

# Gas safety in catering and hospitality

## HSE information sheet

### Catering Information Sheet No 23 (rev1)

#### Introduction

This information sheet gives catering and hospitality businesses advice on some aspects of safety in the installation, use and maintenance of gas-fired equipment used for cooking. It answers some frequently asked questions and covers issues related both directly and indirectly to the use of gas, which have been a recent source of misunderstanding.

It builds on information in both HSE Catering Sheet 10<sup>1</sup> and current guidance issued by The Heating and Ventilating Contractors' Association (HVCA) (Document DW172 *Specification for kitchen ventilation systems*) on interlocking of ventilation systems with gas supplies.<sup>2</sup>

#### Installation and repair work on gas appliances

Such work will include equipment using natural gas or LPG in hotels, restaurants, fish and chip shops, and mobile catering units.

Everyone who does this type of work must be competent. Whether contractors or in-house staff do the work, the company must be CORGI-registered and operatives must have a valid certificate of competence relevant to the particular type of gas work involved.

This is a requirement of the Gas Safety (Installation and Use) Regulations 1998 (GSIUR).<sup>3</sup>

In premises where GSIUR doesn't apply, such as canteens in factories, competence is still essential in these situations and employers need to ensure that any staff doing such work have the necessary qualifications. In practical terms, CORGI registration is the clearest way of demonstrating competence.

All hospitality and catering employers using contractors for gas work should take reasonable steps to check that contractors have a current relevant certificate of competence. This can be checked by asking to see an individual's CORGI identity card,

which lists the competencies held, or contact CORGI on 0870 401 2300. Use of out-of-date certificates is not unknown.

#### Maintenance and inspection by employers and users

Regulation 35 of GSIUR requires employers to ensure that gas appliances, flues, pipe work and safety devices are maintained in a safe condition. They should be inspected by a competent person in accordance with current industry practice. Periods between inspections may vary depending on the equipment and its use and should follow manufacturer's recommendations, but as a general rule annual inspections will be a reasonable minimum frequency.

#### Landlords and residential accommodation

In addition to duties to maintain appliances, flues and pipe work, landlords must have all appliances and flues checked every 12 months by a CORGI-registered business, and provide tenants with a copy of the report (landlord's gas safety record) within 28 days. This applies to residential accommodation (whether rented or occupied under a licence) including hotels, guest houses, bedsits, communal kitchens, tied accommodation, holiday boats, caravans and staff accommodation, even on industrial or other premises not otherwise subject to the Regulations. So this duty may apply in certain areas of the hospitality industry.

#### Use of gas and routine tasks on equipment

All catering and hospitality staff who use gas equipment should be trained in its proper use and common-sense daily visual inspection for obvious faults. This will include such things as damaged pipe work and connections, inoperative flame supervision devices (these shut off the gas supply automatically if the flame disappears), missing restraints on equipment

needing them for stability, inoperative locks on castors of mobile equipment and smells of escaping gas. All staff should be familiar with necessary procedures in such situations.

Routine tasks such as connecting and disconnecting plug-in gas connections to appliances when moving for cleaning, or changing LPG cylinders or hoses, can be carried out by people who are not CORGI-registered, but they must be competent. It should be noted that the installation of an appliance with a plug-in gas connection should only be carried out by a CORGI-registered person, including the safety examinations prescribed in GSIUR.

## **Ventilation**

The majority of catering kitchens use mechanical ventilation systems to create a comfortable working environment that promotes health and safety at work and encourages good 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 is supplied in the form of natural ventilation through air vents, louvres or serving hatches etc. In the majority of new and upgraded installations, ventilation systems also provide mechanical make-up air to the kitchen as well as extraction. It is important to recognise that ventilation systems serve several purposes apart from the removal of combustion products. They:

- introduce sufficient clean, cool air and remove excess hot air from the cooking area, to enable the occupants to breathe adequately and provide comfortable conditions;
- prevent incomplete combustion of gas and the consequent production of harmful carbon monoxide;
- dilute and remove odours, vapours and steam from the cooking process.

## **BS 6173: 2001 Specification for installation of gas-fired catering appliances for use in all types of catering establishments<sup>4</sup>**

This British Standard was extensively revised and published in May 2001. A period of three months was allowed for users to convert to it from the 1990 version. So from September 2001 all new installations should have been to this Standard. It specifies the installation requirements for new and second-hand, gas-fired appliances and places greater emphasis on food hygiene and ventilation requirements.

Although not a statement of the law, British Standards set out agreed good practice. The current version of the Standard includes the following points.

### **Flame supervision**

When installing second-hand ovens and similar enclosed burner equipment such as steamers, these should be provided with flame supervision devices and appropriately upgraded gas controls.

For existing ovens this has been HSE advice since 1994, unless it is too expensive compared with the risk, but many employers remain unaware of it and should consult Catering Information Sheet No 3<sup>5</sup> for more information. In practice, as employers have now had many years to comply, ovens should only be operating without flame supervision devices in exceptional cases. Generally speaking, all ovens should have been upgraded or replaced by now.

The Standard also states that all burners on second-hand equipment being installed should be fitted with flame supervision devices where this is reasonably practicable. This will apply to all other open burners on second-hand equipment.

The need to retrofit flame supervision to existing equipment in-use should be determined by the site-specific risk assessment. As new equipment should be supplied with flame supervision, overall industry standards will improve as older equipment is replaced.

### **Isolation of gas supplies**

Each fixed appliance should have a single manual means of isolation for servicing or cleaning purposes and pipes shall be located to leave a space of at least 25 mm between the pipe and the wall in order to assist cleaning.

### **Interlocking of mechanical ventilation system and gas supplies**

Changes in the Standard introducing this new requirement have caused confusion and HSE, industry experts and CORGI have agreed to interpret and apply these changes in the following manner. The flowchart in Figure 1 summarises the process.

### **Regulation 27(4), Gas Safety (Installation and Use) Regulations 1998**

While most appliances installed in commercial kitchens under canopy systems are designed to operate without a flue (type A), others (such as some types of convection ovens and deep fat fryers) would normally require connection to a dedicated flue system (type B).

Due to the possible adverse effect 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 an individual flue, but under a canopy. However, the canopy/extraction system is performing the same function as a flue so regulation 27(4) of the Gas Safety (Installation and Use) Regulations 1998 (GSIUR) applies. This requires the provision of an interlock, which will shut off the gas supply to such an appliance in the event of an air movement failure. So, for type B appliances, both the law and the Standard require interlocking.

This regulation has been largely overlooked but has been reinforced by the Standard.

New installations with interlocks between the ventilation and gas supply should not be provided with an override function as this conflicts with the safe operation of the appliances beneath such ventilation.

Effective preventative maintenance and cleaning arrangements will help to prevent appliances regularly being removed from use due to failings of the ventilation system, caused by poor maintenance or a build up of cooking residue.

### **Existing installations**

There are large numbers of pre-September 2001 installations that do not comply with the new Standard or the law. While it is accepted that the catering industry record in terms of reported incidents is good and the Standard is not retrospective, this should not lead to complacency in considering inadequate ventilation and extraction through risk assessment, particularly where type B appliances are used.

Where there is no interlocking of the ventilation system and gas supply, users need to assess whether a risk is likely to arise and, if so, ensure it is removed.

Where interlocking has been provided which includes an override function, continued use of the override should be determined through thorough risk assessment of the installation and how it is used.

### **Assessing the risk**

Any user of gas who has any concerns about the safety of their installation should not wait until the next routine maintenance visit or breakdown, but seek urgent advice from a competent gas operative and where necessary a ventilation expert.

When carrying out minor upgrades or repairs and at routine maintenance visits, gas operatives (who are duty bound to take action if they discover health and

safety defects) will need to assess the overall condition of the installation against the current BS 6173: 2001 and HVCA document DW172. This process should take into account the procedures, training, systems of work and warning notices etc that are being applied, in addition to the condition and use of the existing ventilation system.

They may have to apply the appropriate CORGI Gas Industry Unsafe Situations Procedure. These range from immediate condemnation of the appliance to simple notification that it does not comply with current standards. If a gas operative does this, they should give the person responsible for the kitchen information about the appropriate standard and the practicability of upgrading the installation.

Factors that will increase the risk include:

- evidence that the ventilation system is not used or is unreliable;
- small room volume;
- obvious poor design/maintenance of 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 without adequate ventilation;
- poor general ventilation to dilute any spillage of products;
- extensive use of gas-fired appliances for long periods;
- ageing system/installation;
- operation of type B appliances.

Factors that will reduce risk include:

- good natural ventilation;
- satisfactory fume removal through ventilation ductwork by natural draught alone;
- well-maintained ventilation system;
- good user awareness of risks and proper, documented procedures for using additional ventilation;
- minimal 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.

The most likely classification will be a 'Not to Current Standards' (NCS) notification, along with documented recommendations as to what would be needed to upgrade the installation.

If a gas operative believes that there are factors that may increase the risk described above, an 'At Risk' (AR) or 'Immediately Dangerous' (ID) classification

should be issued, dependent on the nature of level of risk present. Such occurrences are likely to be rare if proper past maintenance has been undertaken.

### **Practical application**

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

The first step would be to survey the installation to determine the effectiveness of the ventilation and extraction available. This may include undertaking an appropriate canopy function test using equipment which directly measures carbon dioxide levels. With the ventilation system operational, such a test will help to confirm whether or not the canopy is able to remove the combustion/cooking products. This should be with all the appliances that are located under the canopy in operation on full load, to simulate a 'worst-case' scenario. Figure 2 provides further details regarding an appropriate canopy function test method. Further guidance on the use of electronic portable combustion gas analysers can be found in BS 7967: 2005.<sup>6</sup>

If the system copes in these circumstances and suitable procedures and warning notices are in place, then a 'NCS' notification would be appropriate. The gas operative should also recommend what is required to bring the installation up to a standard where it will meet the requirements of the current BS 6173 and DW172, recording this information on appropriate documentation.

If it is felt that the above requirements are not being met fully, the gas operative should raise the classification to an appropriate level. For example, if carbon dioxide levels are above background ambient levels and rapidly increasing, indicating a build up of fumes and that the canopy ventilation is ineffective, the installation should be regarded as 'ID'. The following scenarios illustrate how this may work in practice:

#### **Scenario 1**

A fryer has to be replaced at short notice in a modern, open kitchen in a burger restaurant. The restaurant has used the same equipment for five years and is provided with a modern, high-specification ventilation system, with good written systems for maintenance and use.

Operation of fryers without ventilation running results in a build up of heat and cooking fumes which are rapidly dispersed when ventilation is switched on. All fryers have flame supervision.

*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 decides to await major refurbishment, due in three years' time, 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 advice 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 that 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 supervision on any burners. Operation of cooking equipment without ventilation 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 canopy test monitoring carbon dioxide levels 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 Unsafe Situations Procedure. Subsequently, the owner agrees to upgrade ventilation by installing a new interlocked ventilation system and creating further ventilation openings, so that the build up of combustion products is prevented and general ventilation improved. Appliances are also upgraded, where required, to allow the interlock provision to provide proving of burner and pilot valve closure.

#### **New installations**

Because the Standard applies to any installation of an appliance, rather than a new kitchen installation, questions have arisen about the installation of individual appliances.

In general, the interlocking requirements set out in BS 6173: 2001 should be applied in full whenever either a completely new kitchen installation is carried out or a mechanical ventilation system is installed or replaced. However, a straight replacement of a cooking appliance(s) in an existing equipment line-up would not generally be regarded as a new installation.

On the other hand, where a type B appliance (one designed for use with a flue) is being installed under a ventilation system, interlocking for that appliance will be required in order to meet GSIUR regulation 27(4).

### Interlocking mechanism

Direct airflow measurements have traditionally been regarded as the most reliable means of monitoring that ventilation ducting is working properly, but in catering ducting, fat and grease build-up can cause these to fail. There are a range of indirect airflow measuring methods which indicate that the ventilation system is working effectively. Provided these are suitably located and ducting is kept adequately clean, equipment failure and ventilation shutdown should be avoided.

### Future developments in ventilation system maintenance

Properly functioning ventilation systems are becoming a more important feature in ensuring kitchen safety. So the use of a properly designed and fully specified system, with a record of its design performance characteristics, as required by DW172, will make it considerably easier for both owners of kitchens and gas operatives to assess whether fumes are being adequately removed and fresh air and combustion air are being provided.

### Safety standards for new appliances

All new appliances for commercial catering must be CE-marked in accordance with the Gas Appliance (Safety) Regulations 1995. CE-marking indicates conformity with these Regulations and that a notified body has approved the appliance. Although the Regulations apply principally to domestic appliances, industrial space heaters and commercial catering equipment are covered.

The principal standard that applies to safety standards for gas-fired catering equipment is BS EN 203-1: 2005 *Specification for gas heated catering equipment. Safety requirements.*<sup>7</sup>

One area that remains a source of confusion is the provision of flame supervision on hob burners. Many existing appliances are not fitted with this, although the Standard came into effect in 1993.

Flame supervision should be provided on new equipment, in compliance with BS EN 203-1. (It should be provided on second-hand equipment being installed or existing equipment following the guidance in BS 6173.)

### Mobile equipment

Many more appliances are now fitted with castors to allow movement for cleaning as a result of the increasing demands of food hygiene laws. Careful installation allowing cleaning without moving the appliance may permit fixing of such appliances where there are risks of splashing from hot liquids (particularly oil) during movement and flexible gas connectors may not be necessary. If appliances containing hot liquids have to be moved, they must be fitted with lockable castors that are regularly maintained.

### Mobile catering

Vehicles using gas-fired cooking appliances, such as fish and chip vans or travelling barbecues, usually use LPG.

Appliances and any pilot lights should not be lit while the vehicle is in motion. This increases the chance of the flame going out and some vehicles have exploded due to this. There are some exceptions to this such as specialised vehicles for 'meals on wheels' which have special safeguards installed. The Road Vehicles (Construction and Use) (Amendment) (No 4) Regulations 2003 apply and should be consulted for detailed guidance.<sup>8</sup>

### Carbon monoxide/dioxide alarms

Some kitchens have carbon monoxide alarms installed. Domestic models are not designed or tested for use in the generally much harsher commercial working environment and should not be used. If installed, carbon monoxide detectors shall give an audible alarm and be linked with an automatic gas shut-off system. This should be fail-safe and require manual intervention to restore the gas supply.

Carbon dioxide alarms are now becoming available for use in commercial installations. Their use should be considered within the site-specific risk assessment of the appliance and installation, ensuring an appropriate proactive alarm maintenance regime is introduced in line with the manufacturers' instructions.

**These alarms should only be regarded as a secondary backup. The primary safeguard remains the provision of adequate ventilation to ensure complete combustion of gas and removal of combustion products.**

## **LPG-fuelled, portable blowtorches**

These are often used for caramelising dishes such as crème brûlée and have been involved in several fires and explosions in kitchens when accidentally placed on hot surfaces in kitchens. At least one entire kitchen has been burnt to the ground due to this cause of fire. Such torches should not be placed on or near hot surfaces or near open flames.

## **Home-made blowtorches**

A number of restaurants use a length of flattened copper pipe connected to a flexible hose and mains gas rather than a hand-held torch for such work and other activities. Only blowtorches of an approved proprietary design, which have been installed and tested by a CORGI-registered installer, should be used.

When not in use, the blowtorch should be disconnected from the gas supply and the gas sealed off. A self-sealing, quick-release fitting installed downstream of an installation valve may be suitable for this application.

## **Ventilation ductwork**

Sources of fires in ductwork above open flame gas appliances include flambéing, flame-grilling and stir-frying. Ductwork should be regularly cleaned to prevent build up of grease and fat.

This can be an unpleasant and awkward task and great care is needed to ensure a proper job is done as experience has shown this is often skimped.

The risk of a large build-up of grease within a ductwork system can be greatly reduced if an appropriately designed canopy with modern grease filtration is used.

## References

- 1 *Ventilation of kitchens in catering establishments*  
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Web version: [www.hse.gov.uk/pubns/cais10.pdf](http://www.hse.gov.uk/pubns/cais10.pdf)
- 2 *Standard for kitchen ventilation systems* DW172  
Heating and Ventilating Contractors' Association.  
Available from HVCA Publications, Old Mansion  
House, Eamont Bridge, Penrith, CA10 2BX Tel: 01768  
860405 e-mail: [hvcapublications@welplan.co.uk](mailto:hvcapublications@welplan.co.uk)
- 3 *Safety in the installation and use of gas systems  
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[www.hse.gov.uk/pubns/cais3.pdf](http://www.hse.gov.uk/pubns/cais3.pdf)
- 6 BS 7967: 2005 *Carbon monoxide in dwellings and  
the combustion performance of gas-fired appliances*  
British Standards Institution  
Part 1 - *Guide for identifying and managing  
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combustion products and carbon monoxide detector  
activation*  
Part 2 - *Guide for using electronic portable  
combustion gas analysers in the measurement of  
carbon monoxide and the determination of  
combustion performance*  
Part 3 - *Guide for responding for measurements  
obtained from electronic portable combustion gas  
analysers*
- 7 BS EN 203-1: 2005 *Specification for gas heated  
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Standards Institution
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- 9 BS 6896: 2005 *Specification for installation of gas-  
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commercial heating* British Standards Institution
- 10 EH40/2005 *Workplace exposure limits: Containing  
the list of workplace exposure limits for use with the  
Control of Substances Hazardous to Health  
Regulations 2002 (as amended)* Environmental  
Hygiene Guidance Note EH40 HSE Books 2005  
ISBN 0 7176 2977 5

## **Further information**

British Standards are available from BSI Customer Services, 389 Chiswick High Road, London W4 4AL  
Tel: 020 8996 9001 Fax: 020 8996 7001  
e-mail: [cservices@bsi-global.com](mailto:cservices@bsi-global.com)  
Website: [www.bsi-global.com](http://www.bsi-global.com)

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**This document contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.**

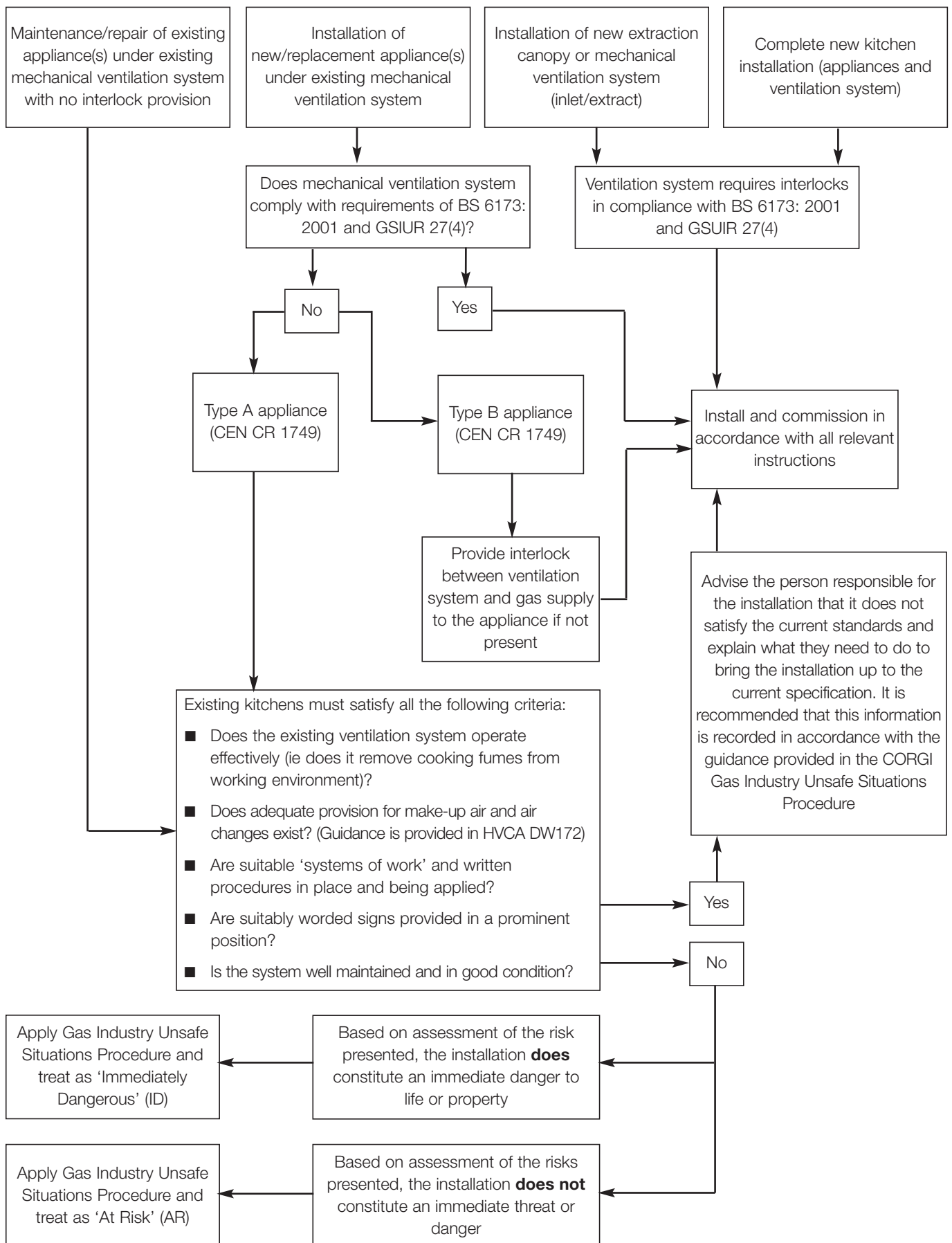
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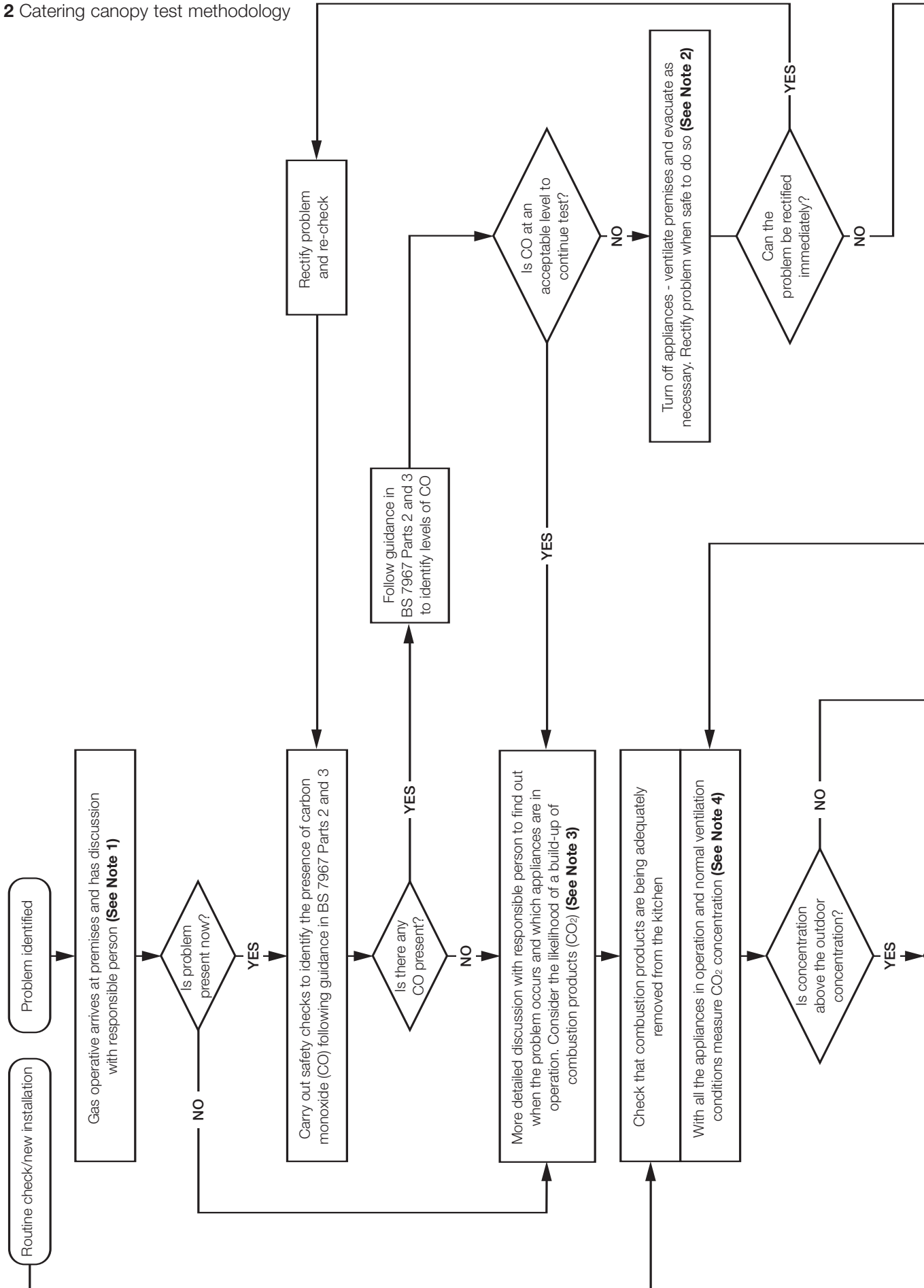


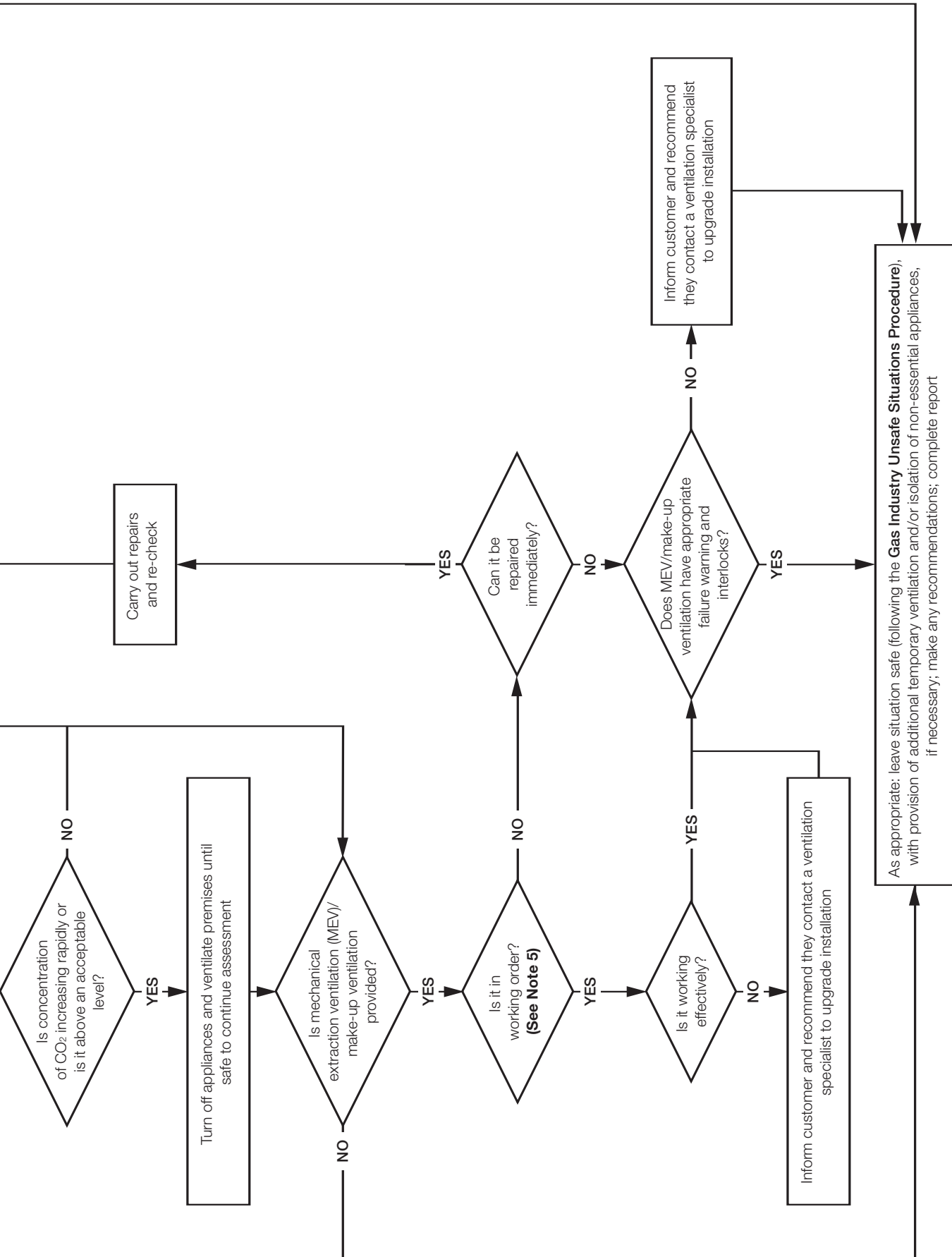
**Figure 1** Interlocking of mechanical ventilation system and gas supplies



**Note:** Type A appliances are normally a flueless type. Type B appliances are normally designed to be connected to a flue or be installed below a device, which will evacuate the products of combustion (mechanical ventilation system)

Figure 2 Catering canopy test methodology





Notes: Please see overleaf

This table refers to Figure 2

<p><b>Note 1</b></p> <p>Some establishments may have a manager responsible for health and safety. A discussion with the responsible person might include the following questions:</p> <p>(a) Does the problem only happen when appliances, including mobile/portable appliances, are or have been in use? Are there any safety warning notices/labels attached to the installation/appliances?</p> <p>(b) Do workers feel unwell in the premises and recover when outside or away from the workplace? What are their symptoms?</p> <p>(c) Is there a pattern to the occurrences, eg observed once, more than once or many times? Does it occur during particular weather conditions or certain activities, or from the use of a chemical or substance, or in a particular area?</p> <p><b>Note 2</b></p> <p>If other fuel burning appliances are present and in operation, where practical check them for production of CO and spillage. If these appliances are thought to be the cause of the problem, recommend the responsible person to seek expert advice.</p> <p>For oil appliances, contact the Oil Firing Technical Association (Tel: 0845 658 5080 Website: <a href="http://www.oftec.co.uk">www.oftec.co.uk</a>).</p> <p>For solid fuel appliances, contact the Solid Fuel Association (Tel: 0845 601 4406 Website: <a href="http://www.solidfuel.co.uk">www.solidfuel.co.uk</a>).</p> <p><b>Note 3</b></p> <p>Other issues you could ask about include any possible damage, eg heat stress/corrosion, maintenance history, potential for misuse and any operating difficulties.</p>	<p><b>Note 4</b></p> <p>Measure concentrations of CO<sub>2</sub> as follows:</p> <p>(a) Measure the outdoor CO<sub>2</sub> levels.</p> <p>(b) Above each individual appliance at approximately head height.</p> <p>(c) At centre of room at approximately head height.</p> <p>(d) Just inside the canopy of any installed mechanical extract system.</p> <p>Concentrations should not exceed 2800 ppm (including the outdoor level) at any of the locations listed above (see BS 6896: 2005 <i>Specification for installation of gas-fired overhead radiant heaters for industrial and commercial heating</i>).<sup>9</sup></p> <p>Occupational exposure limits (see EH40/2005)<sup>10</sup> for CO<sub>2</sub> are 0.5% (5000 ppm) 8-hour time-weighted average and a short-term exposure limit of 1.5% (15 000 ppm) 15-min time-weighted average.</p> <p>Where concentrations exceed 2800 ppm consider the need to turn off appliances or isolate non-essential appliances and the possibility of evacuation. Immediately ventilate the affected area by opening windows and doors as necessary until CO<sub>2</sub> level is reduced below 2800 ppm so that the investigation can continue.</p> <p><b>Note 5</b></p> <p>Check that electrical power is being supplied to MEV fan, the fan is securely attached to drive motor shaft, fan blades are present and undamaged, air filters are not blocked, and any trip system is working correctly.</p>
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