

## Regulations

Though there is some crossover the overriding legal document is the *Gas Safety Installation and Use Regulations*  
Other regs are more specific

BS 6173:2009. (Replaced 2001)

BS 6172

DW172 (Replaced DW 171 2005)

HSE Catering sheet 10.

HSE catering sheet 23.

BS 5440-2000

IGEM/UP/11 (Replaced IM25)

DfES BB101

We do not attempt to replace the published documents but to quote definitions and point to the area where the required design information may be found. For full information refer to the standards, and for clarification contact GasSafe Technical helpline.

The following information is correct at 06.01.04 with updates from UP/11 and DW 172 on 30.5.05. It is reproduced in good faith with commentary by ourselves in (*blue italics*) to point towards the relevant, and save engineers going up blind alleys. Should any errors or omissions be found we would be glad of the feedback.

A basic premise for kitchen ventilation is to remember that gas cookers/ranges/hobs are *appliances* within the scope of the Gas Safety (Installation and Use) Regulations 1998. There is a safety requirement to provide fresh air (Oxygen) for combustion and to remove the products of combustion (Carbon Dioxide) from the kitchen. See GSIUR 27(4). This is essential to prevent the possible production of Carbon Monoxide.

These air volumes and the free area required to provide them is normally based on the heat input to the appliance.

In addition there are HSE requirements to provide a safe and comfortable environment. As flaming and frying produce carcinogenic's these must be removed by the extract system.

### **Approved Code of Practice and Guidance.** to *Gas Safety (Installation and Use) Regulations 1998*

The GSIUR Regulations deal with "the safe installation, maintenance and use of gas systems, including gas fittings, appliances and flues, mainly in domestic and commercial premises".

Regulation 2.8....."gas appliance" means any appliance designed for use by a consumer of gas for heating, lighting, cooking or other purpose. ....

2.13 "**the responsible person**", in relation to any premises, means the occupier of the premises or, where there is no occupier or the occupier is away, the owner of the premises or any person with authority for the time being to take appropriate action in relation to any gas fitting therein.

2.21 "**work**" in relation to a gas fitting includes any of the following activities carried out by any person, whether an employee or not, that is to say-

- a) installing or connecting the fitting;
- b) maintaining, servicing, permanently adjusting, disconnecting, repairing, altering or removing the fitting or purging it of air or gas;
- c) where the fitting is not readily movable, changing its position; and
- d) removing the fitting.

But the expression does not include the connection or disconnection of a bayonet fitting or other self-sealing connector.

Regulation 2.27(6). Nothing in these regulations shall apply in relation to -

- (b) the supply of gas to, or anything done in respect of a Bunsen burner used in an educational establishment; or.....

Regulation 27.4 No person shall install a power operated flue system for a gas appliance unless it safely prevents the operation of the appliance if the draught fails. (*This applies to canopies*).

Though it is not seen as good practice, LPG appliances may be installed in cellars, providing they do not have automatic ignition of the flame i.e are manually controlled. (GSIUR 6(8b)). The contradiction to this is that any room with LPG or LPG mixtures installed must have a low level vent. (*Impossible in a cellar*)

## KITCHENS

**BS 6173:2009** Specification for installation and maintenance of gas-fired catering appliances for use in all types of catering establishments (2<sup>nd</sup> and 3<sup>rd</sup> family gases)

Though this standard does cover 2<sup>nd</sup> and 3<sup>rd</sup> family gases it does not cover “mobile” LPG installations. For these see UKLPG Code of Practice 24 Parts 3<sup>(1)</sup> and 4<sup>(2)</sup>

The standard requires to gas to a kitchen to be interlocked with the mechanical air supply and extract canopy so that failure of these fans will shut down the gas supply.

The major change is to require ambient air testing in the kitchen at specific points within the room, such as just inside the edge of the canopy and the centre of the room. This must be done at initial commissioning and at subsequent service visits. This was initially outlined in Feb 2007 in HSE catering sheet 23.

No overriding of the ventilation interlock with the gas system is now permitted. Risk assessments need to be applied to existing installations with override fitted.

Responsibility lies with the person installing and commissioning the ventilation system to ensure the system meets the minimum design criteria for that specific installation. This includes air velocities, lighting, sound levels, ambient air temp and recording this information on the canopy rating plate.

It applies to ‘domestic type’ appliances used in a commercial environment but not to small B & B establishments.

This standard was published in August 2009 replacing BS6173 2001 which is withdrawn.

1 Scope ..... Note 1 This specification also applies to the installation of typical domestic cookers or leisure appliances such as barbecues when installed in commercial catering sites or establishments. It is not intended to apply to primarily domestic premises, e.g. those supplying a small number of clients on a “bed and breakfast” basis. However the rules for hygiene and personal safety should be applied. ....

6.1.2 .....Where an appliance is not fitted with a flame supervision device, the gas supply shall be fitted with a proving system to prove the closure of all valves prior to the establishment or restoration of the gas supply. ....

7.2.2 LPG fired appliances shall not be installed in cellars or basements which have no natural floor level ventilation.

7.3 .....Either this (manually operable) valve shall be located outside the catering area or near an exit, and be in a readily accessible position, or an automatic electric valve system shall be fitted. In the latter case, an emergency stop button or control shall be located to enable operation in an emergency.

11.1 .....Appliances shall be interlocked with any mechanical ventilation system that is fitted to enable their safe operation. ....

11.2 An interlock shall be provided which will cut off the gas supply or prevent the operation of appliances if the mechanical ventilation system provides an inadequate airflow rate for the safe operation of appliances and the safety of personnel. ....An interlock on a new installation shall not be fitted with an override function. ....

11.4 Food Technology classrooms

**DW 172** *Standard for Kitchen Ventilation Systems* is published by Heating and Ventilating Contractors Association. (HVAC) Tel 020 7313 4900 email [contact@hvca.org.uk](mailto:contact@hvca.org.uk) website [www.hvca.org.uk](http://www.hvca.org.uk)  
(DW 172 replaced DW 171 in 2005)

1.3 The Food Safety (General Food Hygiene) Regulations place an onus on the proprietor of “a food business” to ensure that all hazards are identified and that steps are taken to ensure that adequate safety features are in place. Part of that process requires that there must be suitable and sufficient means of either natural or mechanical ventilation.

1.4 The Workplace (Health Safety and Welfare) Regulations also require that “an effective and suitable provision shall be made to ensure that every enclosed workplace is ventilated by a sufficient quantity of fresh or purified air”.

1.7 The 4 main emissions that require removal are :- Smoke; Expanded air from the heat load surrounding the cooking device; Precipitation of moistures existing in the food into a vaporous state, primarily consisting of steam, grease, and cooling odours; Exhaust fumes from the combustion appliances such as gas, charcoal or mesquite.

3.1 .....Dedicated make up air systems to be 85% maximum of the extract flow rate.

- Min air change rate of 40 per hour – not to be used as a basis of design of the canopy or vent ceiling.
- 3.2 Variable speed regulation can also enhance energy efficient use of the system and plant when there is partial or low load cooking conditions. However, care shall be exercised in maintaining correct velocities through the grease filters when cooking is in process. For recommended face velocities see Table 13.
- 3.6 Fresh air ventilation rates must be sufficient to ensure that the CO exposure levels to which kitchen staff are subjected do not exceed the COSHH limits of 300 parts per million (ppm) for 10 minutes, or the World Health Organisation guide-lines of 10 ppm as an average over 8 hours. *(From EH40/02 the 2002 COSHH guide, the long term exposure limit (8-hour TWA reference period) states 30ppm, and the short term exposure limit (15-minute reference period) gives 200ppm TCW)*
- 3.9 Diversity factors shall not be applied to reduce the extract flow rate calculated from Table 2 when partial or intermittent use of appliances is proposed.
- 5.2 .....The ‘Thermal Convection Method’ of calculation should be the only method used. Other methods have been included in this document for use only when insufficient information is available at the design stage (see sections 5,5 to 5.8).....
- 6.1 In order for the kitchen extract system to function correctly, it is essential that an allowance is made for the provision of replacement air. This should be achieved either by introducing mechanical supply air, or by making provision for natural infiltration. ....
- 6.2 Where mechanical input is selected, the system shall provide a maximum 85% of the total extracted volume with the remaining 15% infiltrating naturally into the kitchen from the surrounding areas. ....
- 6.5.1 A minimum air entry temperature of 10<sup>0</sup>C shall be selected for canopies and 16<sup>0</sup>C for ventilated ceilings.
- 15.2 For the distribution of supply air to the canopy.....Bird mesh screens to the rear of any inlet louver shall be incorporated. Insect mesh shall not be used as it can become easily blocked.
- 15.15 The discharge terminal shall be open without mesh and.....However consideration should be given to situations where the lack of a mesh/guard might allow hand access to operating fan blades.
- 15.17 The use of a ‘chinamans hat’ cowl should not be used....
- 17.8 ...variable and two speed regulation are now common.....A minimum extract level shall be set within the regulator to ensure that, even when set to low speeds, an acceptable ventilation rate is maintained....
- 17.9 Where a make-up air system is selected, the speed regulators for both the supply and extract fans shall be electrically interlocked to ensure that the desired balance is maintained.
- 17.10 BS 6173 *(reference to this standard)*
- 20.6.3 When the fire suppression system is activated, mains energy supplies such as gas or electricity serving the appliances, must immediately be automatically shut off and isolated.
- 21.4 For columns containing gas services a ventilation grill is required at high and low level.
- 21.9 .....Combined gas and electricity “knock-off” buttons shall be provided on the end of each vertical column.
- 24.7 Each installed canopy or ventilated ceiling shall be fitted with a rating plate. For canopies this shall be fitted on the inside left end of each canopy on which the following information should be recorded.....
- 25.1.1 .....For detailed requirements refer to the HVCA publication TR/19 Guide to good practice- Cleanliness of ventilation systems.
- 25.1.2 .....it is recommended that kitchen exhaust ductwork should be cleaned annually as a minimum.

**HSE Information Sheet 10: Ventilation of kitchens in catering establishments. Catering Sheet No 10 (rev1)**

*(A free downloadable pdf file TCW)*      [www.hse.gov.uk/pubns/cais10.pdf](http://www.hse.gov.uk/pubns/cais10.pdf)

Introduction. ....to assess whether existing ventilation installations are adequate.....

The importance of kitchen ventilation. ....Kitchen ventilation is required to create a safe and comfortable working environment. ....particularly important to provide adequate make-up air for gas fired appliances. ....also apply to other energy sources.

Adequate ventilation. ....remove cooking fumes at the source.....remove excess hot air and introduce incoming cool clean air so that a comfortable working environment is achieved..... provide sufficient air for complete combustion at fired appliances....be easy to clean.....be quiet. Further details can be found in Catering sheet 23 and 3.....

**HSE Information Sheet 23:** Gas safety in catering and hospitality. Catering Sheet No 23 (rev1)

*(A free downloadable pdf file TCW) [www.hse.gov.uk/pubns/cais23.pdf](http://www.hse.gov.uk/pubns/cais23.pdf)*

Introduction. ....advice on some aspects of safety in installation and use.....answers frequently asked questions .....which have been a recent source of misunderstanding.

*An explanation of the application of the various standards and how far and under what circumstances they expect you to go in upgrading installations*

**BS 5440-2:2000** Part 2 Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70kW net (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> family gases)

*(Note that this standard is for appliances up to 70Kw input and generally refers to Domestic situations. Nevertheless Table 4 states no maximum appliance rating. Also Table 4 only refers to kitchens under 10m<sup>3</sup> ie 2mtrs square by 2.5 meters high. TCW.)*

5.4 Flueless appliances

Where a flueless appliance is installed/operated in a room or internal space, that room or internal space shall be provided with vents which communicate directly with outside air and are sized in accordance with Table 4. For further information on cooker installations in kitchens see 6.4

6.4 Internal kitchens

.....Flueless (*cookers TCW*) appliances in internal kitchens shall be ventilated in accordance with Approved Document F in England & Wales, or the Building Standards (Scotland) Part K in Scotland.

Commentary and recommendations on 6.4

a) England & Wales

Approved Document F (England & Wales) requires that “there shall be adequate means of ventilation for people in the building”. Section 1, Ventilation of non habitable rooms not containing openable windows, **1.5** states “in kitchens not containing openable windows (ie internal rooms) the requirements will be satisfied if there is either:

- a) mechanical extract ventilation rated at 30 litres/sec for a hob or 60 litres/sec elsewhere and the fan has a 15 minutes overrun and is either controlled automatically or manually; or
- b) passive stack ventilation operated manually and/or automatically by sensor or controller (see note 1); .....

Ventilation reference is also made in CIBSE guide B2.

**SCHOOLS**

**Gas installations for educational establishments IGE/UP/11** available from The Institute of Gas Engineers

[www.igem.org.uk](http://www.igem.org.uk) Replaced British gas standard IM25 summer 2004.

Scope

2.1 These Procedures provide guidance for those concerned with the design, installation, operation and maintenance of pipework, systems and appliances in educational establishments, universities and training facilities. The procedures do not cover gas installations in individual domestic dwellings which may be integral with an educational establishment. However the installation of domestic gas appliances in the educational establishment itself is covered.

6.2.3 Where it is not practicable to install a manual isolation valve in a readily accessible position, or where it is beneficial to provide automatic means of isolating and restoring the gas supply to an area, an automatic means of isolation may be utilised. Such automatic means of isolation shall, in the event of a shutdown taking place, require manual re-setting to take place such that an automatic check is performed to prove that all downstream gas isolation valves are closed.

*The standard then has Section 7 Laboratories, Section 8 Art Design and Technology and Section 9 Food Technology.*

7.6 Purpose-provided permanent ventilation shall be fitted to provide sufficient fresh air for combustion and climate control. Ref shall be made to the manufacturer’s instructions for advice on vent requirements.

8.1.4 .....Purpose-provided permanent ventilation shall be fitted.....

9.1 All gas fired catering appliances shall be installed in accordance with BS6173 and HSE Information Sheet, Catering Sheet No 10.

9.2 Domestic cooking appliances shall be installed in accordance with the manufacturer's instructions and BS6172. ....more than one cooker. ....Catering sheet 10 for ventilation requirements. ....Catering sheet 23.....

**BS 6172:1990** Specification for installation of domestic gas cooking appliances (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> family gases)

1 Scope .....including educational establishments.....

6 Ventilation

The ventilation requirements for the appliance shall comply with BS 5440 Part 2. (*this is the multiappliance requirements. TCW*)

## **CLASSROOMS**

There is also a move towards monitoring the CO<sup>2</sup> levels within classrooms. This is dealt with in *DfES Building Bulletin 101* – ventilation in school buildings

It states that the CO<sup>2</sup> levels in teaching areas should not exceed 1500ppm and there should be means for the occupants to lower this concentration to 1000ppm. The CIBSE TM40 guide recommends limiting the value to 1000ppm.

The simple way is to fit a 'traffic light' visual indication detector at head height to allow the staff to open windows, but the detection systems can also provide output signals to open vents or operate extraction fans.

Intermittent appliance use (bunsen burners or cookers) will obviously increase CO<sup>2</sup> levels.