

Title: Gas cookers in internal kitchens - Ventilation requirements as applied to Scotland

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Note: This version of Technical Bulletin (TB) 005 replaces the version originally published 15 October 2010 which is now withdrawn. This version has been updated in line with BS 5440-2: 2009 and the Scottish Building Standards Technical Handbook Domestic 2010 Section 3 – Environment, clause 3.14 – Ventilation - and applies particularly to installations in Scotland.

This Technical Bulletin provides guidance to Gas Safe registered businesses/engineers on the ventilation requirements for gas cooking appliances located in ‘internal’ kitchens and those kitchens which are now regarded as ‘internal’ following modifications to the building and applies particularly installations in Scotland

Background

This Technical Bulletin (TB) is intended to provide guidance on the ventilation requirements of gas cooking appliances located in internal kitchens and those kitchens which have now become internal due to modifications to the building e.g. due to the addition of a conservatory, or building extension and applies particularly installations in Scotland.

Note 1: For details on the ventilation requirements for gas cookers in internal kitchens in England, Wales, the Isle of Man and Guernsey, see [TB 005\(A\)](#) and for Northern Ireland, see [TB 005\(C\)](#).

Note 2: For a list of definitions used in relation to this TB see page 4.

Ventilation requirements

The ventilation requirements for gas cookers/hobs can be found in the current version of British Standard (BS) 5440-2⁽¹⁾ and in particular, Table 6 – *Minimum permanent opening free-area for flueless appliances* – gives the ventilation recommendations for gas cooking appliances. Part of the Table relevant to gas cooking appliances is reproduced below.

Type of appliance	Maximum appliance rated input limit (net)	Room volume (m ³)	Permanent vent size cm ²	Openable window or equivalent also required ^{(A)(B)}
Domestic oven, hotplate, grill or any combination thereof ^(C)	None	<5	100	Yes
		5 to 10	50 ^(D)	
		>10	Nil	
(A) Alternative acceptable forms of opening include any adjustable grille or louvre, hinged panel or other means of ventilation that opens directly to the outside air. This is additional to the permanent vent requirement. (B) Where no openable window direct to outside is available, other products shall be sought (see 7.4) Building Regulations advice should be followed, see 7.4 (Note: clause 7.4 is reproduced below). (C) The appliance, unless a single burner hotplate/boiling ring, shall not be installed in a bedsitting room of less than 20m ³ volume. (D) If the room or internal space containing these appliances has a door which opens directly to the outside, no permanent opening is required.				

Note 3: Where appropriate, the requirements of BS 5440-2⁽¹⁾ Clause 6.6 – **Multi-appliance installations** – should also be taken into consideration.

Clause 7.4 of BS 5440-2: 2009⁽¹⁾ states:

“7.4 Internal kitchens

Open-flued appliances in internal kitchens shall be provided with ventilation in accordance with 6.3. Flueless appliances in internal kitchens shall be ventilated in accordance with Table 6.

For further information, the ‘Commentary’ on clause 7.4 to BS 5440-2⁽¹⁾ directs the reader to the relevant Building Regulations document. In the case of Scotland, the Scottish Building Standards Technical Handbook Domestic and in particular Section 3 – Environment, clause 3.14 - Ventilation currently applies (see [Note 4](#)).

Note 4: For details of current gas safety legislation, building legislation and industry standards for the geographical areas covered by Gas Safe Register, see the [Legislative, Normative & Informative Document List \(LNIDL\)](#)⁽²⁾ at: <https://engineers.gassaferegister.co.uk> - login and visit the Technical Information area.

In addition to the ventilation requirements for combustion air, there is a need for the provision of ventilation, including mechanical extract ventilation in dwellings. Extract ventilation is provided to aid removal of high concentrations of pollutants and water vapour released from activities such as painting, cooking, etc.

Building Standards Technical Handbook - Section 3 - Environment (Domestic) (2010 edition)

The Technical Handbooks provide guidance on achieving the standards set in the Building (Scotland) Regulations 2004 (as amended) and are available in two volumes, for Domestic buildings and for Non-domestic buildings. Domestic Section 3.14.7 – ‘Moisture producing areas’ – states:

“If the conservatory or extension is constructed over an area that generates moisture, such as a kitchen, bathroom, shower room or utility room, mechanical extract, via a duct if necessary, or a passive stack ventilation system should be provided direct to the outside air. Any existing system disadvantaged by the work may require to be altered to ensure supply and extracted air is still to the outside air.”

Information taken from a table in section 3.14.2 of the Handbook is reproduced below as [Table 1](#).

Table 1. Recommended ventilation of a kitchen		
	Ventilation recommendations	Trickle ventilation < 10m³/h/m²
Room	Minimum intermittent extract rate	
Kitchen	either: a) mechanical extraction capable of at least 30 l/sec (intermittent) above a hob; or b) mechanical extraction capable of at least 60 l/sec (intermittent) if elsewhere; or c) a passive stack ventilation system.	10000mm ²
Note: Additional information from the Technical Handbook: <ul style="list-style-type: none">• With regard to a) and b) in Table 1, Clause 3.14.10 explains that mechanical extract ventilation units can be switched manually or automatically via a humidistat control;• Where a kitchen contains an open-flued appliance, Clause 3.17.8 explains that the extract rate of the fan should not exceed 20 litres/second to prevent spillage from occurring.		

A trickle ventilator, (sometimes called background ventilation), is a small ventilation opening, mostly provided in the head of a window frame, but not always and is normally provided with a controllable shutter. They should be provided in naturally ventilated areas to allow fine control of air movement. Clause 3.14.5 explains that the area recommendations in the table to clause 3.14.2 may, in some situations, be difficult to achieve in the window frame and other options may need to be considered.

Use of extract fans to achieve purge air requirements for gas cookers

If the kitchen has no external walls, the ventilation provision (background and extraction) should be via an intermittent mechanical extraction fan. The extract fan rate should be a minimum of 30 l/s where the fan is located above the hob and 60 l/s if the fan is located elsewhere in the kitchen. Intermittent extract can be operated manually and/or automatically by a sensor (e.g. humidity sensor, usage sensor, etc.). In kitchens, any automatic control should provide sufficient flow during cooking with fossil fuels to avoid the build up of combustion products. Any automatic control should provide a manual over-ride to allow the occupant to turn the extract system on.

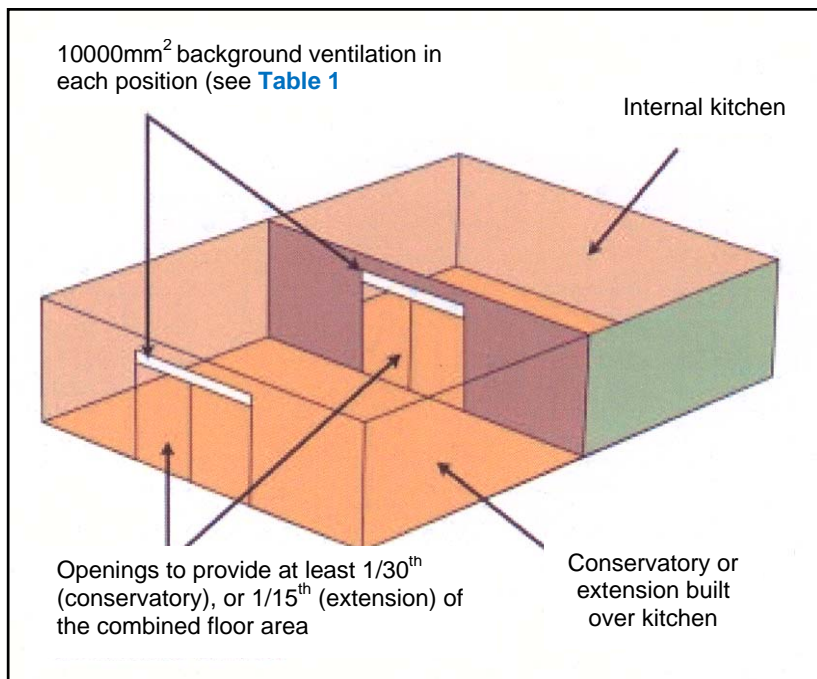
Clause 3.14.10 of the Technical Handbook explains that mechanical extract ventilation units can be switched manually or automatically via a humidistat control. Clause 3.17.8 of the Technical Handbook explains that where a kitchen contains an open-flued appliance, the extract rate of the fan should not exceed 20l/s to ensure safe operation.

Note 5: For further guidance on the effects of extract fans on open flued appliances, see [TB 095^{\(3\)}](#), which can be viewed at: <https://engineers.gassaferegister.co.uk> - login and visit the Technical Information area.

If the extraction is via a cooker hood, it should be installed paying due regard to both the hood and cooker manufacturer's installation instructions. Mechanical extract terminals and extract fans should be placed as high as practicable but preferably within 400mm of the ceiling.

Conservatories and extensions built over existing windows

Section 3.14.7 of the Technical Handbook explains that constructing a conservatory or extension over an existing window, or ventilator, will effectively make it an internal room, by restricting air movement and could significantly reduce natural ventilation to that room.



Clause 3.14.7 explains that a conservatory may be constructed over a ventilator serving a room in a dwelling provided that the ventilation of the conservatory is to the outside air and has an opening area of at least 1/30th of the total combined floor area of the now internal room and the conservatory.

The ventilator to the internal room should have an opening free area of at least 1/30th (for a conservatory), or 1/15th (for an extension) of the floor area of the room. Trickle ventilators should also be provided relevant to the overall areas created.

Additionally, Section 3.14.7 explains that an extension may also be built over a ventilator but a new ventilator should be provided to the room. Where this is not practicable, e.g. where there is no external wall, the new extension should be treated as part of the existing room rather than the creation of a separate internal room because the extension will be more airtight than a conservatory and therefore the rate of air change will be compromised. The opening area between the 2 parts of the room should be not less than 1/15th of the total combined area of the existing room and the extension.

If the conservatory or extension is constructed over an area that generates moisture, such as a kitchen, bathroom, shower room or utility room, mechanical extract, (via a duct if necessary) or a passive stack ventilation system should be provided direct to the outside air. Any existing system disadvantaged by the work may require to be altered to ensure supply and extracted air is still to the outside air.

Note 6: See diagram above for the method of providing ventilation through a conservatory.

Passive stack ventilation

Alternatively, guidance given in Clause 3.14.6 of the Technical Handbook explains that an open-flued appliance may provide sufficient extract ventilation for the room in which it is located when in

operation via its chimney/flue system acting as a form of 'Passive Stack Ventilation' (PSV) and can be arranged to provide sufficient ventilation when not firing. It is essential that the recommendations of BS 5440-2⁽¹⁾ are complied with. Clause 3.14.6 of the handbook explains that the provisions **may** be adequate in the case of:

- a) A solid-fuel open-flued appliance installed in the internal kitchen is the primary source of heating, cooking or hot water; or
- b) Where there is an open-flued appliance (e.g. gas-fired, oil-fired), which has a chimney/flue system with a free area equivalent to 125mm diameter and the appliance's combustion air inlet (e.g. air vent) and dilution inlet (e.g. draught diverter) are permanently open, i.e. there is a path with no control dampers which could block the flow or ventilation path and can be left open when the appliance is not in use; or
- c) The appliance is an oil fired appliance which is a continually burning vapourising appliance (only) such as a cooker or room heater and the room is fitted with a ventilator with a minimum free area of 10,000mm².

Note 7: For further guidance on PSV systems, see [TB 057^{\(4\)}](#), which can be viewed at: <https://engineers.gassaferegister.co.uk> - login and visit the Technical Information area.

Additional guidance

A flowchart has been developed (see [Appendix 1](#)) to provide guidance to Gas Safe registered businesses/engineers when assessing the safety of gas cooking appliances located within internal kitchens in relation to the requirements of both regulation 26(9) of the Gas Safety (Installation and Use) Regulations (GSIUR) and the current Gas Industry Unsafe Situations Procedure (GIUSP) (see [Note 8](#) and also [Note 4](#)).

Note 8: The GIUSP ([TB 001^{\(5\)}](#)) can be viewed at: <https://engineers.gassaferegister.co.uk> - login and visit the Technical Information area.

Where appropriate, further help and advice on the suitability of the ventilation provision should be sought from the local building control body.

Definitions of terms used in this Technical Bulletin

Internal kitchens: In relation to this Technical Bulletin, examples include but are not limited to:

- where there is no door, openable window, or equivalent to direct to outside air;
- where there is no opening communicating directly with the outside air because all walls are internal, e.g. no walls are in direct contact with outside air, such as in residential flats;
- where a conservatory, or building extension has been 'built over' the only wall of a kitchen communicating with outside air, such as in a terraced property.

Habitable room: is a room used for dwelling purposes but which is not solely a kitchen, utility room, bathroom cellar or sanitary accommodation.

Outside air: can be hard to define at times and the person carrying out the inspection should treat each case on its own merits. As an example, a ventilation route is taken through an exterior wall; however, a car port has since been constructed over the ventilation termination. There are gates at either end of the car port which fills 75% of the end space. The roof to the car port is corrugated but the gaps under the corrugations have not been filled. The air in this case may be considered as outside air, as the space cannot be realistically described as overtly enclosed.

Passive stack ventilation (PSV): is a ventilation device using ducts from terminals in the ceiling of rooms, to terminals on the roof that extract air to outside by a combination of natural stack effect and the pressure effects of wind passing over the roof of the building. Open-flued systems such as those utilised by gas appliances operate in a similar manner.

Trickle ventilator means a closable small ventilator which can provide minimum ventilation.

Note 9: For general information about the process behind the development of Gas Safe Register Technical Bulletins and the expectations for all Stakeholders, see *TB 1000*⁽⁶⁾ at: <https://engineers.gassaferegister.co.uk> - login and visit the Technical Information area.

Bibliography

(1) BS 5440-2: 2009 – Flueing and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases) – Specification for installation and maintenance of ventilation provision for gas appliances

(2) LNIIDL - Gas Safe Register Legislative, Normative & Informative Document List

(3) TB 095 - Effect of mechanical fans on open-flued appliances

(4) TB 057 - Passive stack ventilation

(5) TB 001 Gas Industry Unsafe Situations Procedure

(6) TB 1000 – An introduction to Gas Safe Register Technical Bulletins

Note: Gas Safe Register Technical Bulletins and the Legislative, Normative & Informative Document List can be viewed at: <https://engineers.gassaferegister.co.uk> - login and visit the Technical Information area

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Appendix 1
Ventilation requirements for flueless gas cooking appliances in internal kitchens as applied to Scotland

Section A

Providing that the installation passes all relevant safety checks, (GSIUR 26(9)) the cooker installation can be regarded as satisfactory
Where a building extension or conservatory is built over an existing kitchen go to Section B

START Section A

Does the room volume and where required, combustion air ventilation meet the requirements of BS 5440-2?

Classify cooking appliance as 'At Risk' ('AR') in accordance with current GIUSP

Section B

START Section B

Classify cooking appliance as non-compliant with current standards.

Where a building extension or conservatory is built over an existing kitchen
 Assuming the general ventilation requirements of BS 5440-2 are met, additional requirements apply for internal kitchens, or where a building extension or conservatory is built over an existing kitchen.
 Where no opening to outside via door, window or similar exists, Scottish Technical Handbook – Environment (Domestic) Section 3.14 – Ventilation also applies

Classify cooking appliance as non-compliant with current standards.

Is there sufficient continuous/intermittent purge ventilation provided (extract fan) ducted to outside air?
 See Note 1.

Mechanical ventilation method

Natural ventilation method

Is ventilation provided through openable doors/windows/ PSV in kitchen and adjoining room/ conservatory to outside air?

Note 1: Refer to guidance in the main Technical Bulletin under – Use of extract fans to achieve purge air requirements for gas cookers.
Note 2: Refer to Table 1 in the main Technical Bulletin under – Technical Handbooks Building legislation – Section 3 - Environment – Domestic.
Note 3: Refer to guidance in the main Technical Bulletin under – Building extensions/conservatory installations and also – Passive stack ventilation.

Is extract rate via Intermittent Either:
A) at least 30 l/s (extract hood or canopy over hob), or B) 60 l/s extract located elsewhere in kitchen? Or if Continuous extract
 See Note 2.

Is ventilation provision equivalent to 1/30th of combined floor area of kitchen and adjoining conservatory (1/15th for extension)?
 Or 125mm PSV (minimum CSA 12000mm²)?
 Or open-flued gas/oil appliance with minimum 125mm chimney/flue, correct ventilation, no dampers or flue stabilisers?
 Or solid fuel appliance where it is the primary central heating, hot water or cooking source?
 See Note 3.

Has trickle ventilation between kitchen and adjoining room/conservatory to outside air equivalent to 10000mm² been provided at least 1.75m above floor level?
 See Note 1.

Classify cooking appliance as non-compliant with current standards.

Has trickle ventilation between kitchen and adjoining room/conservatory to outside air equivalent to 10000mm² been provided at least 1.75m above floor level?
 See Note 1.

Providing that the installation passes all relevant safety checks, (GSIUR 26(9)) the cooker installation can be regarded as satisfactory

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