ACOP – GAS AND COMBUSTION SAFETY AWARENESS GUIDE

FOR NON GAS FITTING OPERATIVES

This document is for guidance on safe practice for non-accredited operatives. Non gas fitting persons should hand over responsibility any non accredited functions. This course to guide you on prevention of gas and combustion safety dangers and to consider when the works undertaken require pre or post work inspection and certification of safety by a GAS or HETAS registered professional.

CTS GROUP – Gas registered – 229998 – Philbeach house, Dale, Haverford West, SA62 3QU
info@cts-group.org.uk T: 01416289980 or Text: 07553865278 for technical support (Gas and Combustion Safety)

Important Notes on Ventilation

The gas safety installation and use regulations require that operatives use the manufacturer's instructions when determining appliance ventilation requirements. Using the British Standards is not sufficient due to the requirements of many modern and fan assisted appliances High Efficiency Open Flue Appliances.

Multiple Flue Types in the Same Room

Where you find a situation where both open flue and flueless appliances are located in the same air space the ventilation requirements are per BS5440, but since this is not part of the ACOP Syllabus you should consult your technical officer or contact us for free technical advise using the numbers provided. We are on hand 6 days a week.

Testing Flues

In order to safely test any flue you require the competence a gas registered engineer has. This competence enables you to confirm the flue construction is suitable and the terminal is correct for the appliance installed before a flue flow/spillage test is undertaken. This work must be undertaken by a competent person who is acs accredited for gas or Hetas certified for solid fuel.

GAS & COMBUSTION SAFETY AWARENESS – QUICK GUIDE

Quick Guide	@	Information
Smell Gas - Anytime		Contact ESP on 0800 111 999 Immediately
Damage or heavy contact with gas pipework – No Smell of Gas		Turn off gas at the ECV and contact a gas registered engineer
Boxing In Pipework		Ventilate the Boxing to British Standards and ensure no compression fittings are within the duct: refer to your technical support for professional guidance.
Covering Gas Pipework		Not Permitted - Pipework must all run in easily accessible ventilated ducting and must not be covered by insulation
Gas Pipework crossing Cavity		Must be Sleeved and Sealed
Flue Types	**OF**	Open Flue - Draws combustion air from the room, and exhaust via a flue to outside (Ensure no airborne contaminants any near this type of appliance, its air vent or flue outlet).
	RS	Room Sealed - Draws combustion air via a flue from outside and exhausts via the inner rim of the flue back outside (Avoid any work in or around the flue terminal)
	FL	No Flue - Combustion air from the room, exhaust back into the room (Openable window needed) and minimum room volume. Refer to Manufacturers instructions or contact your registered technical support officer at CTSGroup for guidance where required.

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Ventilation	**Always Check Manufacturers Instructions** for Ventilation Requirements and do not cross ventilate if adding vents. Vents must be sleeved and sealed across the cavity. If more than one appliance flue type in the room or absence of Manufacturer's instructions please contact your gas registered engineer or CTSGroup Technical Support on 01416289980 or mail info@cts-group.org.uk - British Standards are overruled by the MI and must be adhered to. When changing the air vent sizes where an open flue or flueless appliance is installed, the appliance must be tested by a registered gas or HETAS professional to ensure correct combustion post work.
	Insulation must not be pushed into loft eaves without a bridge to allow the free flow of air
	Only approved ventilation outlets must be used. Vents that are closeable or have flyscreens must be replaced with approved vents/vent covers
	DO NOT ADD Vents to a room with an open flue appliance - Cross Ventilation must not be permitted
Chimneys & Flues	Do not infill to an exterior wall where a chimney is on the inside without consulting a surveyor
	Flues must be sleeved across the cavity and separated from infill.
	Extending flues must be completed by a gas registered installer
	Do not cover flues or chimneys - EVER
Testing Chimneys	Where a chimney is used for solid fuel or gas appliances it must be tested prior to installation and post installation. Where the gas appliance needs to be removed to test a gas registered engineer must undertake this work. Private customers should have flues and chimneys tested annually for insurance purposes.
	Spillage Tests can only be undertaken in accordance with the Manufacturers instructions, and should be undertaken by a gas registered engineer with an HTR1 Ticket (For gas Fires) or CENWAT competence Certificate for Gas Boilers. Non accredited persons should not undertake this work.

Contamination	Builders dust and airborne contaminants must not occur within 10 metres of gas flues. Many flues are fan operated and have negative and positive pressure at the outlet meaning builders dust will be drawn into the appliance blocking filters and injectors. Any suspected contamination must be followed by turning off the appliance and having a gas registered engineer service the appliance
FREE Onsite Technical Support	**Contact CTSGRoup on: 01416289980 and leave a message if no one picks up, or use our live chat at https://www.cts-group-training.net, or email info@cts-group.org.uk for a fast response. Text: 07553865278 for the fastest response on or off site. NEVER GUESS ANYTHING. Know when your competence ends and someone else's starts**

SOLID FUEL APPLIANCE VENTILATION

Ventilation for these appliances is not covered by any British Standard, simply because the heat input depends on the volume of fuel (coal, wood pellets, logs etc being used). However, a good guide is provided by HETAS and is relative to the builders opening size.

When determining appliance ventilation for solid fuel appliances please refer to the manufacturer's instructions (where relevant), otherwise use the following pages for guidance. Ideally contact a hetas engineer for advice and to test the flue post works. This will ensure legal responsibility and the requirements of the Health and Safety at Work ACT are met. The following pages are extracted from HETAS OWN GUIDE and are shared freely.

Permanent Ventilators (for the Supply of Combustion Air)

Introduction

All heating appliances that produce heat from the combustion of carbon based fuels such as gas, oil and solid fuels including wood, require enough fresh air from outside for complete combustion and to enable the fue/chimney to function correctly to remove the combustion products safely to the outside. Solid Fuel, Wood and Biomass burning Appliances that draw their combustion air from within the dwelling are required by Building Regulations to have installed a fxed permanently open ventilator to provide this air from the outside of the dwelling. Without adequate ventilation there is a danger that the combustion process will be incomplete producing large amounts of carbon monoxide and also that the function of the fue will be impaired. This combination can cause emissions of poisonous gases to the room resulting in sickness and ultimately death to the occupants.

Air Requirements for Solid Mineral Fuel & Wood Burning Appliances

Building Regulations (Approved Document J) give guidance that should be followed on the amount of air that solid fuel appliances require. For closed appliances this is based mainly on their rated heat output. Less efcient appliances such as simple open fres require more air than closed appliances because of the additional air that enters the appliance above the frebed and the regulations give separate guidance on this. The information given below is for quick reference and is extracted from Table 1, Section 2 of the Building Regulations Approved Document J: 2010; Combustion Appliances and Fuel Storage Systems. Note: The air requirement for other fuels, e.g. oil and gas, will be diferent.

Closed Appliances, e.g. Stoves, Range Cookers or Independent Boilers.

For closed appliances without any draught stabilizer ftted installed in a building where the design air permeability is greater than 5.0 m3/h.m2, the air requirement is 550 mm2 per kW of rated output above 5kW e.g. for 8 kW this would be:- (8-5) x 550 =3 x 550 = 1,650 mm2/16.5cm². If the building's design air permeability is less than 5.0 m3/h.m2 the air requirement is 550 mm2 per kW of rated output.

If the appliance has a fue draught stabilizer ftted then the following air requirements apply:- Installations in buildings where the design air permeability is greater than 5.0 m3/h.m2 ; For the frst 5 kW of rated output add 300 mm2 per kW and then from 5 kW upwards, add 850 mm2 per kW. e.g. for 8 kW the air requirement would be: (5x300) + (3x850) = 4,050 mm2/40.5cm2. If the building's design air permeability is less than 5.0 m3/h.m2; add 850 mm2 per kW of rated output.

Note: It is unlikely that a dwelling constructed before 2008 will have an air permeability of less than 5.0 m3/h.m2 at 50Pa unless extensive measures have been taken to improve air tightness. Appendix F of Approved Document J gives additional details.

Open Fires

If the open fre is the simple inset type incorporating a throat forming lintel or gather then the air requirement would be 50% of the cross-sectional area of the throat opening. If the open fre is the free-standing type which does not incorporate a throat then the air requirement would be 50% of the cross-sectional area of the fue. Detailed guidance with examples is given in the above regulations.
For simple inset open fres with a throat the guidance states that the following air requirement is necessary based on the width of the fre opening:-

350mm fre opening = 14,500 mm2/145cm2
400mm fre opening = 16,500 mm2/165cm2
450 mm fre opening = 18,500 mm2/185cm2
500 mm fre opening = 20,500 mm2/205cm2

For freplace openings greater than 500 mm in width or freestanding open fres that are open to the room on more than one side please see the additional guidance given in the above regulations.

PREVENTION OF GAS EXPLOSION

Gas Explosions are a result of 2 Main Factors

A Build Up of Gas

An Ignition Source

ignite

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Video: acop_gsa_clwi_693.mp4

PREVENTION OF GAS EXPLOSION

BOXING IN OR ENCLOSING GAS PIPEWORK

Where gas pipework is to be enclosed in any form of boxing, enclosure or area that RESTRICTS ACCESS and free air movement which can lead to the build up of gas, all "COMPRESSION" Fittings must be removed. A Registered gas engineer is needed for this.

Where Gas Pipework is enclosed in any form of mechanical enclosure a gas tightness test should be carried out before and after any work.

All pipework enclosures or restricted areas must have purpose provided ventilation.

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PREVENTION OF GAS EXPLOSION

Gas Pipework is often run externally these days to prevent increased dangers within a property.

Gas pipework must not be covered by insulation materials and must either be left in the open or ducted in a purpose designed, ventilated channel

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PREVENTION OF GAS EXPLOSION

Any Gas Pipework Travelling through a cavity must be SLEEVED and SEALED.

If your work should come across a gas pipe that is not sleeved or sealed this must be reported to a gas registered engineer, gas safety consultant or your site gas safety officer.

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PREVENTION OF GAS EXPLOSION

When Installing Insulation materials to an external wall this sleeve is even more important

The exiting gas pipe must be sleeved. The area between the pipe and the sleeve should be open to the atmosphere.

Your work must allow this opening to continue freely to the outside air. The only change to this is when the gas pipe exits through a gas meter box where the heightened danger requires the seal between the gas pipe and sleeved should be sealed externally.

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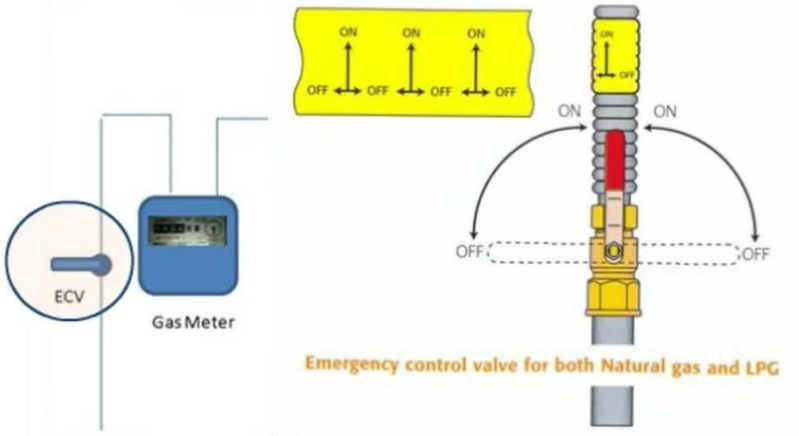
PREVENTION OF GAS EXPLOSION

How to ISOLATE the gas at the ECV or AECV.



Emergency control valve for both Natural gas and LPG

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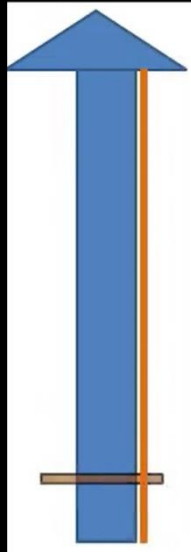
PREVENTION OF GAS EXPLOSION



Any external wall coating that is greater in depth than 5mm needs risk consideration.

When Installing fixed insulation panels, NO GAPS should be left that could be filled with gas in the event of an escape

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PREVENTION OF CARBON MONOXIDE

Remove Rubber Terminal Covers to inspect the terminal and pathway of the flue through the wall.

More often than not you will discover the gap between the flue and building material is not sealed Internally or Externally.

This should be sealed prior to any building works

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PREVENTION OF CARBON MONOXIDE

Cavity Insulation

Cavity fill that is injected can easily find its way into the smallest gaps.

Vents can easily be blocked. You Must check that all vents are **Sleeved and Sealed** across the cavity prior to filling.
If you find any un-sleeved or un-sealed vents, you must arrange for them to replaced with suitably sized vents that meet the Manufacturers requirements.

Any active open flue appliances should be inspected and tested in conjunction with regulation 26(9) by a gas registered engineer after any vents are altered or replaced

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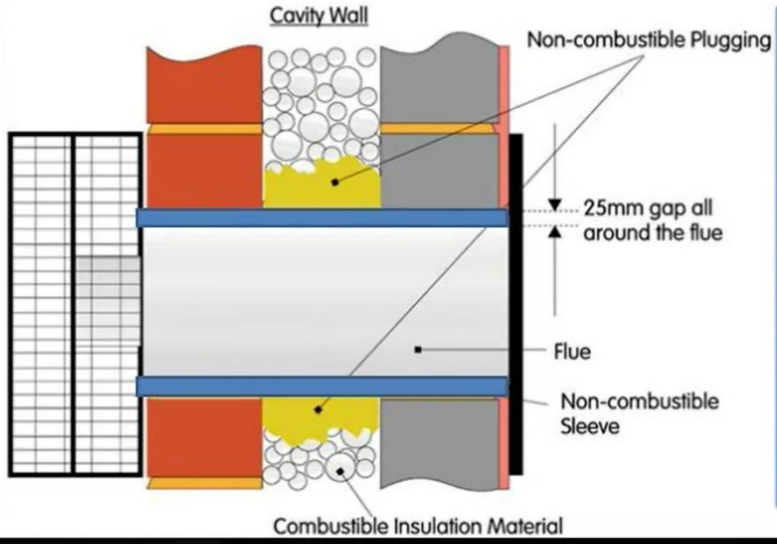
PREVENTION OF CO – Cavity Fill and Flue Faults



When filling around flues that cross the cavity, guidance is for a 25mm air gap around the flue with a non combustible sleeve.

The cavity around the flue should be plugged before filling commences.

Modern appliances have different rules.

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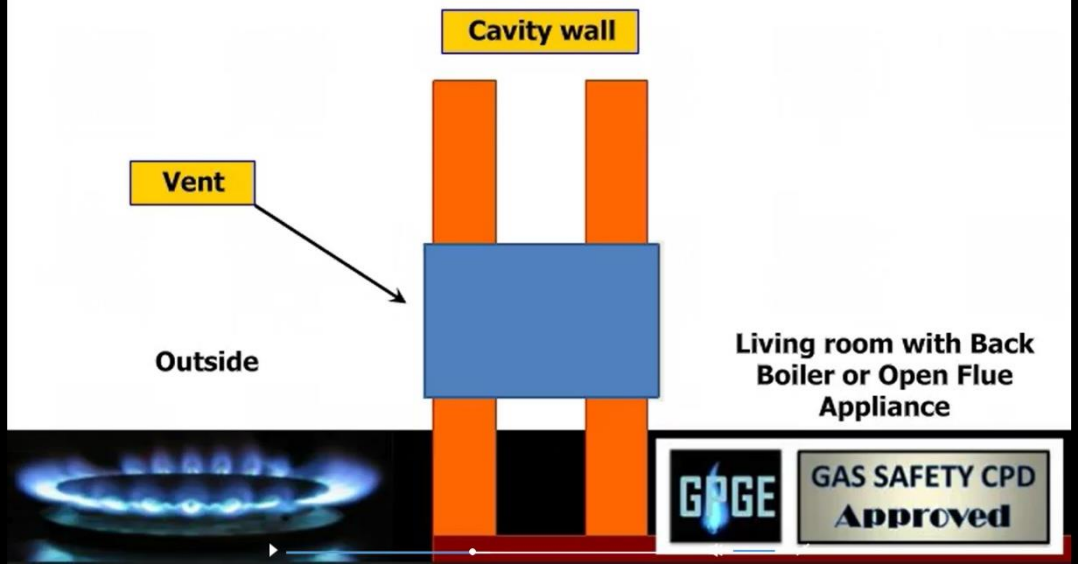
PREVENTION OF CO - VENT FAULTS

The vent should be ducted across the cavity wall.



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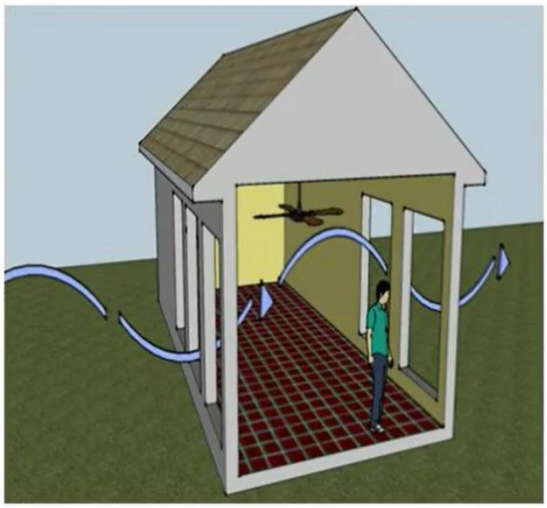
PREVENTION OF CARBON MONOXIDE



Cross Ventilation Occurs when there is a through draft from 2 or more vents being installed in the same room that are usually a minimum 500mm apart

Cross Ventilation Must not be allowed to occur in rooms with Open Flue Appliances, where this through draft can cause the exhaust products from the appliance to be drawn back into the room

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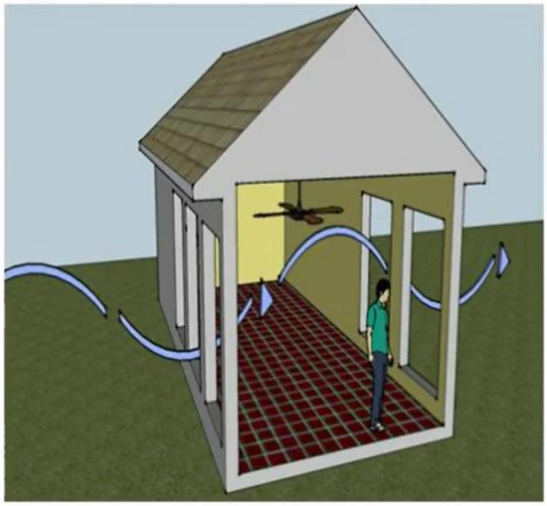
PREVENTION OF CARBON MONOXIDE



If replacing a vent, always ensure the old one has been removed, and preferably site it in the previous vent position. If you must install the vent elsewhere, and where a cross draft is suspected a gas registered engineer will need to be called to inspect the property and test the appliance for safety after the work. The appliance must be turned off and a safety label attached until it has been tested

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PREVENTION OF CARBON MONOXIDE

Where work has been carried out that could in any way have affected the flue/chimney system, it must be inspected in its entirety to confirm all joints are mechanically sound and there are no signs of distress

Work to extend flues must only be carried out by competent gas registered persons to prevent this type of Reportable Incident

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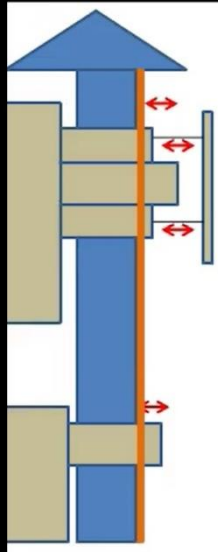
PREVENTION OF CARBON MONOXIDE



You are likely to encounter Flue Exhaust and Air Inlet Ducts on the external surface of buildings. .

These are installed with strict guidelines from the manufacturer to ensure adequate clearances for the prevention of dirty exhaust gases mixing with fresh air being drawn into the appliance

When installing external insulation panels, these dimensions must be maintained. This may involve extending the flue or leaving suitable air channels

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PREVENTION OF CARBON MONOXIDE

All Insulation products should be prepared and pre fabricated away from any flue, appliance or vent, and brought to the work area only after preparation

Scaffolding that is erected for the purpose of your work must allow sufficient clearance to chimney, vents and flues. The same is true of ladders, g materials which close proximity to vents

ue that is partially t sensitive boards re two problems here. The appliance is likely to draw its own exhaust gasses back in causing CO and heat damage is likely to the wooden boards above the flue

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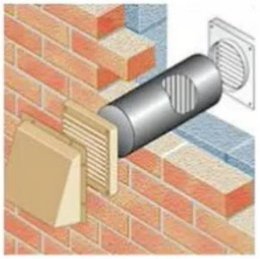
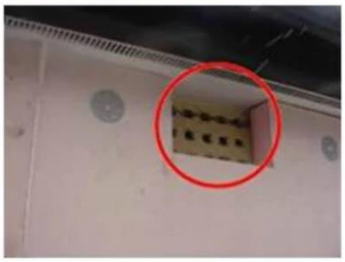
PREVENTION OF CARBON MONOXIDE



Where Ventilation Ports are observed, external insulation panels and their finished coating must not in any way obstruct or reduce the CSA (Cross Sectional Area) of the Ventilator.



Some of the air ports on this ventilator have been covered in contravention of this rule. If this vent is serving a gas appliance the work will have placed the appliance at risk and your business in line for prosecution

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PREVENTION OF CARBON MONOXIDE

Room sealed terminals are most often installed horizontally or vertically and consist of 2 adjacent apertures, one for the air inlet, the other which extends further out is for the exhaust gas removal.

During External Works care must be taken to prevent any airborne contaminants being drawn into the appliance via the flue.

The flue terminal and flue path must be inspected before and after any work on the property to confirm there are no changes.

If you suspect that contaminants or builders dust could have entered the flue you MUST bring this to the attention of your site MANAGER

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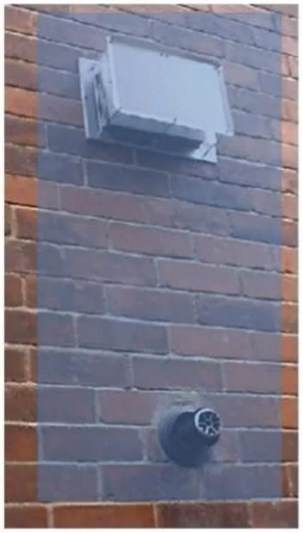
PREVENTION OF CARBON MONOXIDE



In the event that any foreign bodies, debris or dust are allowed to enter the flue terminal during the course of works, the appliance "MUST" be switched off, inspected and serviced by a gas registered engineer and re-commissioned prior to re-use.

You MUST NOT cover a flue at any time, even if this is to prevent the ingress of foreign bodies. Only if your Manager or supervisor has first isolated and labelled the appliance can the flue be covered temporarily. Flue Covers and their removal must only be undertaken by an appointed, competent representative.

You will receive specific instructions by your supervisor or manager where a flue has been covered. If you notice an appliance running with a flue cover connected or a cover left after work is completed.. YOU MUST REMOVE THE COVER AND CONTACT YOUR MANAGER IMMEDIATELY.

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PREVENTION OF CO – Cavity Fill and Flue Faults

Before undertaking cavity insulation at a property you must survey the external construction. You are especially looking for chimney breasts that are visible externally.

Cavity Fill MUST NOT be injected into any part of an external Chimney

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Video: acop_gsa_clwi_693.mp4

PREVENTION OF CO – Cavity Fill and Flue Faults

Attention should be drawn to the position of internal chimneys. This brick chimney runs down the inside of this outer wall, and any cavity insulation injection must consider the possibility of breaching the chimney.

It is also not clear where the chimney runs or whether the wall has a cavity. A full Survey is required here

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PREVENTION OF CO – Cavity Fill and Flue Faults

Any Insulation or Cavity Fill at this property could easily enter the chimney through all the poor mortar joints.

If a gas appliance is to be used with this chimney it would certainly need to be lined

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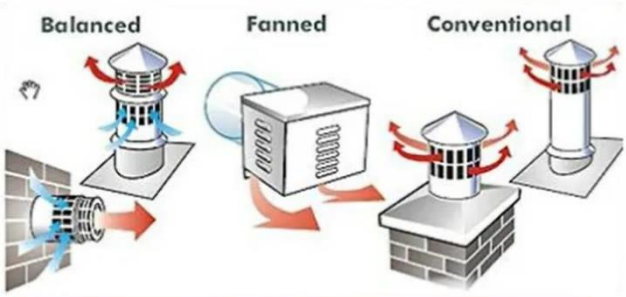
PREVENTION OF CARBON MONOXIDE



FLUELESS APPLIANCE

Get their air from the space the appliance is in and send the combustion products back in to the same space **PURGE AND PURPOSE PROVIDED**

So Let's Recap

What Flue type gets is combustion air directly from outside and send the Exhaust gases directly outside

ROOM SEALED

What Flue type gets is combustion air from the room or space it is in and sends the Exhaust gases directly outside

OPEN FLUE ADVENTITIOUS AND PURPOSE

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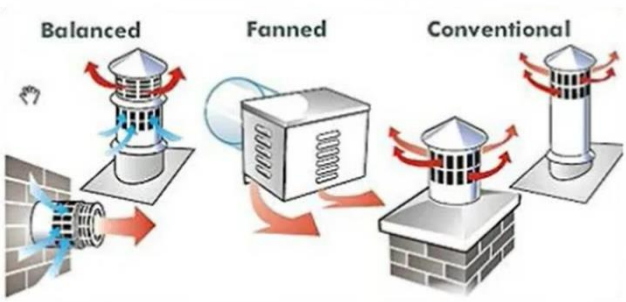
PREVENTION OF CARBON MONOXIDE



More than one Open Flue, or Open Flue Plus Flueless, or More Than One Flueless appliances

More than one Appliance in the same air space.

Where more than one appliance with either open flue, flueless or both are found in the same air space (i.e. an open plan room)

You Must Consult A Registered Gas Safety Consultant for the ventilation requirements because the Manufacturers Instructions do Not Allow for this

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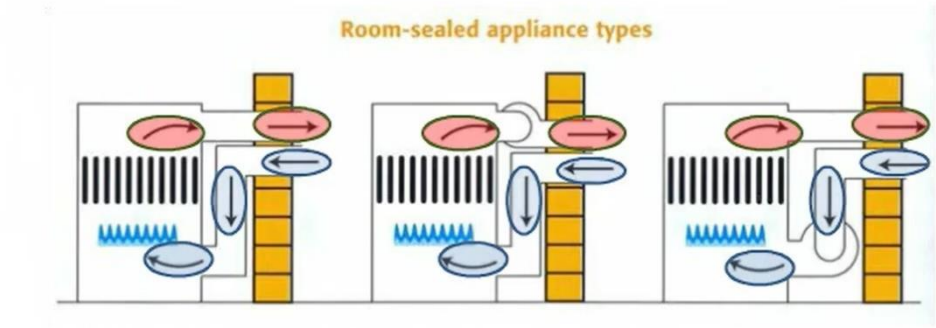
PREVENTION OF CO – RS FLUE

A Room Sealed Appliance Can be Fanned or Natural Draught (Balanced Flue)
It Gets Its combustion air **directly from outside** and sends the combustion products **directly back to the outside**



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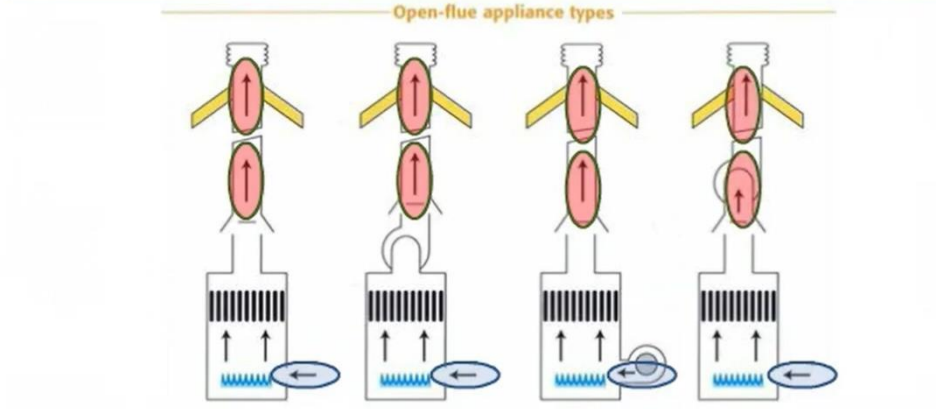
PREVENTION OF CO – OF FLUE

An Open (OF) or Conventional (CF) Can be Fanned or Natural Draught
Open Flue Appliances get their combustion air **from the room/space they are installed in** and send their combustion products **direct to the outside**



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PREVENTION OF CO – FLUELESS

An (FL) Flueless Gas Appliance
draws its' combustion air **from the room/space the appliance is installed in** and sends the combustion products **back into the same room or space**

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PREVENTION OF CO

Loft Ventilation works on the principle of free flowing air. With Ridge ventilators fitted, the movement of air relies on a free air intake from the soffit vents.

There are 2 dangers here

1. Laying Floor Insulation or pushing existing insulation to the edge during your work will stop the airflow.
2. When Fitting Roof Insulation Care has got to be taken to prevent Blocking Roof or ridge vents

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PREVENTION OF CARBON MONOXIDE

The next danger is with External Wall Insulation

Adding 100mm to the face of a building will reduce soffit area ventilation considerably. In Terms of Gas Safety the main consideration is where a gas appliance is utilising air drawn via a loft area that may be restricted leading to carbon monoxide.

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PREVENTION OF CO – FLUELESS

Flueless Gas Appliances

Must be in a room or space with an openable window directly to the outside air, and

Any purpose provided ventilation must be directly to outside

Flueless Gas Appliance work initially on the basis of "PURGE" Ventilation, which is movement of fresh air when doors and windows are opened supported by purpose provided vents.

Flueless Gas Appliances Mostly have minimum room volume requirements because of the speed in which the combustion products can contaminate the air.

Refer to Manufacturers instructions for exact requirements

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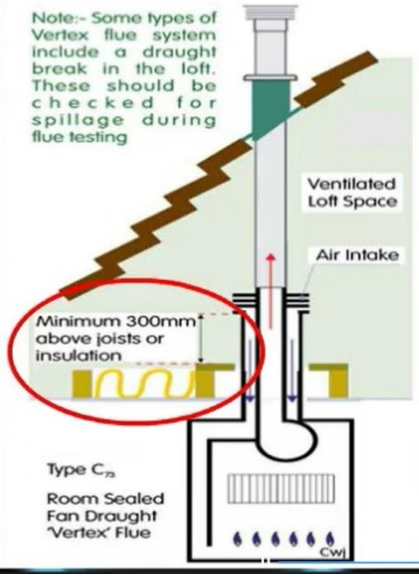
VERTEX FLUES

Gas installers need to be particularly vigilant when looking at this type of flue system, as at first sight they may be incorrectly identified as being open flue or vertical balanced flue.
'Vertex' flued appliances are room sealed, where the air for combustion is taken from a ventilated loft space as shown in the diagram below.

Note:- Some types of Vertex flue system include a draught break in the loft. These should be checked for spillage during flue testing



'Vertex flue' appliances whose air inlet and draught diverters are located in the loft area and which are in the vicinity of any works that produce any form of airborne debris or dust must be inspected and tested by a registered and approved gas engineer after the works. It is recommended that any work in this area is undertaken with care to prevent to expelation of airborne contaminants

Check for a minimum clearance of 300mm before and after works, between the top of the joists or insulation and the lowest part of the air intake.

If this appliance is operated at any time during the works, even the smallest of fibres could be drawn down the air intake and cause Incomplete Combustion(CO)

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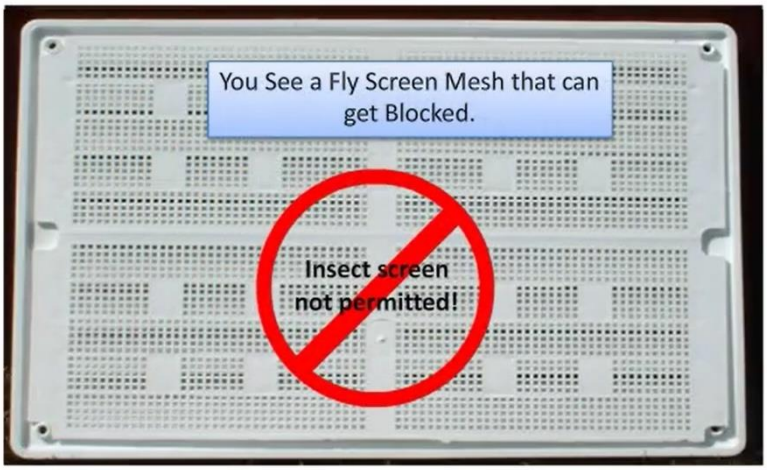
PREVENTION OF CO - VENT FAULTS

But when you look on the other side



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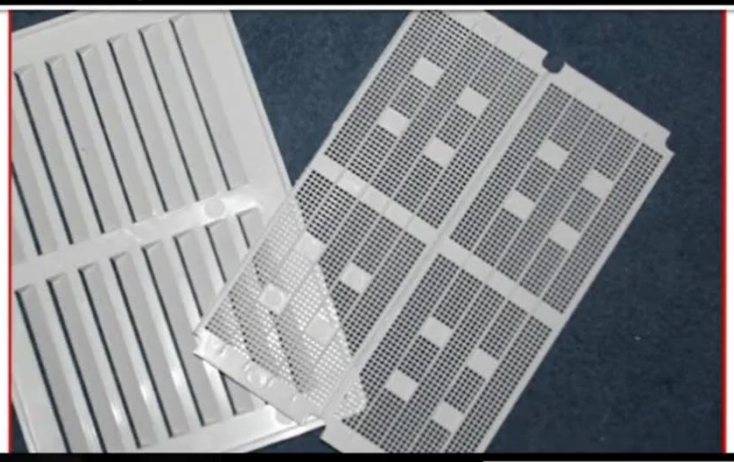
PREVENTION OF CO - VENT FAULTS

If you do find a vent with an insect screen, you can pull the screen out and bin it.



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PREVENTION OF CO - VENT FAULTS

4. These ARE NOT VENTS OR FLUES – They are extractors and remove STEAM & SMELLS. They Also Remove The "COMBUSTION AIR"

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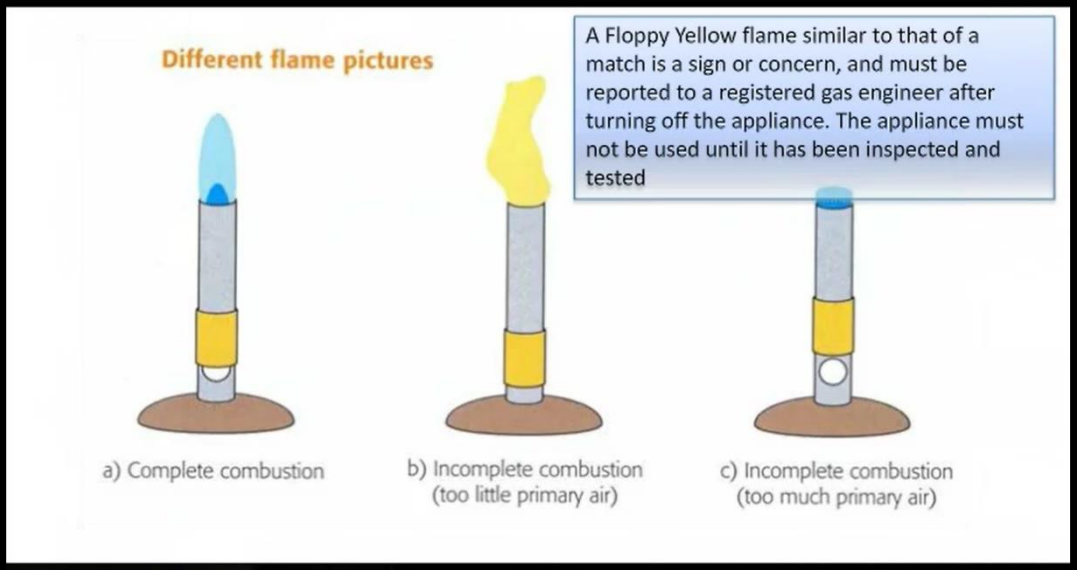
PREVENTION OF CO



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PREVENTION OF CO – FLUE TESTING

A Flue Flow Test should be carried out on any open flue natural draught chimney, ideally before and after any cavity insulation works. An accredited and competent person should conduct this test

The Competent Engineer will test and confirm

- Correct Provision of Draught Ventilation
- The Correct Design and Terminal Type and Position, Construction, Height and CSA
- The strength and soundness
- Adequate Flow Properties

The Inspection and Test should only be carried out by a competent person

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PREVENTION OF CO – FLUE TESTING

A Spillage test must be carried out on any open flue gas appliance that was connected or will be connected to a flue your work may have affected. A registered engineer will need to set the appliance to full gas rate, and then use the Manufacturers Instruction to complete the test safely.

The Spillage Test will confirm the adequate removal of exhaust products from the appliance and confirm the chimney is clear.

This test is covered by regulation 26(9) of the gas safety installation and use regulations and should be carried out by a suitably competent person who can certify the safety of the gas appliance after your work

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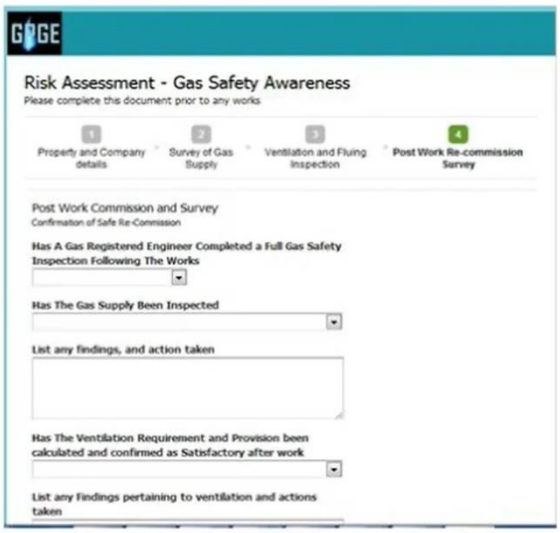
PREVENTION OF GAS EXPLOSION



Risk Assessment - Gas Safety Awareness

Please complete this document prior to any works

1 Property and Company details | 2 Survey of Gas Supply | 3 Ventilation and Fluing Inspection | 4 Post Work Re-commission Survey

Post Work Commission and Survey

Confirmation of Safe Re-Commission

Has A Gas Registered Engineer Completed a Full Gas Safety Inspection Following The Works

Has The Gas Supply Been Inspected

List any findings, and action taken

Has The Ventilation Requirement and Provision been calculated and confirmed as Satisfactory after work

List any Findings pertaining to ventilation and actions taken

Your Work Must Always Complete with a FULL 'POST WORK' SURVEY of the Gas Installation

Gas Supply – Inspected – Tested Where Necessary

Ventilation Provision and Requirements are being met after the works and appliances dependant on this have been tested in accordance with Reg 26(9) by a registered gas engineer

Flues and Chimney have been inspected and where necessary tested

Appliances have been serviced especially where airborne particles dust and other contaminants can affect

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