designers would then normally refer to industry technical guidance, e.g. The Chartered Institute of Building Services Engineers (CIBSE) and American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) publications. The Heating and Ventilation Contractor’s Association is also preparing DW/1712, Specifications for kitchen ventilation systems.
The equipment installer

The equipment installer will need to know the performance and capacity of the ventilation system. They can then ensure the supply and extract air will be capable of meeting the demands of the new item they are installing. This information could be available from the designer, (or for existing systems, from the caterer or building controller).

Where this information is not available (e.g. at some existing systems), measurement of the actual performance of the ventilation system may be required. That can often be provided by a heating and ventilation specialist. Or the manufacturer of the ventilation grille could give information on air flow capacity where make up air enters via such grilles.

Before installing a gas-fired appliance the installer will need to know the specific air inlet requirements. The manufacturer of the new catering appliances has to provide this under The Gas Appliances Directive. The installer can then check that these requirements are met by the ventilation system provided, taking into account the other existing appliances. Information on the ventilation requirements of the existing appliances to enable this calculation to be done could be obtained from the caterer’s records, from the manufacturers concerned or by using the general standards in this guidance.

Notes

This guidance has been agreed by the Health and Safety in Catering Liaison Committee consisting of trade and professional associations, unions and enforcement authorities. It is intended that it will be copied through member associations to reach catering establishments.

Further information

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA. Tel. 01787 881165 Fax. 01787 313995.

HSE priced publications are available from good booksellers

For other enquiries rings HSE’s Info Line tel. 08701 545500, or write to HSE’s Information Centre, Broad Lane, Sheffield S3 7HQ.

HSE home page on the world wide web: http://www.hse.gov.uk
COMMERCIAL KITCHENS

APPLIANCES

General

The installation and location of appliances shall be to the Manufacturers specific instructions. Floors should be as smooth as possible, level and be able to withstand the weight of the fully laden appliance.
Walls and floors need access for cleaning and drainage channels, which are easy to clean.
Gas supply pipe work shall be to the UP/2 standard or equivalent. A manual or automatic system for the isolation of the gas supply in an emergency shall be provided in a readily accessible position, clearly labelled with instructions on what to do in an emergency or to restore the gas supply if shutdown has occurred.
Pipe work shall be protected from corrosion, and any meter shall be in a location where it cannot be damaged.
Any movable appliances shall be fitted with a flexible connection conforming to BS.669 part 2 and have a means of isolation for servicing or cleaning.
A notice will be fitted near to the appliance reminding to reconnect the restraint if it has been disconnected and if fitted rigid a union or means of disconnection between the isolation device and the appliance.

ALL KITCHENS SHALL BE VENTILATED

Guidance on ventilation can be found from:-
The Chartered Institution of Building Services Engineers (C.I.B.S.E. GUIDE)

Single appliances are covered by BS.5440 PART 2 2000 and also manufacturers instructions.
This can appear to be a grey area and requires a certain amount of engineering judgement.
Combustion air requirements are easily calculated on the total amount of gas input, normal ventilation requirements mentioned above apply.

Total ventilation requirements:-

These are not easy to calculate and consideration is required for the removal of products of combustion and other smells or odours and to provide reasonable working temperatures within the kitchen.
A certain number of air changes per hour per appliance is recommended as specified in the BS.6173, BS.5720, BS.5925 and BS.5440 part 2.
The range covers from 20-60 air changes an hour
Can be as much as 120 air changes per hour (basements)
In the case where extract is used you should look for the following points:-

1. Is there any open flued appliances in the room or connecting room.
2. If there are any open flued appliances, close all the doors and windows, put the extract on full power, test flue, if reversing this should be noted and corrective action taken.
3. Calculate any natural or mechanical ventilation to compensate for the extract.
SUMMARY:

Whilst some countries such as Germany, France etc. have standards to assist in the kitchen design the information within the UK is mainly confined to the limited advice given by the CIBSE guide. This document therefore has been produced by a technical group who specialises in kitchen canopies and associated products.

Whatever systems are installed, it is important that local authorities codes of practice and regulations are complied with.

The Food and Safety (General Food Hygiene) regulation 1995 places a responsibility on the food business to ensure that all hazards are identified and that steps are taken to ensure that adequate safety procedures are in place.

Part of that process requires suitable and sufficient means of either natural or mechanical permanent ventilation.

Kitchen Ventilation is required for the following reasons:

Radiant heat given off by the cooking equipment
Removal of odours, products of combustion, steam and grease fumes
Removal of humidity
Replacement of air used by the cooking equipment
Keeping the kitchen and adjoining areas at a reasonable temperature

DESIGN

A basic requirement is that the Carbon Monoxide within the kitchen should not exceed 35 parts a million.

Compressors for cold rooms if fitted in the kitchen or associated areas will have to be taken into consideration.

For dry stores a recommended air change rate of 10 air changes per hour.
For serveries a recommended air change rate of 12 air changes per hour.
For offices attached to kitchens a recommended air change rate of 6 air changes per hour.
For refuse stores a recommended air change rate of 15 air changes per hour.
For preparation areas a recommended air change rate of 15 to 20 air changes per hour.
For kitchens a recommended air change rate of 40 air changes per hour.

Mechanically powered make up air should not be taken from dirty areas such as waste storage or pot washrooms etc. Air drawn in from restaurant areas should not cause unwelcome draughts or be taken from smoking areas.

If the make up air is taken from the outside consideration should be given tempering the air through a recovery system or direct fired air unit, in any case filtration should prevent birds and other animals entering the ventilation system and ultimately the kitchen.

Mechanically powered make up air or extract systems should be interlocked with appliances in such away that failure of the system should cause immediate shutdown of the system. Dependent on the system used some means of providing safety should be employed prior to restoration or use of the appliances.

Discharge louvers should be positioned such that the extracted air cannot be entrained into the air supply system, nor cause a nuisance to others near the discharge louvers.

The ductwork should discharge at least 1m above any open able window and should not have a mesh screen.

Whether using ductwork louvers or discharge terminals an efflux velocity of 12-15m/sec or local authority regulations should be applied. The use of Chainman's hat type terminals should be avoided to prevent an increase in static pressure, downdraught or re-entry noise.

TESTING AND COMMISSIONING

The velocity of air passing through the ventilation system or filtration should be determined by the use of anemometers then checked against the design criteria. Therefore it should be considered good practice to install a data badge to the canopy stating:

Name and address of supplier and installer.
Date of installation and serial number.
Extract flow rate.
Pressure drop across filtration.
Make up air requirements.

All appliance manufacturers commissioning instructions should be complied with, as well as performance and all other relevant documentation.
It is necessary to ensure an adequate supply of fresh air to a kitchen in order to provide air for combustion and to limit the effects of heat and humidity caused by the cooking process. It is also important that products of combustion and cooking vapours are removed at source and not allowed to disperse throughout the kitchen. This is usually achieved by a combination of hoods and extraction fans. Fresh make up air must be fed into replace the foul air extracted. Kitchens require 20-40 air changes per hour.

Most catering appliances should be positioned under a hood or canopy which should be sized to extend 200-300mm beyond the equipment. The lower edge of the hood should be about 2m from the floor. It should have a condensation channel around the inside, which may be fitted with a drain. Hoods should be made of galvanised mild steel, anodised aluminium reinforced glass or stainless steel. The structure must be rigid and stable and preferably be suspended from the ceiling. Frying, grilling and roasting produce greasy vapours and use of replaceable or cleanable filters should be recommended. They should be replaced at least once a month.

**HOODS and CANOPIES**

It is essential to place hoods above the equipment, and good practice to supply hoods for tea making equipment and boilers to localise the escape of cooking smells and convected heat, as well as protecting the décor. Hoods are normally of the valence or island type provided with an undrained gutter and constructed for easy cleaning, using stainless steel anodised aluminium glass or painted galvanised steel according to architectural design.

**LOCAL AUTHORITY REGULATIONS**

Local authority regulations relating to fire precautions, basement kitchens, and smell nuisance to adjoining property must be observed. The latter usually implies terminating the kitchen extract in a building at high level.

**VENTILATION REQUIREMENTS (catering appliances)**

- Bain Marie: 11m³/min
- Café Boiler: 14m³/min
- Sterilising Sink: 14m³/min
- Boiling pan: 17m³/min
- Griller: 17m³/min
- Pastry oven: 17m³/min
- Range single: 17m³/min
- Steaming oven: 17m³/min
- Fryer deep fat: 25m³/min
- Grill (under fired): 25m³/min

In all cases the extract rate should not be less than 17.5 litres per sec. Per square meter of floor area, or less than 20 to 30 air changes per hour. It is not unusual to find 120 air changes per hour where basement kitchens are restricted to the minimum height of 2.5m.

In larger kitchens, areas are subdivided; wash up, preparation, pastry and storage. These areas require a minimum of 10 air changes per hour to create a feeling of comfort.

In serveries care must be taken to avoid premature cooling of food by excessive air movement. Radiant heat from hotplates in serveries or salamanders in grilling areas will cause considerable discomfort, and in such cases, spot cooling can be effective by using other types of grills giving individual control for volume or single cooking.
RADIANT HEAT

This method of replacing the air removed by the kitchen extract system will depend entirely on the areas immediately adjacent to the kitchen and the necessity of maintaining the kitchen under negative pressure. If the kitchen is in a sealed area by virtue of the architectural design, or situated in an abasement area, a separate kitchen supply system should be used to introduce 80 to 85% of the air extracted, the difference being the infiltration keeping the kitchen under negative pressure.

It should be noted that in basement areas containing kitchens and restaurants the supply path to the restaurant areas should be sufficient to offset the downdraught from the street level in addition to supplying air to the kitchens. When non air conditioned, properly ventilated restaurants adjoin the kitchens, the majority of the air may be drawn from it at a rate of 7 litres per sec. per head.

The difference between the extract and replacement air should be provided by a separate kitchen supply system. Outdoor air supplied directly to the kitchen this way can be used effectively to create spot cooling and reduce the discomfort for occupants working for long periods under conditions of high heat and vapour saturation levels.

When adjoining restaurants are used for replacement air, permanent grills sized on 1.0 to 1.5 m/sec. through the free area should be provided in cases where serving hatches are small or likely to be shut for long periods. Velocities through hatches should not exceed 0.25m/sec.

All extract ducts should be made of sheet metal and of a gauge strong enough to withstand frequent scraping and cleaning.

Some grease vapour will pass through the filters and since its dew point is about 152 deg C it will be deposited on the duct walls. The ducts must have adequate access for cleaning and degreasing.

Ducts should be as short as possible and straight with an upward slope of not less than 1 in 12 towards the termination point.

Fans should be mounted on anti vibration pads and be joined to the duct by Flexible connections in order to minimise noise, and terminate so as not to cause nuisance.

KITCHENS

The principle objective of the engineer designing services for kitchens, as for any occupied spaces, should be to enable the occupants to pursue their working activities in comfort.

Often it is not possible to achieve normal comfort conditions in kitchens because of the extremely high expenditure required to counteract the heat released from appliances. Under these circumstances, care should be taken to ensure that acceptable working conditions are achieved.

Air Flow Rates

Generally air is extracted at a constant rate from cooking and subsidiary areas, with replacement air supplied from a separate system and additional make up air from adjoining areas. The extract rate flow rate is based on allocating nominal quantities to various types and sizes of kitchen appliances according to a table of coefficients.

For operation in winter the ventilation may be reduced to two thirds of the tabulated flow values.

When cooking equipment details are not available an approximate extract rate can be calculated by multiplying the number of meals served in one hour by 10 to 15.

If the hood sizes are given, use a minimum velocity of 0.35m/sec. through the hood opening.
Commercial Catering Gas Safety: Interlocking of Mechanical Ventilation & Gas Supplies

Changes to the British Standard covering gas installations in commercial catering establishments have focused attention on the need for correct ventilation and extraction systems. The majority of catering kitchens use mechanical ventilation systems to create a comfortable working environment that promotes health and safety at work and encourages best practice for hygiene and food safety. These systems are designed to remove the products from the cooking processes and discharge them to a safe external location, normally via a canopy installed over the cooking appliances. “Make up” air being supplied in the form of natural ventilation through air vents, louvers or serving hatches etc. In some instances, these systems also provide mechanical “Make up” air to the kitchen as well as extraction. It is important to recognise that the objective of these ventilation systems is not only to provide adequate combustion air for the gas appliances, but also to provide the following:

- Introduce sufficient clean, cool and remove excess hot air from the cooking area, to enable the occupants to breath adequately and provide comfortable conditions.

- Prevent incomplete combustion of the fuel gas and the subsequent production of harmful Carbon Monoxide.

- Facilities dilution and removal of odours, vapour and steam resulting from the cooking process.

While most appliances installed in commercial kitchens under canopy systems are designed to operate without a flue (Type A, as described in CEN CR 1749). Others would normally require connection to a dedicated flue system (Type B, appliances as described in CEN CR 1749) e.g. some type of convection oven and deep fat fryers. Due to the possible adverse effects on flue performance, particularly in those kitchens with powerful mechanical ventilation systems installed, many manufacturers permit the installation of type B appliances without the use of the flue, but under a canopy. Therefore, the canopy/extraction system is performing the same function as a flue system.

Regulation 27(4) of the Gas Safety (Installation & Use) Regulations (GSIUR) deems this as a “power operated flue” system and requires an interlock, which will shut off the gas supply to such an appliance in the event of an air movement failure. This aspect has been reinforced with the issue of the current British Standard BS6173:2001, which requires interlocking of such mechanical ventilation systems and gas supplies for all types of appliances in a commercial kitchen.

Difficulties have subsequently arisen in relation to the application of these requirements, particularly with regards to the installation of new appliances and maintenance work in existing kitchens. How should competent operatives categorise installations, especially those that do not comply as they pre-dated the current requirements and latest understanding of legislation? These problems have become higher in profile following the publication of BS6173:2001, which applies the Standard to any installation of a new appliance, rather than a completely new kitchen installation.

To avoid excessive and unnecessary modifications to existing installations installed prior to the publication of BS6173:2001 and that appear to have presented no problems in operation in the past. For example, a straight replacement of a cooking appliance(s) in an existing equipment line up would not sensibly be regarded as a new installation. In general therefore, the interlocking requirements BS6173:2001 should only be applied in full whenever either a completely new kitchen installation is carried out or a mechanical ventilation system is installed or replaced.

When a type B appliance is being installed or replaced, interlocking for that appliance will be required in order to meet GSIUR regulations 27(4)
Note: The current Industry Unsafe Situation Procedures advise that if mechanical ventilation / extraction systems is not interlocked it should be considered as being at risk. It is recognised that at the present time large numbers of commercial kitchens with mechanical ventilation/extraction systems installed prior to September 2001 are not interlocked. Following careful consideration by Industry including the HSE, the risk assessment can be lowered to not current standards (NCS) providing good management procedures exit. The information contained in this article will form the basis of a new HSE information sheet.

When undertaking the more minor work activities, such as installing a replacement type A appliance (s) or a maintenance visit, risk assessment to health and safety arising from the lack of any of the requirements of the current BS6173:2001, should be the guiding principle. Especially, issues relating to ventilation, interlocking and flame protection. The responsible person for the kitchen should be given information about the requirements of the standard and the practicability of upgrading the installation.

When carrying out minor upgrades or repairs, gas operatives will need to assess the overall condition of the installation against the current BS6173:2001 and undertake a risk assessment on the action required in relation to any shortcomings, especially, those that may affect the health and safety of people working in that environment. This process should take into account the procedures, training, systems of work and warning notices etc. that exist and are being applied, in addition to the effectiveness of the existing ventilation system in achieving the prescribed objectives.

As previously mentioned there are large numbers of pre-September 2001 installations that not comply with the new standards and whilst it is accepted that the catering industry record in terms of reported incidents is good this should not lead to complacency in considering inadequate ventilation and extraction.

The following provides guidelines on how gas operatives should approach pre-September 2001 installations.

Where there is no interlocking of the ventilation system and gas supply, gas operatives need to assess whether a risk is likely to arise. Depending on the result of this risk assessment, the current CORGI Gas Industry Unsafe Situations Procedure should be followed.

Factors, which will increase the risk, include:

- Evidence that ventilation system is not used or is unreliable
- Small room volume
- Obvious poor design/maintenance of the ventilation system (long convoluted ducts, broken fans, leaking ductwork, visible escape of cooking fumes/steam etc.)
- Lack of user awareness of the effect of using gas appliances with out adequate ventilation
- Poor general ventilation to dilute and spillage of products
- Extended use of gas fired appliances
- Ageing system/installation

Conversely, factors, which will reduce risk, include:

- Good natural ventilation
- Satisfactory fumes removal by ventilation ductwork by natural draught alone
- Well maintained ventilation system
- Good user awareness of risks and proper, documented procedures for using additional ventilation at all times
- Minimum use of gas fired appliances
- Modern ventilation system
- Large room size
- Clear permanent notices warning that appliances must not be used without the ventilation system in operation

An example of suitable wording for such notice would be:

**IMPORTANT for your safety. Do not operate any cooking appliance without the mechanical ventilation system in full operation.**
Generally, provided, that all the requirements previously described are being satisfied a Not to Current Standards (NCS) notification will be the appropriate classification, along with documentation recommendations as to what would be needed to up-grade the installation.

If a gas operative believes that factors exist, which may increase the risk described above, an At Risk (AR) or Immediately Dangerous (ID) classification should be issued, depending on the nature of level of risk present.

So what must the gas operative consider before making any decision on whether or not an appliance can be installed or other remedial action taken?

The first thing would be to survey the installation to determine ventilation and extraction and possibly undertake a spillage test at the edge of the canopy, with the ventilation system operational, to confirm whether or not the canopy is able to evacuate the products. This should be with all appliances that are located under the canopy in operation on full load, to simulate a “Worst Case” scenario. If the system copes in these circumstances and suitable procedures and warning notices are in place, then a “NCS” notification would be appropriate. Additionally, the gas operative should recommend what is required to bring the installation up to a standard where it will meet the requirements of the current BS6173 and record this information on appropriate documentation. Alternatively, if it is felt that the above requirements are not being met fully, the gas operative should escalate classification to an appropriate level. Where spillage occurs at the canopy and inadequate ventilation allows a build up of fumes, the installation should be regarded as “ID” and the appropriate action will be required.

To illustrate how this may work in practice, the following scenarios work through the above process.

**Scenario 1.**
A modern open kitchen in a burger restaurant where one fryer has to be replaced at short notice. The restaurant has used the same equipment for five years and is provided with modern high specification ventilation system, with good written systems for maintenance and use. Operation of fryers without ventilation running will result in build up of heat and cooking fumes which is rapidly dispersed when ventilation is switched on. All fryers have flame failure protection.

**Outcome:**
The gas operative decides that the installation is working safely but is considered “NCS” due to lack of interlocking. The owner is notified in writing, of the existing defects and detailing recommendations needed to bring the installation up to current specification. He/She decides to await refurbishment planned for three years hence, before upgrading installation to meet the current requirements.

**Scenario 2.**
A first time routine maintenance visit to a hotel that has recently changed hands is made and the new novice owners are seeking advise on the installation. The kitchen is located in the basement of the building with low ceilings and spreads through several old small rooms. There is also a dilapidated ventilation system that is so noisy staff often prefer to leave it switched off. The fire escape door is regularly left open to improve airflow during busy periods. All the appliances are old and most have no flame protection on any burners. Operation of cooking equipment results in obvious escape of steam and cooking fumes, with evidence of staining on ceiling. Even with ventilation on, the kitchen remains hot and airless. Condensation forms on many surfaces during cooking. A spillage test is undertaken and it reveals that the canopy is not working effectively.

**Outcome:**
The gas operative deems the installation as “ID” and applies the current CORGI Gas Industry Situation Procedure. Subsequently, the owner agrees to upgrade the general ventilation by installing a new interlocked ventilation system and creating further ventilation openings, so that spillage is prevented and general ventilation improved. Appliances are also up-graded, where required to allow the interlock proving of burner and pilot valve closure.
Maintenance/Repair of Existing appliances under existing mechanical ventilation System with no interlock provision

Installation of New/replacement appliances Under existing mechanical Ventilation systems

Installation of new extraction Canopy or mechanical Ventilation systems (inlet/extract)

Complete new kitchen Installation (appliances & Ventilation System)

Does mechanical ventilation system Comply with requirements of BS6173:2001 & GSUIR 27(4)

Ventilation system requires interlocks in Compliance with BS6173:2001 & GSUIR 27(4)

NO

YES

Type A appliance (s) (CEN CR 1749)

Type B appliance (s) (CEN CR 1749)

Provide interlock between ventilation system and gas supply to appliance if not present.

Install and commission in accordance with all relevant instructions

The responsible person for the installation should be advised that the installation does not satisfy the current standards and what would be required to bring the installation up to the current specification. It is recommended that this information is recorded in accordance with the guidance provided in the CORGI Gas Industry Unsafe Situation Procedure.

Existing Kitchens: must satisfy all the Following criteria:

- Does existing ventilation system operate effectively? (effectively removes cooking fumes from working environment.

- Does adequate provision for “Make Up” air & air changes, exist?

- Are suitable “systems of work” and written procedures in place & being applied?

- Are suitable wording signs provided in prominent position?

- Is the system well maintained and in good condition.

YES

NO

Based on assessment of risk present does the installer constitute an immediate danger to life or property.

Apply Gas Industry Unsafe Situation Procedure and treat as Immediately Dangerous (ID)

Based on assessment of risk present the installation does not constitute an immediate threat or danger.

Apply Gas Industry Unsafe Situation Procedure and treat as “At Risk” (AR)