Flues, chimneys and combustion air ventilators.
Flues, chimneys & combustion air ventilators is published by the Cavity Insulation Guarantee Agency (CIGA). It is one of a series of technician’s guides, intended to contribute to best practice in cavity wall insulation.

Whilst every care has been taken in its preparation, CIGA and its authors specifically exclude any liability for errors and omissions or otherwise arising from the contents of this guide. Readers must understand the principles and practices described in relation to any particular application and, where necessary, take professional advice.

The information contained in this guide is not exhaustive. Further details on flues, chimneys, and combustion air supply can be obtained from the following publications.

**Gas Appliances**

**BS5440** – Fleeing and Ventilation for Gas Appliances not exceeding 70kW

Part 1 2008: Specification for the Installation and maintenance provision for gas appliances

Part 2 2009: Specification for the Installation of gas appliances to chimneys and maintenance of chimneys

**BS 5871** Specification for the installation and maintenance of gas fires, convector heaters, fire/back boilers and decorative fuel effect appliances –


Further Technical information should be sought / obtained from the relevant fuel supplier;

Natural Gas

- Gas Safe

Oil Appliances

- (Oil Firing Technical Association for the Petroleum Industry: OFTEC)

Solid Fuel

- **Solid Fuel Appliances** The Building Regulations 2010 Part J Appendix F
  
  [www.planningportal.gov.uk](http://www.planningportal.gov.uk)

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LEGAL REQUIREMENTS

The main legal requirements for protection of the public and employees are the general provisions of Health and Safety at Work act 1974, and related legislation, including the Management of Health and Safety at Work Regulations 1999.

These require the drawing up of a ‘risk assessment’ plan of protective measures, as well as the appointment of competent persons to ensure that safety requirements are met effectively. An example of a risk assessment for Flues, Chimneys and Combustion Air Ventilators is given on page 20.

In addition, for gas installations, there is a requirement to comply with the current edition of the Gas Safety (Installation and Use) Regulations, and in particular Regulation 8. This covers alterations and modifications to buildings in which gas appliances are installed and this would include cavity wall insulation.
PREFACE

“The Technician’s guide to best practice provides technicians with a simple, but detailed manual. It covers best practice for dealing with flues, chimneys and combustion air ventilators during the installation of Cavity Wall Insulation (CWI). It clearly sets out the responsibilities of the CWI installer companies, with practical examples and illustrations of procedures to be carried out by the competent technician.

The guide should be followed by all CWI installer companies and used in conjunction with recommended training programs.
INTRODUCTION

This guide has been written for the CWI Company and technician, to ensure that the performance of fossil fuel-burning appliances is not adversely affected by the installation of Cavity Wall Insulation (CWI).

CWI should not be installed unless you can gain entry to the property, and are able to complete all of the necessary pre and post installation checks.

Installation is a relatively simple operation, but you must carry out your pre- and post- installation checks correctly, or you put the occupants in real danger. If you block any combustion air ventilators or flues of fuel-burning appliances, there is a high risk of someone becoming seriously ill or dying of carbon monoxide poisoning.

All fuel-burning appliances need an adequate air supply and need a clear chimney /flue to operate correctly and safely.

With an appliance in good working order the main products of complete combustion are Carbon Dioxide and Water Vapor. Both of these gases are non-toxic, however if the air supply becomes impaired or violated highly toxic carbon monoxide is produced. This is known as incomplete combustion.

Where the products of combustion are unable to pass through a flue to outside atmosphere, or they re-enter the premises through either a blocked or defective flue or chimney it is referred to as ‘spillage’.

Carbon monoxide poisoning
You cannot see, smell or taste carbon monoxide, but it is an extremely toxic gas. It is absorbed by the red blood cells via the lungs, resulting in illness or death. Exposure to high levels of carbon monoxide can lead to death in as little as 1-3 minutes.

The symptoms of carbon monoxide poisoning can be confused with those of other illnesses, such as colds and flu. Someone exposed to the gas may complain of: Unexplained headaches, Chest pains or muscular weakness, General lethargy or fatigue, Sickness, diarrhea or stomach pains, Sudden dizziness when standing up, convulsions. If carbon monoxide poisoning is suspected, all appliances must be switched off immediately and not used again until the cause has been fully established and rectified.

Where carbon monoxide poisoning is confirmed the installation must not be disturbed (other than making safe) and the incident reported to the HSE under RIDDOR.

Technician’s competence

To attain a level of competence, technicians must have successfully completed an approved / registered Combustible Fuels Awareness training course covering all checks and inspections referred to in this guide.
CONTENTS

YOUR RESPONSIBILITIES 1 - 2

- Carbon monoxide (CO) analyzers
- Carbon monoxide (CO) alarms
- Glass fronted fires
- Pre-installation checks
- Installation checks
- Post-installation checks

IDENTIFYING APPLIANCES, VENTS AND FLUES 3 - 4 -5

- Typical fuel – burning appliances
- Air bricks and ventilators
- Combustion air ventilators
- Other ventilators
- Common air bricks
- Maintaining air supply

COMBUSTION AIR & VENTILATION REQUIREMENTS 6 – 6a

VENTILATOR REQUIREMENTS 7a-7b-7c

VENTILATION REQUIREMENTS FOR OPEN-FLUED GAS APPLIANCES 8

FLUES 9

FLUELESS GAS FIRES 10

CHIMNEYS 11

CHECKING FLUES AND APPLIANCES 12

PRE-INSTALLATION CHECKS 13

POST INSTALLATION CHECKS 14 – 15 – 16 -

- Solid fuel appliances
- Glass fronted fires / boilers and floor mounted, free standing boilers
- Gas fired appliances
- Room sealed appliances (balanced flue)
- Oil fired appliances
- Testing for carbon monoxide (CO) CO readings

WARNING NOTICE 17 – 18

EXAMPLE OF RISK ASSESSMENT 19

TECHNICIAN’S SAFETY CHECKS 20

TECHNICIANS SAFETY CHECK SHEET 21
YOU’RE RESPONSIBILITIES

You must leave flues, chimneys and combustion air ventilators in the same or in better condition than before cavity wall insulation took place.

When you identify that a fault could harm the occupants or yourself, remember that people’s health & well-being must be safeguarded. You should take appropriate action and or issue a Warning Notice.

You must ensure that the installation vehicle is equipped with:
- Smoke pellets and holder
- Smoke matches and holder
- Warning notices.

General.

The normal procedure of installing cavity wall insulation should not affect the operation of fuel – burning appliances, flues or chimneys.

The appropriate checks must be carried out at all stages of the works:
- Pre installation
- Installation
- Post installation.

When you leave the installation, make certain that you have not blocked or compromised any chimney, flue or combustion air ventilators with insulation materials.

If for any reason a smoke / spillage test cannot be carried out by the cavity wall insulation installing technician, an approved appliance maintenance contractor must carry out the appropriate checks. (I.e. Gas Safe – registered installer for gas appliances HETAS or Solid Fuel approved engineer installer for all solid fuel appliances – OFTEC registered engineer for Oil appliances)

CARBON MONXIDE (CO) ALARMS

The Health & Safety Executive in its discussion documents Gas Safety Review: options for changes states: HSE recommends the use of CO alarms meeting all current British Standards as a second line of defence. It is emphasised by the HSE that alarms must not be seen as a substitute for proper regulatory installation maintenance and safety checks on Gas appliances and flues. This view is endorsed by CIGA.

GLASS FRONTED FIRES

Some manufacturers state that decorative canopies or fronts of fires should be removed from gas fires in order to carry out spillage tests. Where these parts are to be removed by the householder and are not designed for the safe use of the appliance, then this can be carried out by the installation technician. Where removing the part would affect the safe operation of the appliance then this work must only be carried out by a Gas Safe registered installer.

PRE- INSTALLATION CHECKS

Fuel burning appliances, combustion air ventilators, and the routes of all flues on chimneys on external walls must be located and identified. Ventilators should be checked to ensure that they are compliant with the regulatory standards and that chimneys are not capped.

Appliances must be run and the flame observed, especially with glass – fronted gas fires. Confirm exit of combustion gases by carrying out a flue, or spillage test. Should any of the checks prove unsatisfactory report them to your supervisor and do not proceed with the installation until the problem(s) have been fully resolved.
LOCATE and NOTE

- Each Appliance Type:
  - Boiler
  - Space Heater (fire)
  - Other
- Fuel Type Used
  - Gas
  - Oil
  - SmokelessOvoids, Briquettes, Wood, Bio Fuel, bituminous coal
- Combustion air ventilators for each appliance
  - Location
  - Type
  - Compliant / None Compliant
- Carry out a spillage test’s where applicable

You must be satisfied that the ventilator’s supplying combustion air for the fuel – burning appliances meets the current standards and requirements.

INSTALLATION CHECKS.

Installation procedures are fully detailed in the Technicians Guide: Installing Cavity Wall Insulation

Particular care is needed during;

DRILLING.
When drilling holes, do not drill directly in line with a chimney of flue.

INJECTION.
When installing cavity wall insulation near a chimney or flue, check that no insulation material is visible within the flue. Care and attention should always be applied.

POST – INSTALLATION CHECKS.

Ensure that:
  a) All combustion air ventilators are clear and functioning correctly
  b) All flues on external walls are clear and not compromised.

Go inside the property and check for any visible evidence of insulation material in or around fuel-burning appliances.

Ask the customer / occupant to run each appliance. Check the appearance of the flame.

For wood burners and Solid Fuel Fires you should observe flues and chimneys from outside of the property, to ensure that combustion gases are being exhausted.

Carry out Smoke / Spillage tests for all fuel burning appliances on external walls and compare them with your pre-installation safety checks.

You could be held personally responsible and face prosecution if occupants subsequently become ill or die from carbon monoxide poisoning due to careless work on your part.

ADVICE TO CUSTOMER’S.

If you are unsure about the operation of an appliance or the effectiveness of the flues, chimneys and combustion air vents you must issue a warning notice (see pages 18/19)

Explain to the customer that the appliance must not be used / operated until the appliance and or its flueing system has been thoroughly check by a registered and approved maintenance contractor.

Should you believe that a Gas appliance is dangerous it must be turned off and the Gas Emergency Service or Gas Safe registered contacted and immediately notified.

For liquid petroleum gas – Contact the Supplier.

The information provide here does not cover every eventuality. If you in any doubt, seek further informed advice
IDENTIFYING APPLIANCES, VENTS & FLUES.

TYPICAL FUEL – BURNING APPLIANCES

It is important to establish what fuel type is used by each appliance. Different fuels and appliances will have different flues, chimneys and combustion air ventilation requirements.

Always see the appliance’s in use before installing cavity wall insulation to compare its performance following the installation. The appearance of the flame should be noted in this respect (see page 10): checking flues & appliances) Scorch marks or staining in or around the appliance casing or other signs of distress may indicate existing problems.
SAFEGUARDING THE COMBUSTION AIR SUPPLY

The combustion air supply to each appliance must be isolated from the cavity to guarantee an un-obstructed supply of air to the appliance(s). If there is not enough air, carbon monoxide may be produced which could build up and cause serious illness to the occupants. In severe cases it may kill.

It is essential that the air ventilator is continuously sleeved across the cavity.

It is your responsibility to ensure that there is sufficient combustion air available to the appliance following the installation of cavity wall insulation.

AIR BRICKS & VENTILATORS

There are many air bricks and ventilators in external walls. Where air bricks continue to have a purpose, they must be sleeved continuously with a proprietary duct from the cavity, and not blocked by the insulation material.

Initially you must locate, identify and note the position of combustion air ventilators for all fuel – burning appliances within the property. It is vital that these are thoroughly checked.

TYPICAL COMBUSTION AIR VENTILATORS

Incorrect air supply - Must not be drawn from the wall cavities

Correct

Combustion air ventilators must not draw air from the wall cavities; they need to be non-closable, kept free from obstruction.

Combustion air ventilators must not be closable or incorporate fly screens or mesh

It is of the utmost importance that combustion air ventilator ‘new fits’ are sold specifically as combustion air vents e.g. Stadium, Ryton, Permalli – this means that they will be stamped with the free air and be unobstructed.
COMMON AIR BRICK TYPES

Due to the tapered design of their vent holes, “Terracotta” air bricks only provide limited free air flow and will not normally provide sufficient combustion air. They should be replaced with a regulatory combustion air vent.

Other ventilators with fly screens must be removed / replaced

225mm x 150mm terracotta louvre
225mm x 150mm plastic

OTHER VENTILATORS

Other ventilators include those
- providing under floor (to suspended floors)
- Cavity wall & roof ventilators
- Room vents (kitchen / bathroom
- Extractor fans
- Air vents to larder / food storage.

All operational ventilators must be sleeved and protected and maintained (Kitchen / bathroom vents must be maintained)

Bedroom ventilators should be maintained; however, should the client request that these are sealed over, record ventilator location and its use on the work records.

Be careful not to confuse cavity vents with others – such as under floor vents.

OBSOLETE CAVEITY VENTILATOR’S.

These must be sealed with an appropriate material to prevent
- Material loss
- water ingress
- infestation
COMBUSTION AIR & VENTILATION REQUIREMENTS

If a combustion air ventilator is required, one must be fitted before you proceed with cavity wall insulation. The nominal size and the free air area of combustion air ventilators vary from manufacturer to manufacturer. Dimensions referred to in this guide are the nominal sizes used by the trade, but the key consideration is the free air area that the vent provides.

A number of different terms are used by vent manufacturers to describe the free air area, including: ‘air flow rating,’ ‘free air opening,’ ‘available air opening,’ and ‘vent free area.’

Gas appliances must be provided with at least 500mm² of free air per kW - above a 7kW net input rating†. Oil and solid fuel appliances require 550mm² of free air per kW - above a 5kW rating.

A table showing the vent free areas required for any open flued gas appliance, up to a 70kW Nett rating is shown on page 8 (excluding DFE gas fires). However, most fuel-burning appliances found in domestic CWI installations, are covered by two sizes of standard plastic air vents:

A typical 225mm x 150mm plastic air vent (the old 9” x 6,” or ‘two brick’ size), provides up to 15,600 mm² of free air, which is sufficient for:

• Gas-fired appliances with a net heat input up to 37kW (126,000 Btu).

A typical 225mm x 225mm plastic air vent (the old 9” x 9,” or ‘three brick’ size), provides up to 23,400mm² of free air, which is sufficient for:

• Gas-fired appliances with a net heat input up to 53kW (180,000 Btu)
• Oil-fired and solid fuel appliances with a heat input up to 45kW (153,000 Btu)

Open-flued, solid fuel fires

A permanent air vent must be fitted in any room or space containing a working solid fuel open fire. The CWI installer is not required to fit an air vent when the installation is obsolete: e.g. when the appliance has been removed, or the flue and fireplace recess is permanently blocked. With these appliances, the combustion air requirement is calculated as at least 14,500mm² unless otherwise specified in the manufacturer’s instructions. The standard 225mm x 150mm plastic vent, or a 125mm dia circular hole core ventilator, will usually provide 10,000mm². Always check the vent size before fitting.

Solid Fuel Stoves, Closed Appliances (boilers and cookers).

Approved document J requires ventilation for any appliance with a rated output above 5kW or every kW where the fire is fitted to a property built since 2008.
† Information regarding the input rating of a gas appliance can be found on the appliance data badge. This is normally fixed on the appliance casing.

‡ Ventilation provided for gas appliances should not be over-sized, as this can have a detrimental effect on the energy-efficiency of the appliance. In turn, this may encourage customers to block the vent off.

Note: For all gas appliances ventilation requirements are calculated from net values. If the manufacturer specifies gross values divide by 1.11
Where it is not clear, take value as a net value to err on the side of safety.
Combustion Air Ventilation Requirements for Solid Mineral Fuel & Wood Burning Appliances

Does the room contain a Solid Mineral Fuel or Wood Burning Appliance?

Does the room contain a Closed appliance?
Approved document J requires:
- Ventilation for any appliance with or without a draught stabilizer fitted?
- Ventilation required for any appliance for every kW into a property built from 2008

Extract from :- Approved Document J Combustion Air Ventilation

Open Fire
The size of an air vent is subject to the throat area or cross sectional area of the flue:- [50%]

Closed Appliance
- Free air of 550mm² x kW rating applies to appliances above 5kW
- Free air of 555mm² x kW for homes built from 2008

Table: ADJ Air Supply to Solid Fuel Appliances

<table>
<thead>
<tr>
<th>Type of Appliance</th>
<th>Type and Amount of Ventilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open appliance</td>
<td>Permanently open vent with a total equivalent area of at least 50% of the cross sectional area of the flue</td>
</tr>
<tr>
<td>Open appliance, such as an open fire with a throat.</td>
<td>Permanently open vent with a total equivalent area of at least 50% of the throat opening area</td>
</tr>
</tbody>
</table>
| Open Appliance, such as a stove, cooker or boiler with a draught stabiliser | Properties built before 2008:  
  - 300mm²/kW for the first 5kW of the appliance rated output  
  - 850mm²/kW for the balance of the rated output |

Equivalent area is measured :-
divide the area given in mm by 100 to find the corresponding area in cm²

<table>
<thead>
<tr>
<th>Nominal fire size (fireplace opening size)</th>
<th>350mm</th>
<th>400mm</th>
<th>450mm</th>
<th>500mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total equivalent area of permanently open vent's</td>
<td>14,500mm²</td>
<td>16,500mm²</td>
<td>18,500mm²</td>
<td>20,500mm²</td>
</tr>
</tbody>
</table>

Example: an appliance with a flue draught stabiliser and a rated output of 7kW would require an equivalent area of \([5 \times 300] + [2 \times 850] = 3200\text{mm}^2\)
It is unlikely that a dwelling constructed prior to 2008 will have an air permeability of less than 5.0m²unless the dwelling has received extensive measures to improve the air permeability.
Combustion Air Ventilation Requirements for Gas Appliances

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the room contain a DFE fire in an open flue?</td>
<td>Where a design plate or Appliance Manual is Not available: seek Technical Advice</td>
</tr>
<tr>
<td>Does the room contain a fuel burning appliance?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is it a balanced flue or room sealed appliance?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is it a gas appliance of 7kW or under?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is it a flueless gas appliance?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is it a Gas Appliance from 7kW up to 37kW?</td>
<td>Free Air area = 10,000mm²</td>
</tr>
<tr>
<td>Is it a Gas Appliance from 37kW up to 53kW?</td>
<td>Free Air area = 15,600mm²</td>
</tr>
<tr>
<td>For appliances above these kW ratings contact a registered Gas Safe Engineer for Technical Advice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Free Air area = 23,400mm²</td>
</tr>
</tbody>
</table>
Combustion Air Ventilation for Oil Fired Appliances

Does the room contain a fuel burning appliance?

- Yes
- No

Is it an oil fired appliance of 5kW or under?

- No
- Yes

Is it an Oil Fired appliance from 5kW up to 30kW?

- Yes
- No

For oil fired appliances above these kW ratings, seek technical advice from an approved OFTEC engineer

Free air area = 55mm² x kW

7c
VENTILATION REQUIREMENTS FOR OPEN FLUED-GAS APPLIANCES

7kW and under heat input (net) does not require additional ventilation.
The combustion air requirements for an open flued gas appliance can be determined using the following:

2. A gas range rated appliance with a heat input from 20kW to 25 kW (net) the maximum heat input must be used to determine the ventilation required.

25kW – 7kW = 18 kW
18 x 500mm² = 9,000mm² of ventilation required.

Note: There are different ventilation requirements for a single gas appliance or groups of appliances with a total input rating over 70kW (net). Advice regarding these appliances should be sought from a registered gas safe or solid fuel engineer.

Gas Appliances in compartments

Open flued gas appliances located in compartments which are ventilated directly to outside require ventilators fitted at high and low level. The ventilators should be sized as follows:

High Level Ventilator - 500mm²/kW heat input

Low level ventilator – 1000mm²/total kW heat

Input Example: 20kw boiler + High Level 500 x 20 = 10,000mm²

Low Level 1000x20 = 20,000mm²

Heat input greater than 7kW (net) requires an additional 500mm² of ventilation per kW e.g. an appliance with 15kW input requires:

15kW - 7kW = 8kW
8 x 500mm² = 4,000mm² of ventilation required.

<table>
<thead>
<tr>
<th>Heat input kW net</th>
<th>Room vent free area (mm²)</th>
<th>Heat input kW net</th>
<th>Room vent free area (mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>3</td>
<td>14,500</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>3</td>
<td>15,000</td>
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<td>3</td>
<td>14,000</td>
<td>7</td>
<td>31,500</td>
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FLUES

To work properly and safely, fuel burning appliances need a continuous supply of air. Some draw air from within the room (open flues) from outside.

- **Gas fire 7kW and under**
  - Combustion air vent normally not required

- **Oil cooker & boiler (lined flue)**
  - Combustion air vent required

- **Solid fuel boiler (lined flue)**
  - Combustion air vent required

- **Free standing, oil-fired boiler**
  - Combustion air vent required

- **Gas fired back boiler**
  - Combustion air vent required

- **Free standing oil-fired boiler**
  - Combustion air vent required

- **Inset Flueless gas fire**
  - Seek Technical Advice

- **Room sealed (balanced flue or oil-fired)**
  - No combustion air vent required

Example of a Free standing stove flue arrangement.
FLUELESS GAS FIRES

Until recently, all fixed gas fires in the UK have been fitted with a flue to discharge the combustion gases to the outside air. Where these appliances are only for room heating, and with the exception of the fuel effect type, they have generally been exempt from the requirement to have a permanent vent to provide combustion air.

However, gas fires that do not have a flue, have been introduced into the UK to be used for background heating. In all cases you must seek technical advice to confirm the ventilation requirements on these appliance types.

In place of a flue, these fires use burner technology or have a catalytic element that ensures that only minimal non harmful levels of carbon are produced. In addition, they have built-in oxygen depletion sensor that will shut down the fire if oxygen levels become depleted.

Considerations
Several important facts must be borne in mind by all CWI personnel involved in the installation process, and particularly by the CWI technicians.

All flueless fires require a minimum permanent combustion air vent of 10,000mm². Further additional ventilation will be required for appliances with a rated input above 2.7kw net within a room, or 5.4kw net within another internal space (i.e. hallway). The vent must lead directly outside and must not be compromised by the CWI see manufacturers data for specific ventilation requirements.

Flueless fires can be positioned on internal walls, and an external survey of the building cannot provide safe information on the fuel burning appliances that may be inside. This emphasizes the importance of a careful internal survey to note the appliance type and location. Where flueless appliances are located on external walls, then safety checks must be carried on each appliance before and following the installation of cavity wall insulation.

There are insert type fires on the market that are designed specifically to replace the internal leaf and the cavity itself.

When installed in an occupied room the minimum room volume is 1 m³ for every 0.045 kW net or when in other internal spaces such as hallways 0.09 kW net. For example, a 1.8 kW appliance installed in a lounge area must have a MINIMUM room volume of 40 m³ where the room volume is smaller it must not be installed. It should be noted that most main rooms in terraced houses, and many in semi-detached properties, do not meet this minimum volume.

Comment

Flueless fire or stove (Secondary Heating Only)

- Highly efficient energy using appliance.
- No flue or chimney or outside wall required.
- Supplementary ventilation required, (e.g. a small air vent, as per manufacturer’s instructions) through outside wall directly into the room.
- Supplementary to primary heating.
- Room size restrictions apply.
CHIMNEYS.
If flues become blocked, then gasses cannot escape to the outside.

Therefore, it is extremely important to locate and identify flues and chimneys.

Where the brick chimney is built externally and it is therefore easily identified, drill holes may be positioned close to the side of the chimney, but not in the projecting part of the chimney.

It is worth noting that brick built chimneys serving open fires and boilers in houses built before 1964 are unlikely to contain a clay flue liner.

Flues and chimneys built into a cavity wall may be isolated from the cavity.

EXAMPLES OF CHIMNEY ROUTES

Examples of Chimney Constructions
During the pre-installation check, the line of the flue must be identified by noting the position of
the appliance and its terminal as shown below, the route often includes offsets that are not
obvious, either internally or externally.

You must know which type you are dealing with to ensure
that no drilling takes place on the line of the flue.
Drilling a hole into a flue could dislodge a piece of masonry
or flue liner that may impede the flue gases - whether
or not the hole is injected with insulation.

In some properties, flues may be formed from hollow
blocks or interlocking liner pots built into the cavity.

Pre-cast flues serving gas appliances are particularly
difficult to trace since both the internal and external walls
show a flush face.
Since the pre-cast blocks can be in contact with the external leaf, it is very easy to drill into the
flue, even if a depth stop is fitted to the drill.

Pre-cast flues can also incorporate offsets that traverse the wall. The pre-installation inspection
of the loft space will help to show the line of the flue above first floor ceiling level.
CHECKING FLUES AND APPLIANCES

Testing appliances

With the exception of decorative fuel effect gas fires, flames in gas appliances must be clear and well defined, not yellow or orange in appearance. The appearance of the flame will vary depending on the fuel used. You should check the operation of all appliances before CWI installation.

With other types of fuel types, the appearance of the flame may vary depending on the fuel used.

Appliances must be operated at maximum output for at least 5 minutes with all doors and windows shut to ensure stable operation under worst case conditions. A smoke/spillage test must be carried out in accordance with the appliance manufacturer’s instructions.

General
Every flue system on an external wall must be checked before and after installation. It is essential that these flues remain clear and that the combustion products are completely discharged to the outside air.

Appropriate methods of inspection and testing for various types of flue system are described below.

Because of the variety of fuel-burning appliance designs, it is sometimes difficult to establish whether the flue performance is satisfactory. If it is not possible to confirm this performance, the fuel appliance, maintenance contractor must carry out the appropriate tests.

PRE-INSTALLATION CHECKS
Each appliance should be ignited and operated prior to CWI installation to observe that the flue is functioning correctly. This allows you to compare the performance of the appliance during, and on completion of the works.

Flame appearance is of particular importance with glass-fronted gas fires. With radiant and convector-type gas fires, check that there are no scorch or soot marks on the outer casing just above the flame enclosure, which would indicate flue problems.

Where a flue is found faulty, CWI installation should be delayed until the appropriate remedial action has been taken.
POST - INSTALLATION CHECKS.

Solid Fuel Appliances

Where practicable, check with the aid of a mirror to see that no insulation material has entered the flue. If a satisfactory visual inspection cannot be made, a check on the efficiency of the flue system must be carried out using a smoke pellet to test each appliance.

All of the smoke should be drawn into the flue. Where there is a shared flue system, no smoke should escape from any other opening within the building.

In certain conditions, there may be a spillage of smoke due to the flue being colder than the outside air. In such cases heat the flue and repeat the test 10 minutes later.

Where doubt remains, a fully qualified engineer should be contacted to confirm the integrity of the flue.

Smoke can be generated from a smoke pellet, but this does not generate heat. If possible and with great care, generate heat within the appliance (e.g. heat from a blow lamp) which can be passed into the flue openings for one minute just prior to repeating the smoke test.

GLASS FRONTED FIRES/BOILERS AND FLOOR MUNTEDFREE – STANDING BOILERS

Where an appliance is operational / working, a spillage test should be carried out in accordance with the manufacturer’s instructions and visually assess that the appliance / flue is no different in its appearance and operation to the checks carried out during the pre-installation process.
Gas-fired appliances

Under the Gas Safety (Installation and Use) Regulations, only registered and approved Gas Safe registered engineers are permitted to carry out work, such as removing any integral part of a boiler or gas fire. “Work” is defined as:

a) Installing or reconnecting the fitting.
b) Maintaining, servicing, permanently adjusting, disconnecting, repairing altering or renewing the fitting, or purging it of air or gas.
c) Where the fitting is not readily moveable, changing its position and
d) Removing the fitting (but the expression does not include the connection or disconnection of a bayonet fitting or self-sealing connection.
e) The following procedures must be adhered to

Carry out standard visual checks.

When carrying out a flue spillage test, all doors and windows in the room should be closed. However, if there is an extractor fan in any room within the premises, the term ‘fan’, includes extractor fans, fans in open flue appliances, fans in cooker hoods, the circulating fans of warm air heating systems and circulatory ceiling fans.

The test must take place with the fan in operation and the inter-connecting doors open.

Run the appliance for 5 minutes. Carry out a spillage test at the base of the canopy, draught diverter - or to the manufacturer’s instructions. No spillage should occur.

A suitable, smoke match holder must be used during the spillage test process
Using a suitable sized tube or tooling, hold a smoke match with its tip approximately 3 mm inside the lower edge of the canopy of the fire. Smoke escaping outwards from the draught diverter or canopy indicates spillage. If spillage does occur, continue to run the appliance for 10 minutes and repeat the test. If spillage still occurs, switch the appliance off. Issue warning notices (See pages (18/19) and calls in the relevant fuel supplier or in the case of a gas appliance the gas emergency service.

**ROOM - SEALED APPLIANCE**

*(balanced flues)*

Wherever possible, look inside flues and air inlets from an external position to check for obstructions. Assess the appearance of the combustion chamber flame, compared with how it looked in your pre-installation check. A well-defined flame generally means that the flue and airway are unobstructed.

**OIL – FIRED APPLIANCES.**

Carry out standard visual checks.

Run the appliance for 5 minutes, during which time you should check the outlet to ensure that the flue has not been blocked.

In the event of a partial or totally blockage, the boiler will usually ‘lock out’. If it does, you must call the relevant fuel supplier or appliance maintenance engineer / contractor.
In our opinion, this appliance should not be used until such time that a fully qualified / registered person or company has checked the appliance, open fire, flue, boiler, and that the appropriate certification has been provided following investigation and resulting remedial / corrective works to ensure that it is safe to use.

Please refer to the ‘Warning Notice’ issue to you

Contact points:

Gas:

Oil

Solid Fuel
<table>
<thead>
<tr>
<th>Issued by: (print)</th>
<th>Company:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technician’s signature:</td>
<td>Date and time of issue:</td>
</tr>
<tr>
<td>Occupiers name:</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
</tr>
<tr>
<td>Post code:</td>
<td>Telephone number</td>
</tr>
<tr>
<td>The appliance make:</td>
<td>Model</td>
</tr>
<tr>
<td>Location of the appliance:</td>
<td></td>
</tr>
</tbody>
</table>

**In accordance with current Gas Safety (Installation and Use) Regulations**

**IMPORTANT – This notice concerns your safety**

It is unsafe to use, because:

In the interest of safety and to comply with current Gas Safety (installation and use) Regulations, the following action has been taken:

- The appliance has been turned off and labelled
- The occupier has been informed, and the appliance left connected:
- The appliance has been turned off and the emergency service notified: ref no:
- The occupier was not present and this Notice has been left on the premises.

The occupier to sign:

I have received a copy of this Warning Notice and confirm that I understand that the use of the installation could present a hazard and could place me in breach of the current Gas Safety (installation and use) Regulations,

Signed: Print Name Date
EXAMPLE OF A RISK ASSESSMENT

RISK ASSESSMENT RELATING TO FLUES, CHIMNEYS AND COMBUSTION AIR VENTILATORS:

**Activity** The installation of Cavity Wall Insulation (CWI) within the external walls of existing buildings.

**Potential Hazard** The ingress of insulation material into existing combustion air ventilators, flues or chimneys during the CWI installation, can result in the impairment of Combustion air flow and / or the escape of combustion air gases produced by an existing fuel – burning appliance into the dwelling.

**Risk:** The risk arising from the hazard is that carbon monoxide produced by fuel – burning appliances will be unable to escape to outside atmosphere. Carbon monoxide is an extremely toxic gas and its presence is difficult to detect. Anyone exposed to carbon monoxide is likely to suffer fatal or very serious illness.

**Those at risk:** The occupants within a building.

**ELIMINATION OF HAZARD** (Control of Risk)

Cavity wall insulation installers must carry out their duties in accordance with:

- Current regulations governing the identified fuel types.
- Technicians guide to best practice: ‘Flues, chimneys and combustion air ventilators’ published by the Cavity Insulation Guarantee Agency (CIGA)

This guide sets out the appropriate checks, procedures and actions that must be carried out during survey, pre – installation and post installation of cavity wall insulation to buildings containing fuel – burning appliances.

**THE RISK ASSESSMENT MUST INCLUDE:**

**SURVEY, IDENTIFY and RECORD**

- Primary Air Type.
- Appliance Type.
- Chimney / Flue Location.
- Combustion Air Supply.
- Secondary Fuel Type.
- Appliance Type.
- Combustion Air Supply Location.
TECNICIANS SAFETY CHECKS

PRE-INSTALLATION CHECKS
• Identify appliance, flue/chimney routes, internal & externally.
• Carry out a spillage test to unlit open flues
Gas.
• Run appliance
• View and note flame color.
• Check for staining to fires appliances and surrounding decoration.
• Check combustion gases externally
• Appliance check (Smoke test / Spillage test)
• Identify combustion air supply

INSTALLATION - VISUALLY CHECK
• Chimney/flue routes to avoid drilling into them
• Chimney/flue routes for ingress of material
• Combustion air ventilator is unobstructed

POST INSTALLATION CHECKS
• Visually check appliances for insulation ingress into the appliance and or chimney flues
• Carry out a spillage test.
Gas.
• Run appliances at maximum for at least 5 minutes
• Visually check that flame compares with pre-installation checks
• Appliance check (Smoke test/Spillage test)
• If results are unclear, retest after a further 10 minutes

IF THERE IS ANY DOUBT:
1. Switch off the appliance’s (Gas) or Ensure where practical that the solid fuel appliance
   must not be used
2. Issue Warning Notice
3. Advise occupants and / or owner.
4. Call in the relevant fuel supplier or registered maintenance contractor / engineer

TRAINING
All CWI installers will receive appropriate combustible fuels awareness training to enable
them to discharge their responsibilities relating to the prevention of insulation ingress into
appliances, flues, chimneys and combustion air ventilators—and to undertake the simple
safety checks referred to within the CIGA guide.

NOTE: All installing companies must ensure that their technicians have successfully
attended a (STGW :- Standard Training in Gas Work, HETAS / OFTEC Awareness course)
to enable them to discharge their responsibilities. This course should include solid fuel
flues and chimney awareness.
Technician’s safety check sheet – flues, chimneys and combustion air ventilators.

This sheet specifies the minimum checks, and actions that must be carried out during the installation of CWI to buildings containing fuel – burning appliances.
It must be read in association with “Technicians guide to best practice – Flues, chimneys and combustion air ventilators”

Survey – identify and record

<table>
<thead>
<tr>
<th>Fuel type(s)</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliance type(s)</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Flue, chimney location(s)</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Location of combustion air Ventilator(s)</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gas</th>
<th>Oil</th>
<th>Coal</th>
<th>Wood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler</td>
<td>Gas fire</td>
<td>Open fire</td>
<td>Balanced flue</td>
</tr>
<tr>
<td>Internal wall</td>
<td>Front elevation</td>
<td>Side elevation</td>
<td>Rear elevation</td>
</tr>
</tbody>
</table>

Pre – Installation

| Appliance identified, flue / chimney routes internally, externally. | Y | N |
| View and note appearance and flame colour. | Y | N |
| Combustion gases checked externally. | Y | N |
| Appliance checked for staining and general visual condition (smoke / spillage test) | Y | N |
| Smoke / spillage tests satisfactory. | Y | N |
| Combustion air supply compliant. | Y | N |
| Signs of spillage / distress to open flues, chimneys. | Y | N |

Installation – Visually check

| Flue / chimney routes to avoid drilling into them. | Y | N |
| Flue / chimney routes to avoid ingress of material | Y | N |
| Combustion air ventilator(s) unobstructed. | Y | N |

Post - Installation

| Visible signs of spillage of the cavity wall insulation within the fire, appliance, flue. | Y | N |
| Appliance run at maximum for a minimum of five minutes | Y | N |
| Visual check that the flame compares with pre – installation inspections. | Y | N |
| Smoke / spillage test satisfactory. | Y | N |
| If results were unclear, re- test after a further ten minutes. | Y | N |
| Re – test satisfactory. | Y | N |

If there is any doubt or questions answered “N“ then :

1. SWITCH OFF THE APPLIANCE – OR ENSURE THAT THE SOLID FUEL APPLIANCE CANNOT BE USED
2. ISSUE A WARNING NOTICE.
3. ADVISE OCCUPANTS AND OWNER.
4. CALL OUT a competent body or person such as a registered qualified supplier or maintenance contractor (e.g. Gas Safe, Hetas, Solid Fuel, Oftec)

Installation address: Name of Technician: Signature: Date: / / 20

Important :- It is the installing firm’s responsibility to ensure that the Technician is able to discharge these responsibilities.
Failure to carry out visual inspections or safety checks could lead to the death of an occupant and prosecution.