Specification for the installation of external wall insulation ensuring the safety and operation of fuel burning appliances V.1.0 31st March 2017.

FOREWORD

This **Specification for the installation of external wall insulation ensuring the safety and operation of fuel burning appliances** has been prepared by industry representatives and is made available by the National Insulation Association (NIA) as a means of setting out the responsibilities for installers of EWI and providing installer technicians with currently accepted good practice in External Wall Insulation (EWI).

Acknowledgement is given to the following organizations for their contribution to the development of this specification:

National Insulation Association (NIA)
Heating and Hot water Industry Council (HHIC)
British Standards Institution (BSI)
Carillion Plc
British Gas
Bosch
Oil Firing Technical Association (OFTEC)
Heating Equipment Testing and Appliance Scheme (HETAS)

Whilst every care has been taken in its preparation, NIA. and its authors specifically exclude any liability for errors and omissions, or incidents 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, seek advice from a suitably competent person.

This specification for the safe installation of external wall installation, provides EWI technicians with a simple overview of the requirements and considerations relating to fuel supply pipework, meter installations and appliance safety.

The information provided has particular relevance for EWI installations where gas burning appliances are present but many of the principles detailed within this document are also applicable to other fuels (e.g. Oil, Solid-fuel).

Such appliances and installations are often subject to alternative industry standards, and may have different legislative requirements. Where EWI work could affect the safety of these appliances or installations (e.g. wood-burning stoves or open fires, Oil supply pipe-work), appropriate advice should be sought from persons competent in such matters. Details of suitable advisory bodies for the solid-fuel and oil industries are contained at the end of the Introduction.

Presentational conventions

The provisions of this specification are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

INTRODUCTION

This document details currently accepted good practice for dealing with flues, combustion air ventilators, fuel installation pipework and fittings, and other items relating to the safety and operation of fuel burning appliances, which may be encountered during the installation of EWI. It clearly sets out the responsibilities of EWI installer companies, with practical examples and illustrations of procedures to be carried out by a competent person. It does not constitute "step-by-step" work instruction, and operatives must take due regard of other requirements, such as their individual company procedures. It is strongly recommended that the principles and practices set out in this specification be followed by all EWI installer companies, and be used in conjunction with recommended training programmes.

Provided that the requirements and guidance on ventilation given in this document is followed, this should result in like-for like replacement of any existing combustion air ventilator, where required due to an unsafe situation being identified, with one of equal, or greater "free area", and in compliance with the current versions of relevant standards, e.g. BS 5440-2 for ventilators serving domestic gas appliances Existing flueless, and open-flued appliances, should therefore not be adversely affected by EWI installation. This supports the overarching objective of this specification, in that the installation of EWI shall have no detrimental effect on installation or appliance safety. It does not seek to confer fuel specific competence on those who are not competent in such matters, but recommends that suitably competent parties are engaged at every stage of the work. If, within an individuals' competence, concern for safety is identified, then work must stop and the situation be re-assessed with the engagement of persons competent in those matters. This applies to all inspection & survey activities, as well as installation tasks. It shall not be presumed that a previously undertaken survey identifying no pre-installation issues is adequate, without further investigation before the work commences. In any case, the safety of workers and customers must be considered of paramount importance, and any course of action taken must be with this in mind.

If on pre-inspection of the site where installation is intended, appliance or installation faults are noted by the operative which could be deemed as unsafe, then this specification requires that the customer be informed in writing, the potential issues brought to the attention of operational management, and documented in company records. It is essential that the customer be advised that the issues identified should be corrected, or brought into compliance with the relevant standards, taking due regard of manufacturers' instructions for appliance issues. Such remedial work may be carried out directly or indirectly, via the EWI company, or through the customers' own competent contractor(s). If the customer declines to have the work carried out, then this should be clearly documented, along with the remedial advice given.

It is essential that installation of EWI, and related tasks, does not proceed where it is suspected that this may have a detrimental effect on appliance or installation safety, or an unsafe situation exists.

GAS RELEVANCE

Gas "work" (see below) as defined in the Gas Safety (Installation and Use) Regulations 1998, may only be carried out by a competent person, such as a Gas-Safe Registered engineer. The purpose of this guide is to raise awareness of certain gas safety issues which an EWI technician may encounter – it is NOT intended to give instruction on how to carry out any gas work. If an EWI installation technician is in any doubt on a particular situation relating to gas work or gas appliances, then a competent person should be consulted.

- ***Gas Safety (Installation & Use) Regulations 1998, Regulation 2(1) states:***

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

a) Installing or re-connecting 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 other "self-sealing connector."

also,

"gas fittings" means gas pipework, valves (other than emergency controls), regulators and meters, and fittings, apparatus and appliances designed for use by consumers of gas for heating, lighting, cooking or other purposes for which gas can be used (other than the purpose of an industrial process carried out on industrial premises), but it does not mean –

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a) Any part of a service pipe
b) Any part of a distribution main or other pipe upstream of the service pipe;
c) A gas storage vessel; or
d) A gas cylinder or cartridge designed to be disposed of when empty

NOTE: The above 'gas relevance' information is included to assist operatives in assessing whether any planned or inadvertent action is likely to be deemed "work", and therefore in need of inspection by a Gas-Safe registered engineer. Where any doubt exists as to the status of such activity, it is essential that such an engineer be consulted for appraisal of the specific circumstances.

FURTHER INFORMATION

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

The Building Regulations 2010 (England and Wales), as amended;

The Gas Safety (Installation and Use) Regulations 1998;

BS 5440 Part 1 *"Flueing and ventilation for gas appliances of rated input not exceeding 70kW …. Part 1: Specification for installation of gas appliances to chimneys and for maintenance of chimneys".*

BS 5440 Part 2 *"Flueing and ventilation for gas appliances of rated input not exceeding 70kW …. Part 2: Specification for the installation and maintenance of ventilation provision for gas appliances".*

Specific guidance on installation pipework (NG & LPG) can be obtained from:

BS 6891 *"Installation and maintenance of low pressure gas installation pipework up to 35mm (R1¼) on premises"*
Further details on oil appliances flues, chimneys, air supply pipework installation can be obtained from:

BS 5410 Part 1 *Code of practice for oil firing - installations up to 45kW output capacity for space heating and hot water and steam supply purposes.*

BS 5410 Part 2 *Code of practice for oil firing - installations over 45kW output capacity for space heating and hot water supply purposes.*

Further guidance on specific appliance types (boilers, fires etc), and any related requirements can usually be found in the manufacturers' instructions. Where these are not available on-site, the appliance manufacturer may be able to provide the information required. It is recommended that any correspondence is in writing (e.g. letter, email), and held on file, so that an accurate record of communication exists.

THE INFORMATION GIVEN IN THIS DOCUMENT DOES NOT COVER EVERY EVENTUALITY. IF YOU ARE IN ANY DOUBT, SEEK FURTHER ADVICE.

For specific information relating to oil appliances, contact:
OFTEC (www.oftec.org)
Foxwood House, Dobbs Lane
Kesgrave, Ipswich,
IP5 2QQ

For specific information relating to solid fuel appliances contact:

HETAS Ltd (www.hetas.co.uk)
Severn House
Unit 5, Newtown Trading Estate
Green Lane, Tewkesbury
GL20 8HD
or
OFTEC (www.oftec.org)
Foxwood House, Dobbs Lane
Kesgrave, Ipswich
IP5 2QQ

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1 INSTALLER RESPONSIBILITY

1.1 FUNDAMENTAL PRINCIPLES

This specification and associated guidance has been prepared for use by installers of external wall insulation (EWI), to ensure that the safety and performance of gas and other fuel burning appliances is not compromised by the installation of EWI. To this end, the observance of requirements **1.1.1** to **1.1.5** is essential.

1.1.1 Access to property

Installers shall not undertake installation of EWI unless entry to the property to carry out all of the specified checks is possible.

1.1.2 Coordination of work

Alterations or new installations such as a new boiler, flue, ventilation duct, pipework, condensate drain etc. shall wherever practicable, form part of a planned work programme for EWI installation in order to ensure that all heating and ventilation structures are correctly terminated to the finished EWI surface and are installed in accordance with the manufacturer's instructions. Where such coordinated installation cannot be achieved, any potential risks or disadvantages shall be made known to the property owner and/ or occupier. Any substantial risks shall result in the works not progressing until remediated.

1.1.3 Pre/Post-installation checks

EWI Installation is a specialist activity and to prevent the occupants of the property being endangered, installers shall carry out pre/post installation checks and all installation work in accordance with this specification and the most recent release of PAS2030.

1.1.4 In-process monitoring

Installers shall undertake monitoring of combustion air ventilators or flues of fuel-burning appliances throughout the installation process to ensure that they do not become blocked or restricted and that they remain effective.

1.1.5 Carbon Monoxide Awareness

Installers shall prepare and operate a procedure for ensuring that all operatives are provided with carbon monoxide awareness information **(see 1.2)** and are informed of the action to be taken in the event of 'fuel escapes or leaks **(see 1.3)**.

NOTE: *Although the term "flue" is commonly used in this specification to indicate the means by which combustion products are carried to the outside air from the appliance, standards and other documents may also make reference to terms such as "chimney" or "chimney/flue". These terms are interchangeable and "flue" is used here for ease of understanding.*

1.2 CARBON MONOXIDE

1.2.6 Overview

All fuel-burning appliances need an adequate supply of combustion air and flued appliances require an unobstructed and fully functioning flue to operate correctly. With an appliance in good working order, the main product of combustion is carbon dioxide. Carbon monoxide is produced when the flue is restricted or the air supply is impaired. When combustion products from open flued appliances are not able to escape via the flue, this is referred to as 'spillage'. Carbon monoxide cannot be seen, smelt or tasted, but it is an extremely toxic gas. It is absorbed by the red blood cells via the lungs, and can result in injury, or even death. The symptoms of carbon monoxide poisoning are vague and 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, diarrhoea or stomach pains
- Sudden dizziness when standing up

1.2.7 Installer responsibility

If an audible carbon monoxide (CO) detector indicates the presence of CO, or this is otherwise suspected, all appliances shall be switched off immediately and not used again until the fuel supplier or a competent maintenance contractor has checked them for safety and correct operation.

NOTE: *It is strongly recommended that where fuel burning appliances are present, wherever practicable and by arrangement with the occupier, an audible carbon monoxide detector conforming to EN 50291 is fitted in advance of any EWI works, such that the occupier is alerted in the event that an appliance or flue subsequently leaks carbon monoxide into the property. If there is more than one appliance, then a CO detector installed in accordance with the manufacturers' instructions may be needed in each room in which an appliance is located.*

1.3 ESCAPES and LEAKS

1.3.8 Gas escapes

Disturbance or accidental damage of gas service or installation pipes, or other gas fittings, may result in a gas escape and installers shall instruct operatives to take the following action:

If you can smell gas -

- Do not smoke or light matches;
- Do not turn electrical switches on or off;
- Turn off the gas supply at the emergency control valve; Open doors and windows (if the smell is inside a property);
- For natural gas, contact the National Gas Emergency Service on 0800 111 999;
- For Liquid Petroleum Gas (LPG) report leaks to the gas supplier, but the National Gas Emergency Service will also assist in an emergency.
- Do not operate your mobile phone until you are at a reasonable distance from the suspected leak

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1.3.9 Oil Leaks

Installers shall instruct operatives to take the following action for any perceived oil leak,

- Prevent further loss of oil, turning off the flow at source, where possible;
- Mop up any obvious spillage with absorbents – Never try and flush it away with water or with chemicals;
- Advise the equipment owner to notify their property insurers;
- For oil fuelled appliances contact OFTEC on 01473 626 298 during hours 9am to 5pm. Outside of this period, an OFTEC technician should be contacted. Details can be found on the OFTEC website www.oftec.org and where the leak is external, report the incident to the UK Pollution Incident hotline 0800 80 70 60

1.4 TECHNICIAN'S COMPETENCE

EWI installers shall employ EWI technicians that have successfully completed a training course covering all matters referred to in this specification and are able to demonstrate competence and working practices that comply with the requirements of the most recent edition of PAS2030 Annex B4 and B7.

For each installation task to be undertaken, the installer shall employ or subcontract at each specified installation location, at least one carded specialist operative (Supervisor) that meets the competence requirements in full for the relevant tasks and the ratio of other operatives employed or subcontracted at that site shall be in accordance with the requirements set out in the relevant Annex of PAS 2030.

EWI installers shall ensure that any fuel specific work is carried out by a person competent in relation to the fuel involved e.g. for gas appliances in the UK this means a Gas Safe registered engineer).

NOTE: The term "fuel specific" relates to any work on gas or oil appliances and/ or their flues, fuel meters, supply pipes and related fittings.

Other work requiring specialist skills, such as removal and re-instatement of condensate drains, modification to pressure relief valve (PRV) discharge pipes etc. can be carried out by other competent persons such as a competent plumber, and EWI installers shall make arrangements for this accordingly. However if any doubt as to the required skill set exists, then a person competent in relation to the fuel involved (i.e. for gas, a Gas Safe registered engineer) shall be consulted.

NOTE: It is strongly recommended that in the planning stage of any EWI work all combustion appliances are identified and evaluated to establish those which either require work by, or advice on proven practice from a Gas Safe registered engineer. Appropriate scheduling of this work will ensure that EWI activities are not delayed.

1.5 LEGAL REQUIREMENTS

EWI installers shall establish and follow procedures for ensuring that they are aware of current legal requirements relating to and impacting upon, the installation of EWI.

NOTE 1: The main legal requirements for protection of the public and employees are the general provisions of the 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' and plan of protective measures, as well as the appointment of competent persons to ensure that safety requirements are met effectively (see also: https://www.gov.uk/guidance/competent-person-scheme-current-schemes-and-how-schemes-are-authorised).

NOTE 2: 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 or modifications to buildings in which gas appliances are installed and would include EWI installation.

1.6 PREPARATORY RESPONSIBILITIES

NOTE EWI Installers are reminded that EWI should not be installed unless entry to the property to carry out all of the specified checks is possible (see 1.1.1).

1.6.10 Condition of flues etc.

Installers shall establish and apply procedures for pre-assessment, installation practice and checks that ensure that flues, chimneys, combustion air ventilators and any other items relating to the safe operation of fuel burning appliances are left in an equivalent or improved condition, when compared to that which existed before the EWI installation took place.

The established procedures for installing EWI shall not affect the operation of fuel burning appliances, flues or chimneys, and checks to confirm correct operation shall be carried out at all stages, particularly on completion.
The procedures shall include measures to ensure that if, during EWI installation work, a fault is identified that could cause harm to the occupants or the installer, or if any fuel-conveying pipework is damaged or disturbed, preventive action is taken by seeking advice from a person competent in relation to the fuel involved (e.g. for gas, a Gas Safe registered engineer and/or by contacting the National Gas Emergency Service or the gas supplier, in the case of LPG), as necessary.

1.6 PREPARATORY RESPONSIBILITIES

1.6.11 Pre-installation survey

Before carrying out any EWI work the installer shall conduct a thorough survey (both inside and outside the property) to identify any risks relating to:

- service pipework and entry tees
- meter boxes
- supply pipework (See Clause 4 for specific considerations relating to oil supply pipework)
- appliance flues
- combustion air and other ventilators
- pressure relief discharge pipes
- condensate drainage pipes
- adventitious ventilation

and provision for addressing any identified risk shall be made and included in the EWI installation plan with reference to relevant gas or oil expertise, as required.

NOTE: It is recommended that where a non-condensing (low-efficiency) boiler is in place it would be sound practice to advise the occupier of the benefits of fitting a new boiler as part of the overall "improvement package". The decision as to whether a new boiler is fitted lies with the customer and this is not a requirement of the EWI installation. This work must be carried out by a Gas Safe registered installer (or in the case of other fuels by an appropriate competent person) and in this situation the boiler manufacturer's instructions would give detailed guidance on condensate drain installation – especially on the need to terminate a condensate drain internally wherever possible to avoid the risk of freezing in cold weather. If external drain installation is the only possible option then manufacturer's guidance on pipe size, insulation etc. must be followed by the appliance installer.

*NOTE 2: *Due regard should be given to adventitious ventilation. This is air infiltration to the property which occurs through minute cracks and gaps in and around the building fabric, such as window and door frames for example. Whilst not proprietary ventilation for combustion appliances, it is essential that the installation of EWI does not reduce the provision of adventitious air to the point where this could affect the safety of open-flued, or flue-less appliances. With this in mind, and due to the inherent difficulties in assessing air infiltration pre and post installation, it is strongly recommended that a competent person is consulted as part of the work, particularly upon completion. For gas appliances, this would be a Gas-Safe registered engineer.*

2 OPERATIONAL REQUIREMENTS – SITE PREPARATION, PLANNING, SCHEDULING, AND COMPETENCE.

2.1 PRE-INSTALLATION BUILDING INSPECTION

The EWI installer shall ensure that a pre-installation building inspection is carried out by a competent person in accordance with CMTC Annex EWI 1 and specifically items 9, 10, 11 and 12 and completed before installation work commences. The survey shall include recording the number, nature, functionality, location, and identification of all fuel burning appliances.

2.2 WALL MARKING

The EWI installer shall adopt and use a system of highly visible wall markings with durability of at least one month longer than the planned length of the installation process. The EWI installer shall ensure that the wall marking system in use and its implications for installation safety are made known to all personnel on site.

NOTE: It is recommended that to reduce the risk of misunderstanding, installers should adopt a consistent system of markings that all personnel likely to be working on installation sites share and are made aware of at induction It is suggested that the markings could be made with a semi-permanent spot marking spray likely to last approximately 6 months before fading. See Annex A for an example marking system.

2.3 PREPARATION OF PLAN/ SCHEDULE FOR GAS WORK

The installer shall prepare a site specific plan/ schedule to ensure that:

- All fuel burning appliance, flues, ventilation and associated items are located, correctly identified and recorded.
- Those items requiring specific fuel competence to carry out work are identified.
- Correct parts (e.g. replacement flues) are identified and sourced to enable work to proceed (and are installed in advance where necessary).
- Work is scheduled so as to be compatible with the planned EWI installation work, ensuring that the required work can be properly completed without restriction from EWI installation activity.
- Any identified, unsafe aspects are acted upon.
- Where there is any uncertainty on safety related matters a competent person shall be consulted before proceeding with EWI installation.
- Work on each item is "signed off" as completed and "to standard" by a competent person assigned by the EWI installer to do so.

2.4 IDENTIFICATION AND SOURCING OF COMPETENT PERSONS

The installer shall ensure that for installations that require a competent person either to advise on and/ or undertake, specified work in relation to fuel burning appliances, the relevant competence is sourced as follows:

- Gas and LPG - work shall be carried out by a Gas Safe registered engineer.
- Oil - work shall be carried out by a competent person such as an OFTEC registered engineer.
- Solid Fuel – work shall be carried out by a competent person such as a HETAS or OFTEC registered engineer.
- Sign-off for completed work is undertaken by a person having the relevant competence, assigned by the EWI installer to do so.

NOTE: Other work (e.g. on condensate drains) should be carried out by an appropriately competent person e.g. a competent plumber.

2.5 SAFE INSTALLATION BY EWI INSTALLATION OPERATIVES

2.5.1 Pre-installation checks by EWI installation operatives

EWI installers shall establish and operate procedures to ensure that on the basis of information from the surveys, plans and schedules specified in 1.6 and 2.1 to 2.3, EWI installation operatives employed to undertake the planned installation confirm the location, identity and status of all fuel burning appliances, combustion air ventilators, flues and other related items (meters, supply pipes and equipment etc.) before commencing the installation.

In addition, EWI installers shall ensure that existing flues and/or air vents are not covered or restricted in any way unless identified and authorised by a suitably competent and trained person.

NOTE: It is strongly recommended that the functional area of such flues and vents be measured and recorded to enable 'before and after' comparison.

Where a condensing boiler is present the condensate pipe shall be located and where external, provision made for its extension to allow for the EWI installation **(see 3.6)**.

The EWI installer shall ensure that operatives responsible for undertaking such checks are aware of the potential risks of EWI installation in relation to condensate drain installation and that the procedure set out in **2.5.3** is followed to the end that any incorrect aspects are notified and rectified, where agreed.

NOTE: This work should be carried out by a competent plumber ensuring that internal condensate drain termination is provided, wherever practicable).

2.5.2 EWI installation operative competence

EWI installers shall establish and operate procedures to ensure that EWI installation operatives employed to undertake the planned installation are competent **(see 1.4)**, aware of and work to the EWI installation safety methods relevant to the fuel burning appliances installed at that location **(see 2.5.1)**. EWI safe installation methods generally applicable to gas burning appliances are set out in **Clause 3** of this document and shall be applied wherever practicable. Where alternative methods are used, installers shall record the reason for their use and make this available, when requested (see also requirements for reference to 'design source', in PAS 2030).

NOTE: Although specifically prepared in relation to gas, the safety principles set out in clause 3 may be applicable in situations where other fuels such as oil or solid fuel, are in use.

2.5.3 Reporting of identified faults in pre-existing combustion air vents and other pre-installed items

EWI installers shall establish and operate procedures to ensure that any pre-existing faults in vents, flues or other pre-installed items (e.g. condensing boiler) identified by them in their required pre-installation building inspection or during installation are reported, where these are located in, or come into contact with the area to be insulated. Such report shall be made to the individual or organization responsible for instructing the installation of EWI as well as the responsible person for the property, and occupier where this is a different party. Following notification, the installer shall allow sufficient time for any required corrective action to be undertaken before completing the EWI installation in accordance with this specification. Where a combustion related issue has been identified, either as part of the pre-installation building inspection or during the installation itself, work shall not continue until the ventilation / flueing of any affected combustion appliances are brought up to the current relevant minimum standards required, taking into account the appliance Manufacturer's instructions Whenever a vent/ flue or other pre-installed item is knowingly left with safety related faults uncorrected, the EWI installer shall leave an appropriate warning notice prominently displayed adjacent to the faulty item (see Annex B for example warning notice). A Gas-Safe Registered engineer would be expected to follow the guidance given in the Gas Industry Unsafe Situations Procedure, where gas-related This course of action shall be explained to the responsible person for the property, and occupier where this is a different party, wherever possible. Explain to the customer, where present, that the appliance must not be used until it has been thoroughly checked by a competent person, such as a Gas Safe registered engineer. Turn off the appliance itself where the customer has given consent to do so.

3 EWI INSTALLATION SAFETY CONSIDERATIONS GAS BURNING APPLIANCES

3.1 General

3.1.1 Fixing of insulation boards, trims, flashings etc.:

When fixing insulation boards and/or trims/flashings/beads/tracks ensure that combustion and other ventilation is kept unobstructed to allow free flow of air to a standard equivalent to the original situation - or to the required standard* if the original ventilation is found to be unsafe or inadequate. In all cases, ensure that sufficient space is allowed to gain access to, and carry out work on, pipework, fixtures, fittings, meters, etc. for maintenance and replacement. Refer to specific guidance in sections below. Distances around Gas Meter Boxes, externally routed pipework and associated gas infrastructure are for guidance only. The local Gas Transporter should be contacted to confirm their minimum requirements which may exceed those listed in this document.

3.1.2 Rendering, finishing and application of adhesives and other wet mortars:

When applying all wet mortars ensure that neither the mortar nor any protective sheeting/masking blocks or impedes any form of ventilation ducts or flues. In no circumstances seal ventilation ducts and flues, even temporarily, with plastic sheeting or other masking whilst application of mortars is going on. If necessary, use hand-held deflectors to ensure that mortar does not drop into or enter the opening. Pipework should also be kept free of mortar splashes, or these should be thoroughly removed before the mortar sets.

3.1.3 Functionality of air bricks etc.:

Existing air bricks within solid wall construction providing sufficient ventilation, may be left in place and a sleeve inserted through the external insulation to a new surface-mounted vent, providing equivalent or greater ventilation free-area. If the existing ventilation provision is unsafe or inadequate*, subject to the outcome of the reporting procedure (2.5.3), give consideration to the removal of the old air ventilator and replacement by a new vent of the required free area, ensuring that it is fully sleeved to a new surface-mounted vent. Check that existing cavities within the wall construction are sleeved to ensure correct through-wall ventilation. Ensure the finished ventilation duct has only one grille at each end and is completely clear of any obstructions such as scrim mesh, loose insulation or debris.

*NOTE: * Wherever there is doubt about the standard of ventilation seek advice from an appropriate competent person and initiate fault reporting procedures (2.5.3) as necessary.*

3.2 Gas Meter Boxes

3.2.1 General principles

3.2.1.1 Aviodance of cold-bridging

Option 1

Meter boxes are surface fixtures that without removal and repositioning on top of the external wall insulation will present a significant cold bridge through the insulation. In all cases where practicable the meter box must be repositioned and secured on top of the EWI system using special thermally insulating fixing blocks or other approved detail (see robust details in PAS2030 – 2017). The mounting system must ensure the weather integrity of the detail and appropriate sealing solutions must be employed to ensure that water cannot enter the EWI system through gaps/penetrations or as a result of cracking in the render finish. Gas pipework must be extended past the depth of EWI and sleeved (continuous from surface of inner wall to surface of outer wall). The pipework must be sealed to ensure that any gas leakage cannot penetrate or accumulate within the wall construction or within the EWI system. Every attempt must be made to mitigate the risk of cold bridging and installers will be expected to demonstrate that all possible solutions have been sought. Constructing the EWI system around the meter box may only be undertaken as a last resort when physical removal or alternative insulation solutions are impossible.

NOTE 1: Removal or replacement of installation pipe work, or LPG service pipework, must be carried out by a Gas Safe registered engineer with the appropriate competencies (or an appropriate Competent Person in the case of pipework conveying other fuels) with fixings as recommended by the EWI supplier/designer.

3.2.2 Compromise solutions for avoidance of cold bridging

When the approach detailed in 3.2.1 is not practicable, stop the application of the external wall insulation system short of the meter box and install a weathered return in render or full system stop bead (also sealed against gas entry).

3.2.3 Provision for access to meter boxes

Following installation of EWI all meter boxes must have a minimum 25 mm gap around them for access and maintenance (this may need to be larger to enable a rendered return to the wall), however due regard must be given to how the meter box is secured; if this is screwed (often at the bottom) access will be required to remove the screws (see Figures 3 and 4).

3 EWI INSTALLATION SAFETY CONSIDERATIONS GAS BURNING APPLIANCES

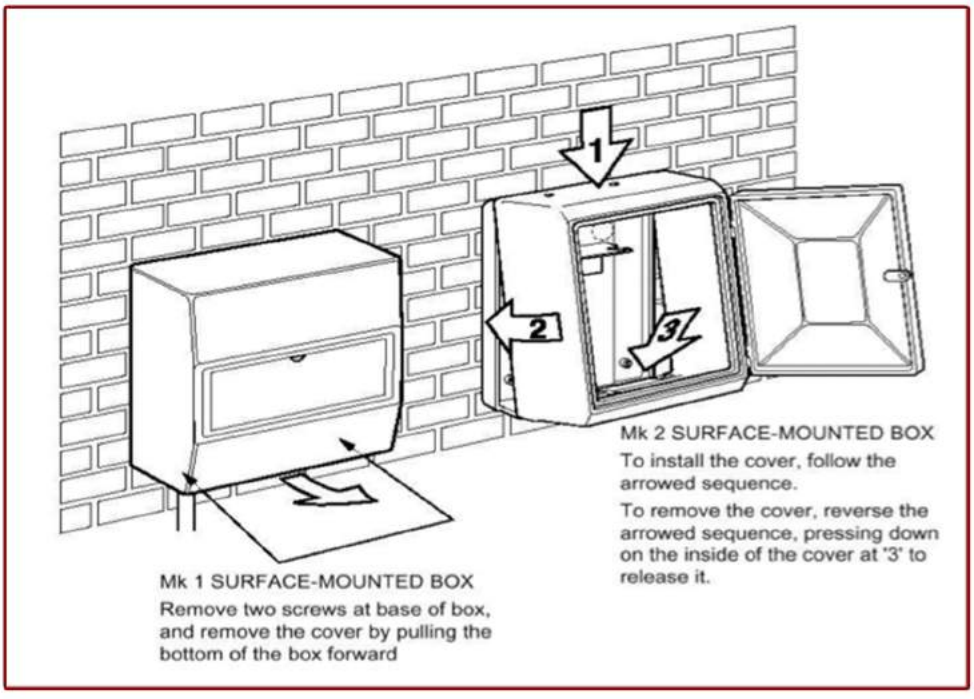
3.2.4 Meter box mounting
3.2.2 Surface mounted meter box:

3.1.1 Fixing of insulation boards, trims, flashings etc.:

When installing EWI in the vicinity of a meter box, ensure that provision is made for the following **(see Figure 1)**:

- Space is required below the box to allow access to the 2 fixing screws;
- Space is required at the sides in order to pull the box front clear;
- Space is required above the box to allow it to be lifted;
- Space is required to allow for the finishing of rendered returns, where these form the opening around a meter box;
- Space is required for sealing EWI material and trim to the wall surface to prevent any gas escapes from entering the insulation, or gaps behind it.

Figure 1 – Surface mounted meter box – indicating need for access.



3 EWI INSTALLATION SAFETY CONSIDERATIONS GAS BURNING APPLIANCES

3.2.3 Semi concealed meter box:

Space is required above the box to allow the door to be fully opened to allow future maintenance or exchange of meter **(see Figure 2).**

Figure 2 Semi-concealed meter box – indicating need for access

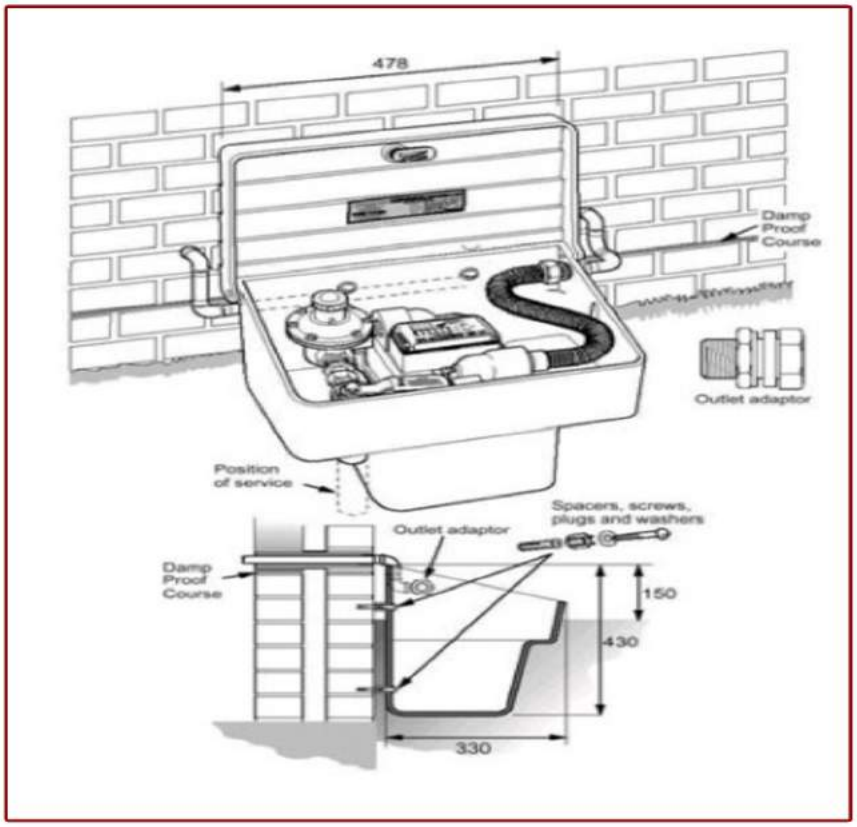


Figure 3 – Meter Box after EWI installation - Option 2 (The discontinuity in the insulation at the retained meter box constitutes a significant thermal bridge in the EWI system which may result in internal surface temperatures falling below the critical temperature for mould growth and/or condensation)

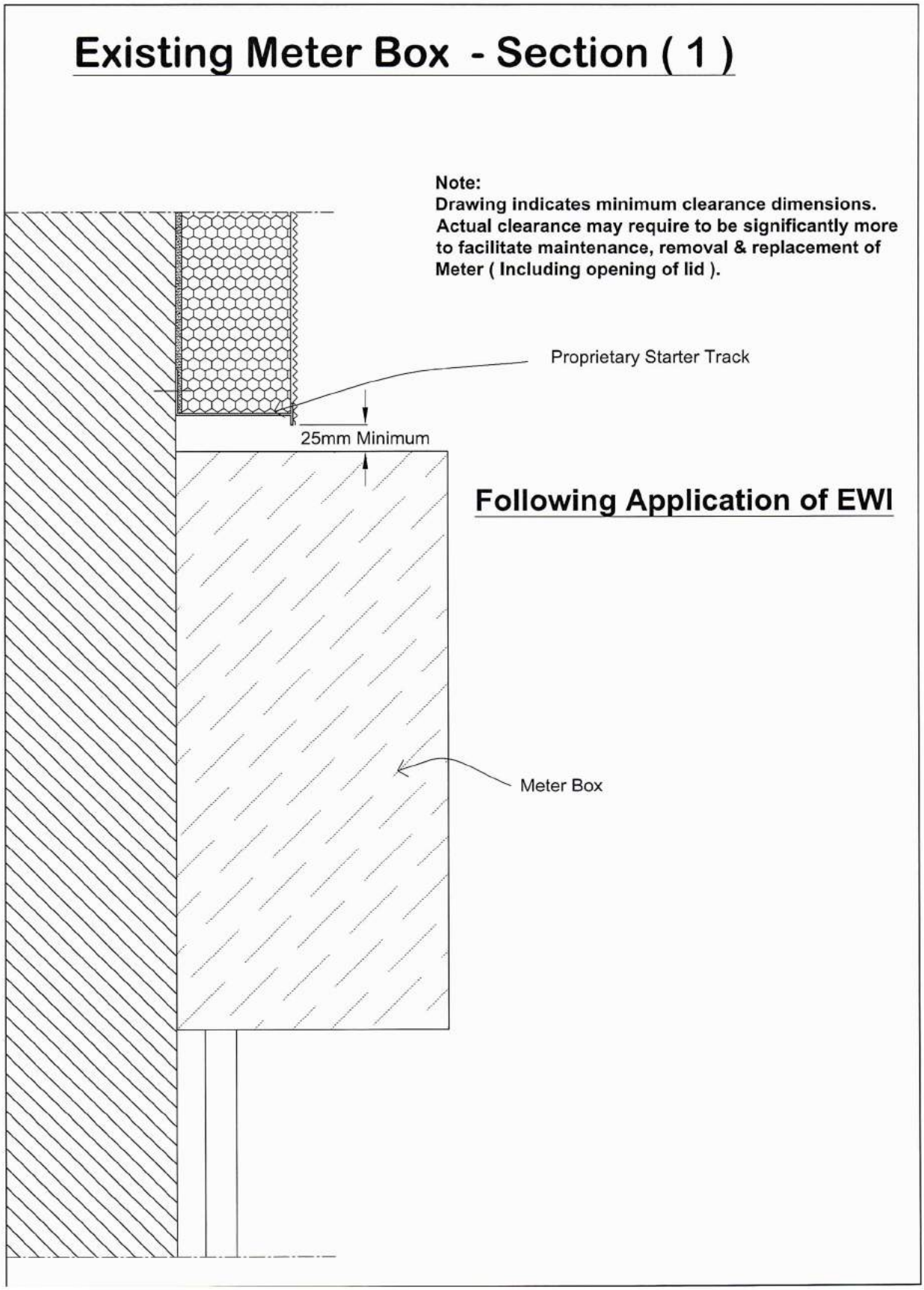
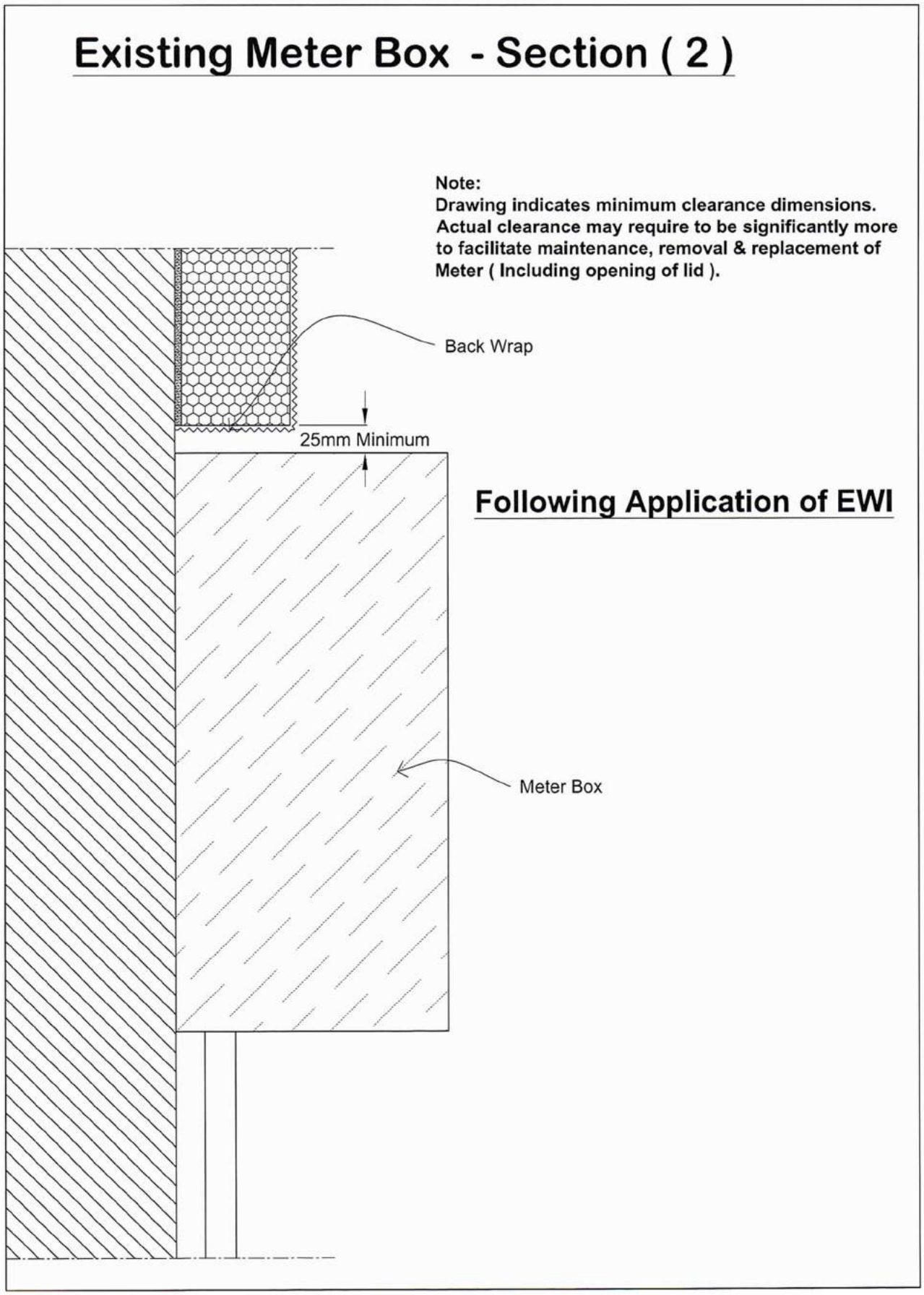


Figure 4 – Meter Box after EWI installation - Option 3 (The discontinuity in the insulation at the retained meter box constitutes a significant thermal bridge in the EWI system which may result in internal surface temperatures falling below the critical temperature for mould growth and/or condensation)



3 EWI INSTALLATION SAFETY CONSIDERATIONS GAS BURNING APPLIANCES

3.3 Gas "service pipes", "service pipe-work" and "installation pipework"
3.3.1 Overview

A natural gas "service pipe" is pipework up-stream of the first gas Emergency Control Valve (ECV) intended for use by a gas consumer. This supplies gas to premises from a distribution main and may include gas service risers on low and high rise buildings. Although legislation does not specifically cover the issue, the Pipeline Safety Regulations 1996, which includes service pipes, places specific responsibilities on the pipeline operator and persons who carry out work in the vicinity of underground and/or above ground pipes. Service pipes are the responsibility of the Gas Transporter, who MUST do any work on that pipework, including building entries and/or meter supplies. Any enclosing of a service pipe would require notification to the appropriate Gas Transporter before work commences. Work on a gas service pipe does not come under the Gas Safety (Installation and Use) Regulations and Gas Safe registered engineers would not be considered competent to work on those systems. There are separate certificates of competence for gas mains and services personnel. In general IGE/TD/4 Edition 4 covers gas service requirements including service entries, however this document does not cover multi-occupancy buildings (flats etc which have a common gas supply but individual gas services and meters). IGEM/G/5 Edition 2 covers these premises.

LPG "service pipework" supplies gas to premises from a gas storage vessel, and includes any pipe between the gas storage vessel, and the Emergency Control Valve (ECV). Further enquiries may need to be made with the fuel supplier, and/or person(s) responsible for the service pipework, before such pipework is worked on, or enclosed.

Gas "installation pipework" is natural gas or LPG pipework down-stream of the first gas Emergency Control Valve (ECV), extending to the point at which appliances are connected. Work on this pipework can only be undertaken by a Gas Safe Registered Engineer (or in the case of other fuels, by an appropriate Competent Person).

supplier, or a person suitably competent to investigate further, should be consulted for further guidance.

3.3.2 Relevant Standards

The relevant standards applicable to gas pipes within ducts, are:

BS 8313: 1997 Code of practice for accommodation of building services in ducts.

BS 6891: 2015 Specification for the installation and maintenance of low pressure gas installation pipework of up to 35 mm (R1¼) on premises.

IGEM/UP/2 Edition 3 Installation pipework on industrial and commercial premises.

IGEM/G/5 Edition 2 Gas in multi-occupancy buildings.

3.3.3 Externally routed gas pipework

Where the gas pipework is routed externally it will be necessary for the EWI installer to provide adequate measures to ensure that the gas pipework is not covered by the insulation material and/or render and that a cold bridge does not result from the installation of the EWI. In all cases where practicable the pipework must be repositioned and secured on top of the EWI system using special thermally insulating fixing blocks or other approved detail (see robust details in PAS2030 – 2017). The mounting system must ensure the weather integrity of the detail and appropriate sealing solutions must be employed to ensure that water cannot enter the EWI system through gaps/penetrations or as a result of cracking in the render finish. Gas pipework must be extended past the depth of EWI and sleeved (continuous from surface of inner wall to surface of outer wall). The pipework must be sealed to ensure that any gas leakage cannot penetrate or accumulate within the wall construction or within the EWI system. Every attempt must be made to mitigate the risk of cold bridging and installers will be expected to demonstrate that all possible solutions have been sought. Constructing the EWI system around the pipework may only be undertaken as a last resort when physical removal or alternative insulation solutions are impossible.

The option given in 3.3.3.1 however is the only one that ensures the continuity of the thermal insulation and should be adopted wherever practicable. The options in 3.3.3.2 and 3.3.3.3 must ensure that the pipework is readily accessible for future maintenance or repair and complies with all statutory requirements. These options will lead to cold bridging of the thermal insulation system at this location and their use will necessitate the introduction of other measures to mitigate the risks e.g. localised internal insulation, reduced thickness external insulation.

3.3.3.1 Option 1

Remove or arrange for removal of pipework from the wall and extend past the depth of EWI and sleeve (continuous from surface of inner wall to surface of outer wall) - refit pipework onto finished surface of EWI using an appropriate fixing method to ensure adequate support.

NOTE 2: Removal or replacement of installation pipe work, or LPG service pipework, must be carried out by a Gas Safe registered engineer with the appropriate competencies (or an appropriate Competent Person in the case of pipework conveying other fuels) with fixings as recommended by the EWI supplier/designer.

3.3.3.2 Option 2

Leave pipe in situ and exposed to ambient air with a minimum gap between the pipe and insulation material of 100 mm each side of the pipe for access and maintenance when required.

NOTE: The insulation material and trim must be sealed to the wall to prevent ingress of gas in the event of gas escape.

3.3.3.3 Option 3

Enclose the pipes in a proprietary enclosure of adequate size to allow access and maintenance when required. Ensure a minimum gap between the pipe and enclosure of 100mm each side of the pipe for access and maintenance when required. The enclosure shall be ventilated where necessary (see section 3.3.5), and fitted with a removable cover.

NOTE 1: It is essential that fire regulations be considered if ducting crosses fire/smoke control areas.

NOTE 2: In commercial and industrial premises the gas industry is subject to the DSEAR regulations requiring risk assessments and area classification (see IGEM/SR/25 and IGEM/UP/16). This is the responsibility of the occupier but any work done on the gas system to enclose pipes etc. will require a reanalysis. (This is not a requirement in the domestic sector).

NOTE 3: Enclosing a Service Pipe within ventilated and removable covers may be acceptable provided the relevant gas distribution network is consulted in advance of the work, approval given and any instruction followed. This may necessitate (re)inspection by the gas distribution network once the work has been completed. Ensure the entire pipe remains accessible, to allow for future access by the Gas Transporter and when otherwise required.

3.3.4 Checks prior to installation of pipe enclosure

When installing the pipe enclosure, ensure that all existing gas service entry points into the building that will be enclosed are sleeved and sealed appropriately. This is to help prevent ingress of gas into the structure or building should a gas escape occur within the enclosure. Although with other fuels the requirement to seal against gas leaks may not be required, it would be considered good practice to seal to avoid thermal losses and protect against infestation.

3.3.5 Construction of pipe enclosure

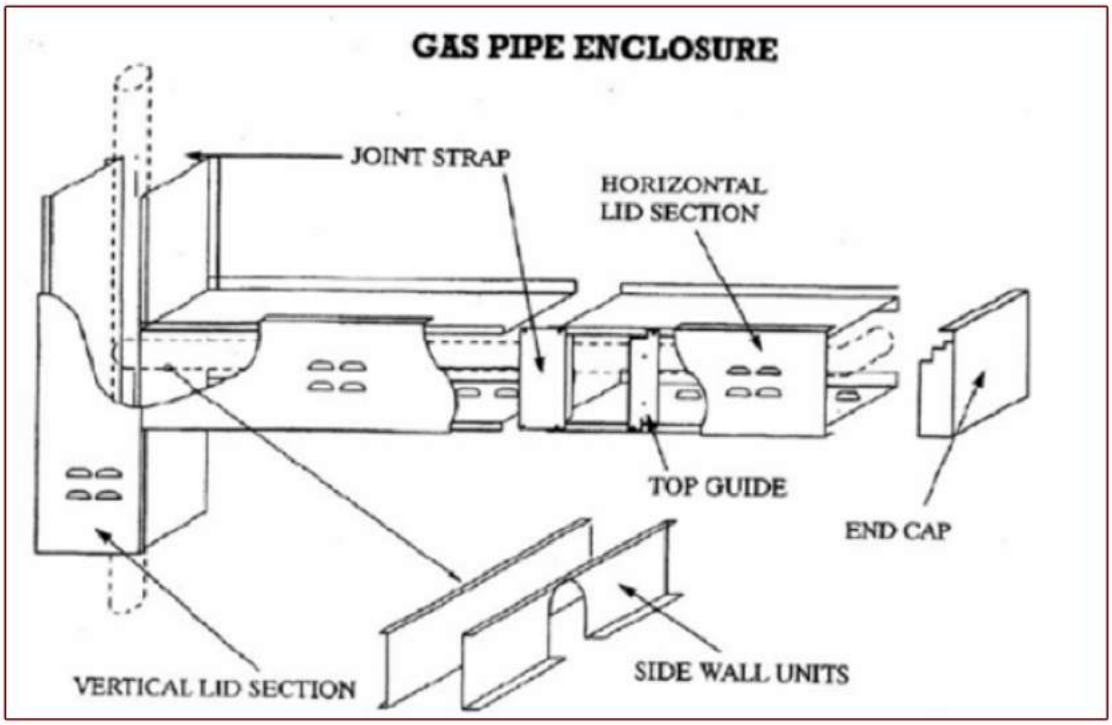
Ensure that the enclosure method selected is designed to provide sufficient clearance from the pipework to accommodate any expansion or contraction of the pipework, or of the enclosure itself, and to allow maintenance.

NOTE: As the enclosure could be supplied, installed and maintained by non-gas-competent persons, the primary concerns are that the finished enclosures will provide adequate ventilation and allow future inspection and/or repair to the enclosed pipework. Therefore this information is not prescriptive as to the exact materials to be used or to the construction methods employed for the enclosure. An example of an enclosure that is likely to fulfil requirements is shown in ***Figure 5****.*

3.3.6 Removable covers

Always use removable covers that are secured in such a way as to be easily removable by the Gas Transporter or other maintenance operatives, in the event of an emergency or routine maintenance requirement.
(The discontinuity in the insulation created by the pipe enclosure constitutes a significant thermal bridge in the EWI system which may result in internal surface temperatures falling below the critical temperature for mould growth and/or condensation).

Figure 5 – Example of service pipework enclosure



3.3.7 Ventilation Requirements:

3.3.7.1 Ventilation location

The Gas Safety (Installation and Use) Regulations; 1998, require that any gas "installation pipework" installed within a shaft, duct or void shall be adequately ventilated. This is to ensure that any gas leaking from the pipework cannot approach the lower flammability limit (approximately 5% gas in air for Natural Gas, 2% for LPG) and can be readily detected. This can be achieved by ventilating to a safe place, preferably outside air. To achieve this:

- Any gaps or holes in the wall forming the back of the enclosure that might allow gas ingress into the property shall be sealed at the time the enclosure is fitted.
- The ventilation openings shall be at high and low level of vertical duct sections, to ensure that there is air movement within the duct.
- Where ducts are horizontal, ventilation openings shall be located such that air movement can occur within the duct. As a minimum the required openings should be provided at either end of the duct, or for longer ducts, at intervals not exceeding 15 metres.

3.3.7.2 Calculation of ventilator sizes

The size of the vents required to ensure there is no significant build-up of flammable gas in the enclosure depends on many parameters. These include the cross-sectional area and length of the enclosure to be ventilated. It is recommended that table 1is used to calculate the required ventilator sizes where gas pipe-work is enclosed. This reflects the guidance of BS 8313:1997, BS 6891:2015 and IGEM/UP/2 Edition 3, and should ensure compliance with The Gas Safety (Installation & Use) Regulations, 1998.

Table 1 – Free area of ventilation openings

Free area of ventilation openings	
Cross-sectional area m^2	Minimum free area of each opening [A)] m^2
Not exceeding 0.01	0
0.01 and not exceeding 0.05	Cross-sectional area
0.05 and not exceeding 7.5	0.05
Exceeding 7.5	1/150 of the cross-sectional area

[A)] For vertical shafts and ducts the required openings should be provided at both high and low level. For horizontal ducts and ceiling voids the required openings should be provided at either end.

3.3.8 Warning Labels:

Locate a warning label on the front of the pipe enclosure approximately 1.8m from ground level to indicate the presence of the gas pipework and give emergency contact details in the event of a smell of gas being detected, or other emergency event that may affect the integrity of the pipework. For longer enclosures or ducting, repeat at suitable intervals. An example enclosure Warning Notice for natural gas is shown in **Figure 6**.

NOTE: for LPG the fuel supplier emergency contact details should be given

Figure 6 – Example warning label

3.4 Entry Tee
3.4.1 Minimum required clearances:

Ensure that a 'channel' above any Service Entry Tee measures a minimum of 250mm high by 100mm wide to allow the use of the 'Turn off' tool, which is about 230mm long (see Figure 7). Unlike other gas pipework, the Service Entry Tee pipework does not need a large access space either side of the pipe, therefore a minimum of 25 mm space between the pipework and the EWI, is adequate (see Figures 8a, b and c). This is different from all other installation pipework and services where a minimum of 100mm either side is required to gain access to work on the pipe with tools.

Figure 7 – Illustration of a turn off tool for service entry tee requiring minimum 250mm clearance above tee

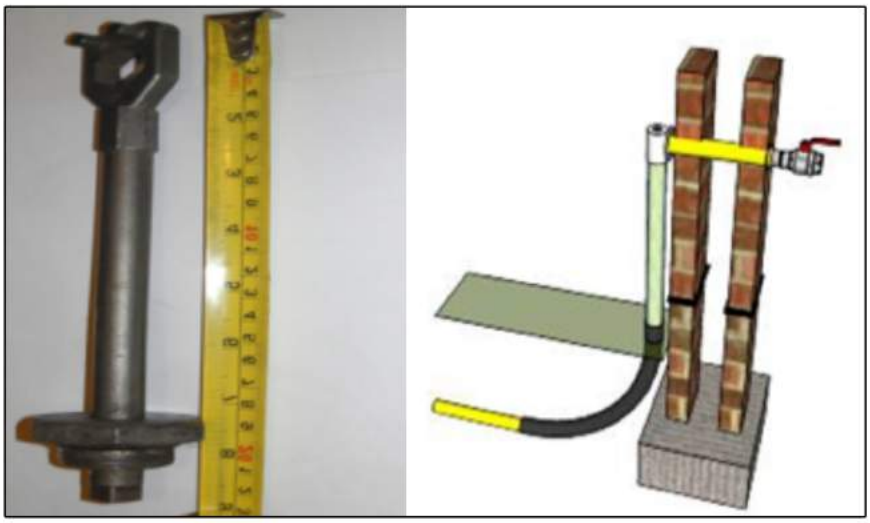


Figure 8 – Gas delivery pipe entry tee – Plan

Figure 8b

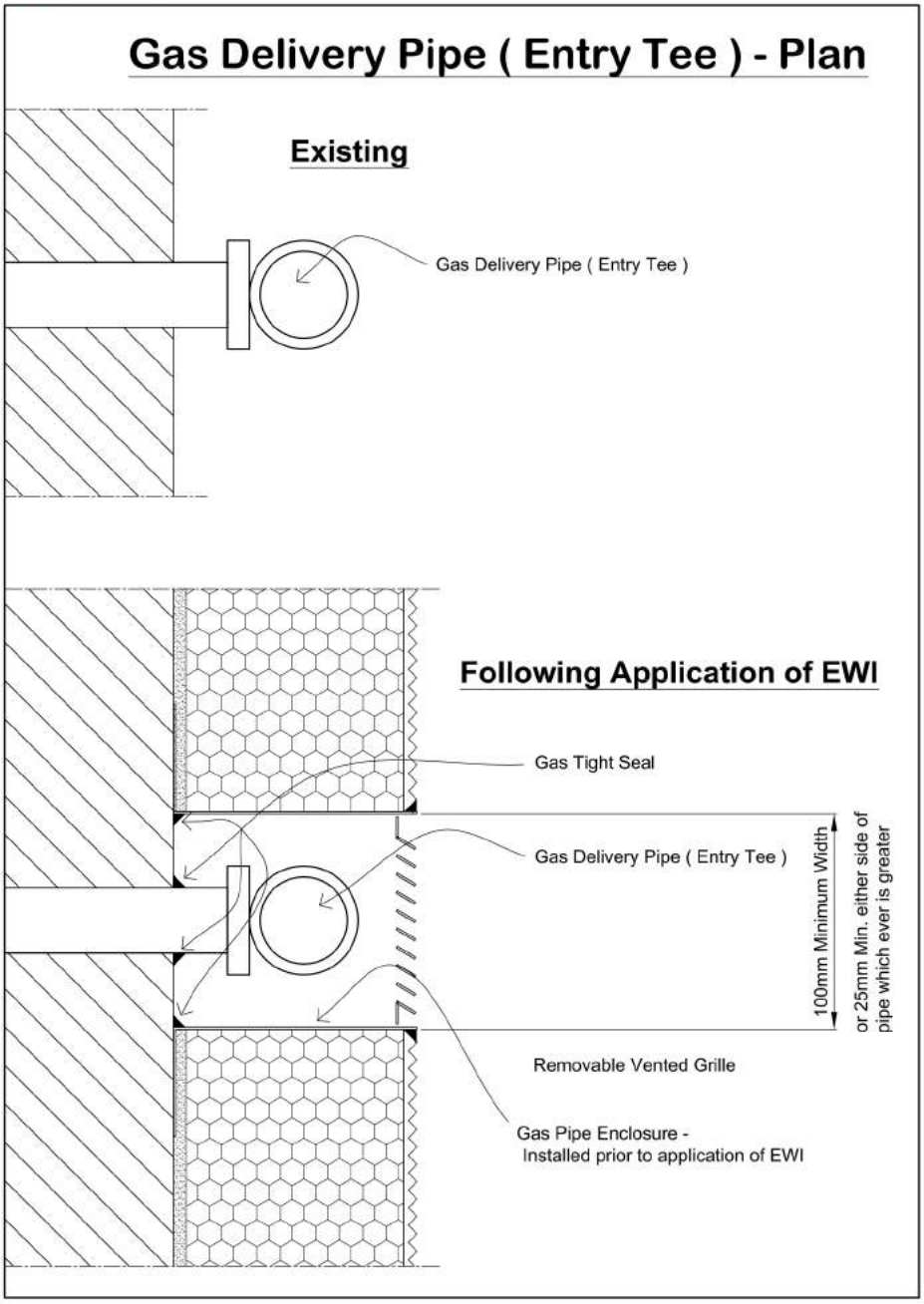
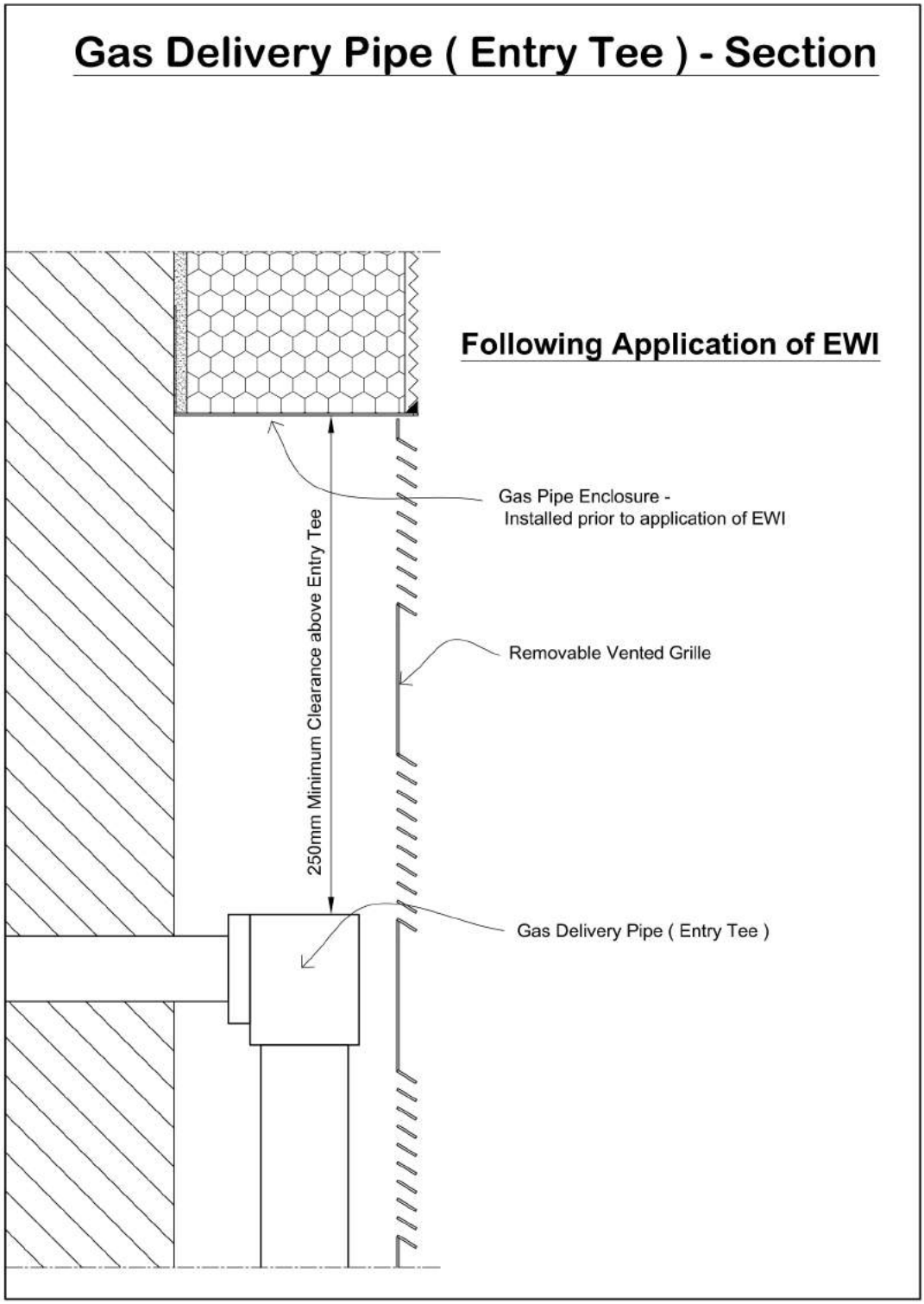


Figure 8c


Gas Delivery Pipe (Entry Tee) - Section
Following Application of EWI
Gas Pipe Enclosure -
Installed prior to application of EWI
Removable Vented Grille
250mm Minimum Clearance above Entry Tee
Gas Delivery Pipe (Entry Tee)

3 EWI INSTALLATION SAFETY CONSIDERATIONS
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3.5 Pressure relief valve (PRV) discharge

PRV discharge pipes are used to prevent pressure build up in boilers or unvented cylinders. The PRV pipework from the boiler/cylinder is likely to pass through the outside wall with the end "turned" back (or have a proprietary "mushroom" fitting installed) to discharge any steam safely back against the wall or down in to the ground see Figures 9a, b and c. 15mm copper tube is the most commonly used material, although in some instances plastic pipe may have been used, often incorrectly. In accordance with 2.5.3, Installers will need to discuss its replacement with the individual or organization responsible for instructing the installation of EWI and take action accordingly unless the installed pipes have been verified as fit for purpose by an appropriate competent person.

Do not leave PRV pipes where they present a scalding hazard to persons in and around the building (e.g. such as by being left terminating in the horizontal plane without additional protective measures).

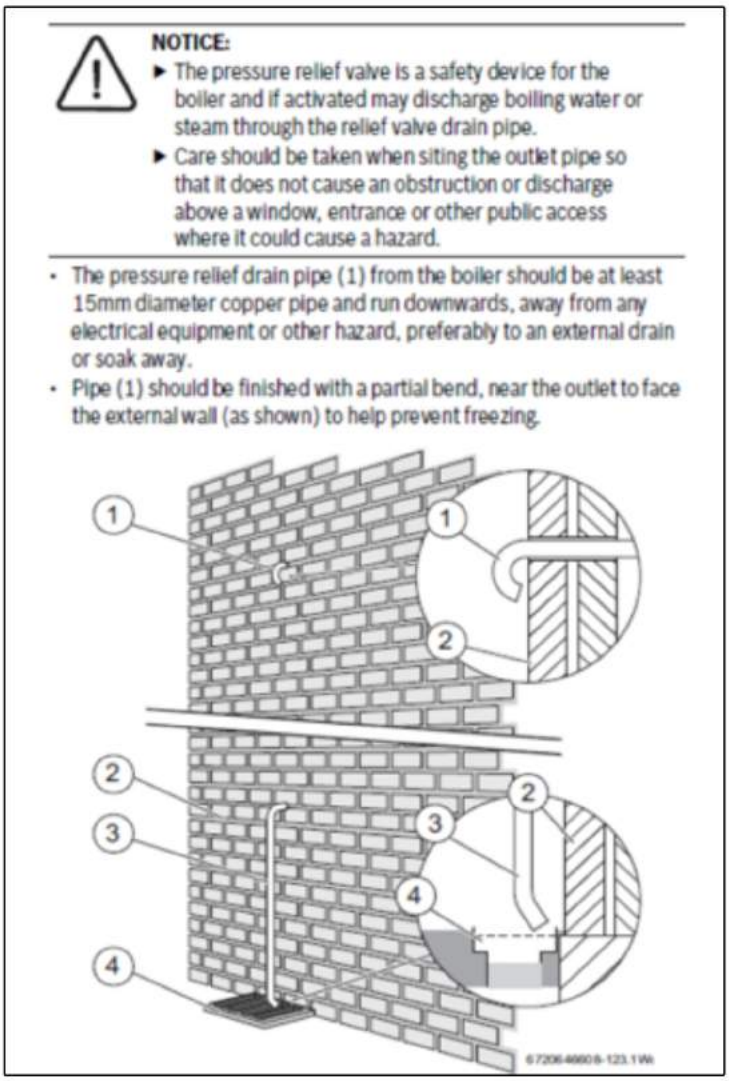
To extend the PRV pipework through the thickness of external wall insulation safely, ensure that it terminates beyond the thickness of insulation + render + return/mushroom head.(see figure 9 for example of soldered connections). Particular attention should be drawn to the need to ensure the pipe can discharge freely under fault conditions. Good practice dictates that the pipe exit "stand off" is equal to pipe diameter (e.g. 15mm stand-off for 15mm PRV pipe).

NOTE: This work can be carried out by a competent plumber and does not require a Gas Safe registered engineer.

However, ensure that all alteration work is checked and signed off, by a Competent Person.

Figure 9 – Typical installations of boiler PRV discharge pipe showing termination of pipework.

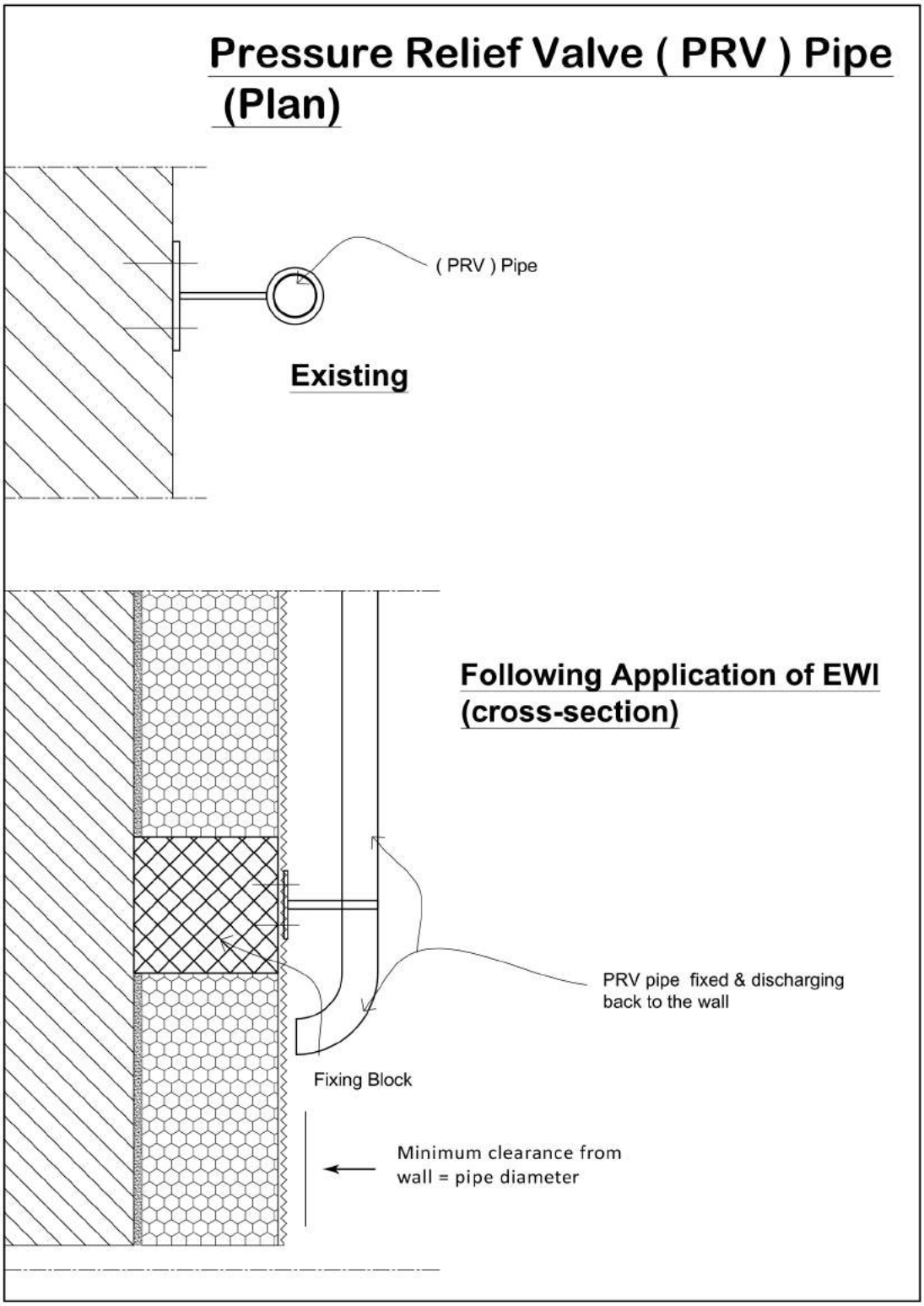
Figure 9a



NOTE 1 to Figure 9: Care should be exercised when soldering connections in the vicinity of EWI to ensure the integrity of the EWI installation.

NOTE 2: Attention is drawn to Part G3 of the Building Regulations (England and Wales) which places more stringent requirements on PRV discharges from unvented cylinders.

Figure 9b)



3 EWI INSTALLATION SAFETY CONSIDERATIONS GAS BURNING APPLIANCES

3.6 Boiler condensate drainage pipe

3.6.1 General

If a condensing boiler is fitted in the property there may be external condensate drainage pipework – usually standard plastic drainage pipework emerging externally below the boiler location and running into a foul water stack, foul water drain or purpose-built soakaway. The pipe diameter may vary, and it may or may not be insulated, depending on whether the original installation was to the required standard **(see Figure 10a).**

NOTE: If a non-condensing (low efficiency) boiler is fitted there will be no condensate drainage pipework.

3.6.2 Procedure

Ensure that pipework is not recessed into or buried within EWI by extending it beyond the thickness of insulation + render in compliance with **Figure 10b and c**.

NOTE this work can be carried out by a competent plumber and does not require a Gas Safe registered engineer.

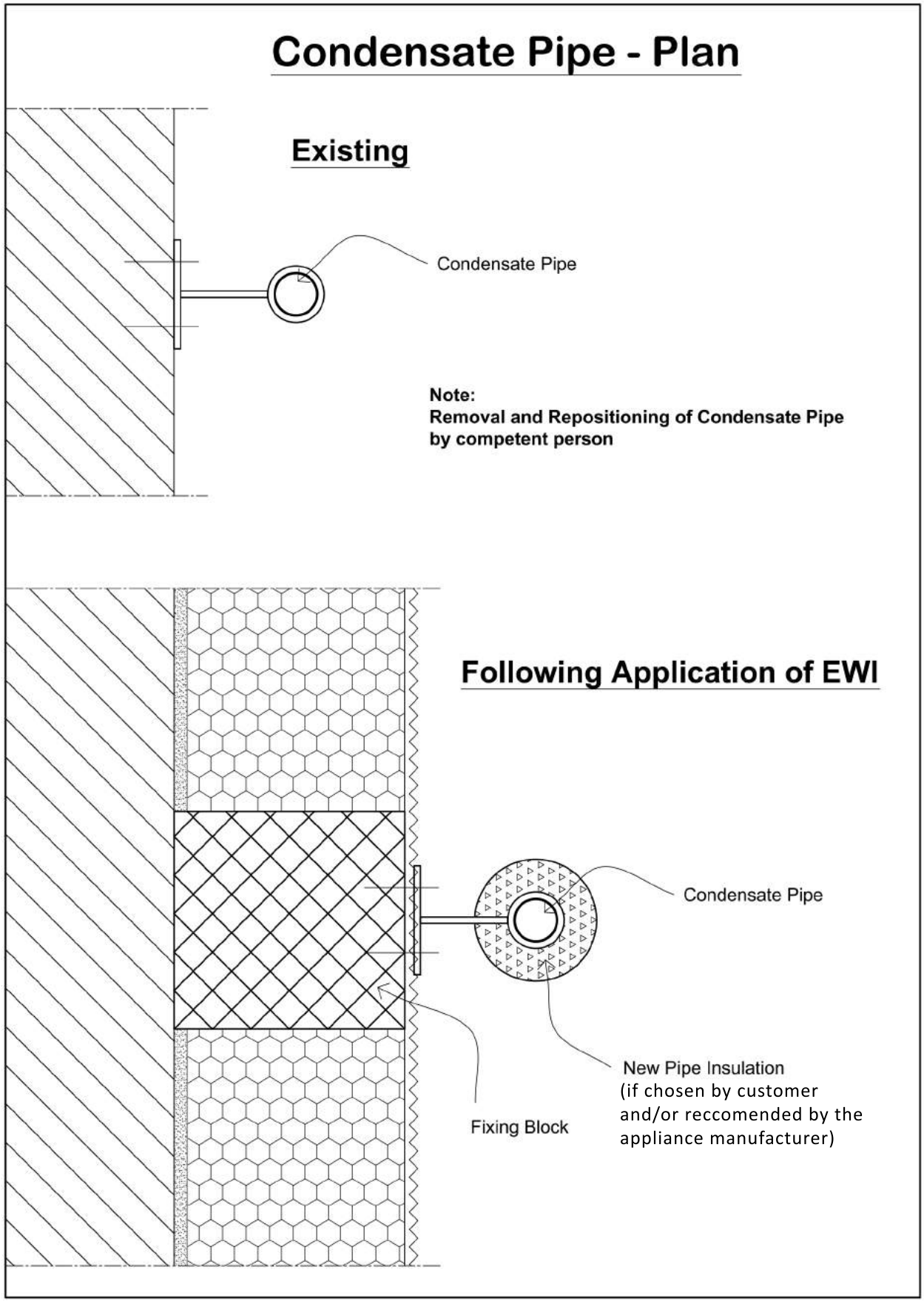
However, ensure that all alteration work is checked and signed off, by a Competent Person.

Figure 10– Condensate drainage pipework before and after EWI installation

10a before EWI installation

(NOTE: To figure 10 White pipe below boiler flue – note apparent lack of pipe insulation)

10b Condensate pipe - plan



3 EWI INSTALLATION SAFETY CONSIDERATIONS GAS BURNING APPLIANCES

3.7 Flues
3.7.1 Boiler/water heater flues:

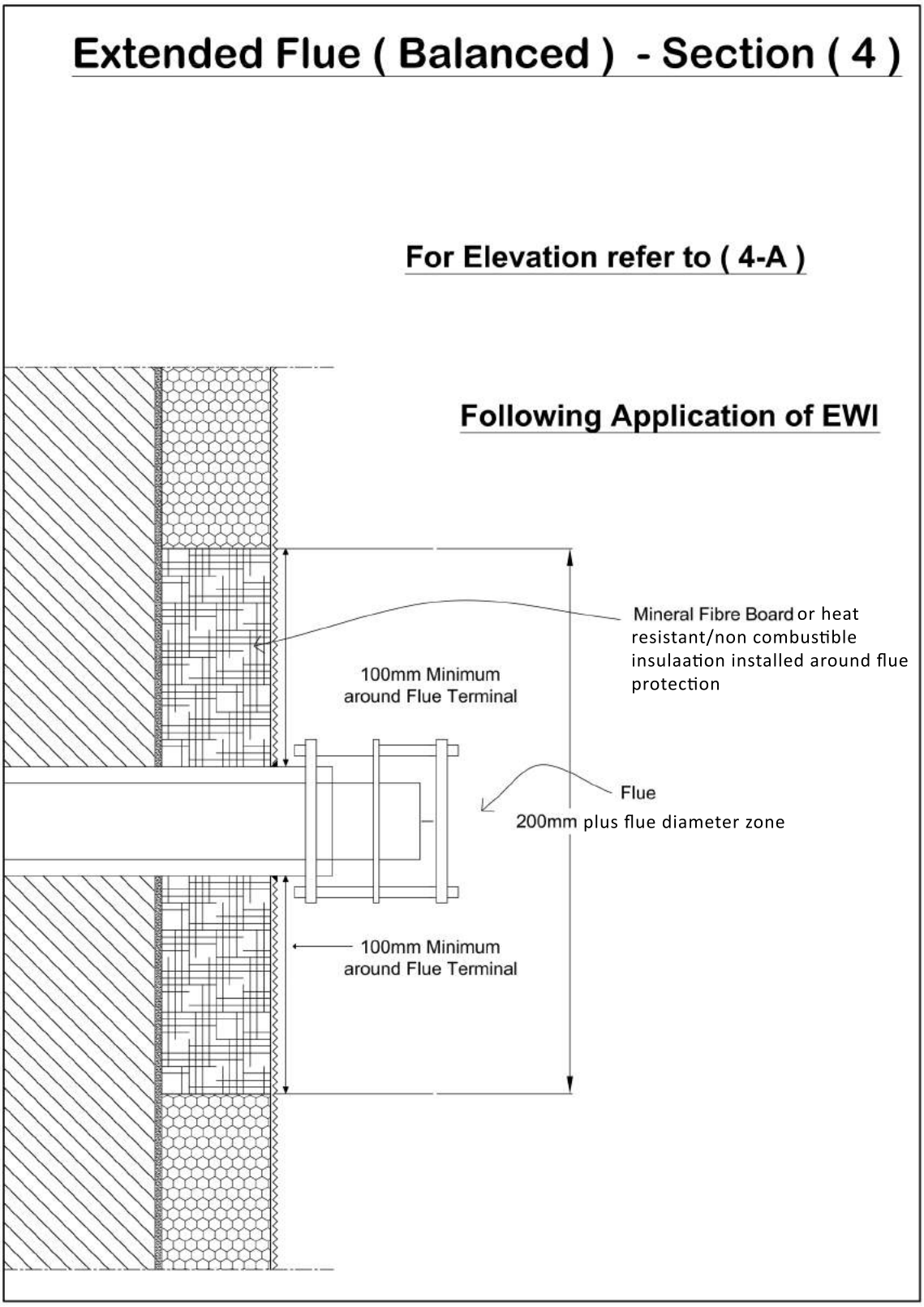
When installing EWI in a property with a central heating boiler or water heater the existing flue should be extended to clear the surface of the EWI in accordance with the appliance manufacturers instructions. The two principal methods are set out in 3.7.2.1 and 3.7.2 The option given in 3.7.2.1 however is the only one that ensures the continuity of the thermal insulation and should always be adopted wherever practicable. The option in 3.7.2.2 will lead to cold bridging of the thermal insulation system at this location and its use will necessitate the introduction of other measures to mitigate the risks e.g. localised internal insulation.

3.7.1.1 Option 1

Ensure that the existing flue is extended in accordance with the appliance manufacturers instructions, by a Gas Safe registered engineer (or OFTEC registered technician), taking account of the temperature resistance of the EWI material. If any part of the flue in contact with the EWI can exceed 70oC, and/or in accordance with manufacturers instructions, then install a collar of mineral fibre or other heat resistant, non-combustible insulating material around the flue to protect the EWI
(see Figure 11a and 11b).

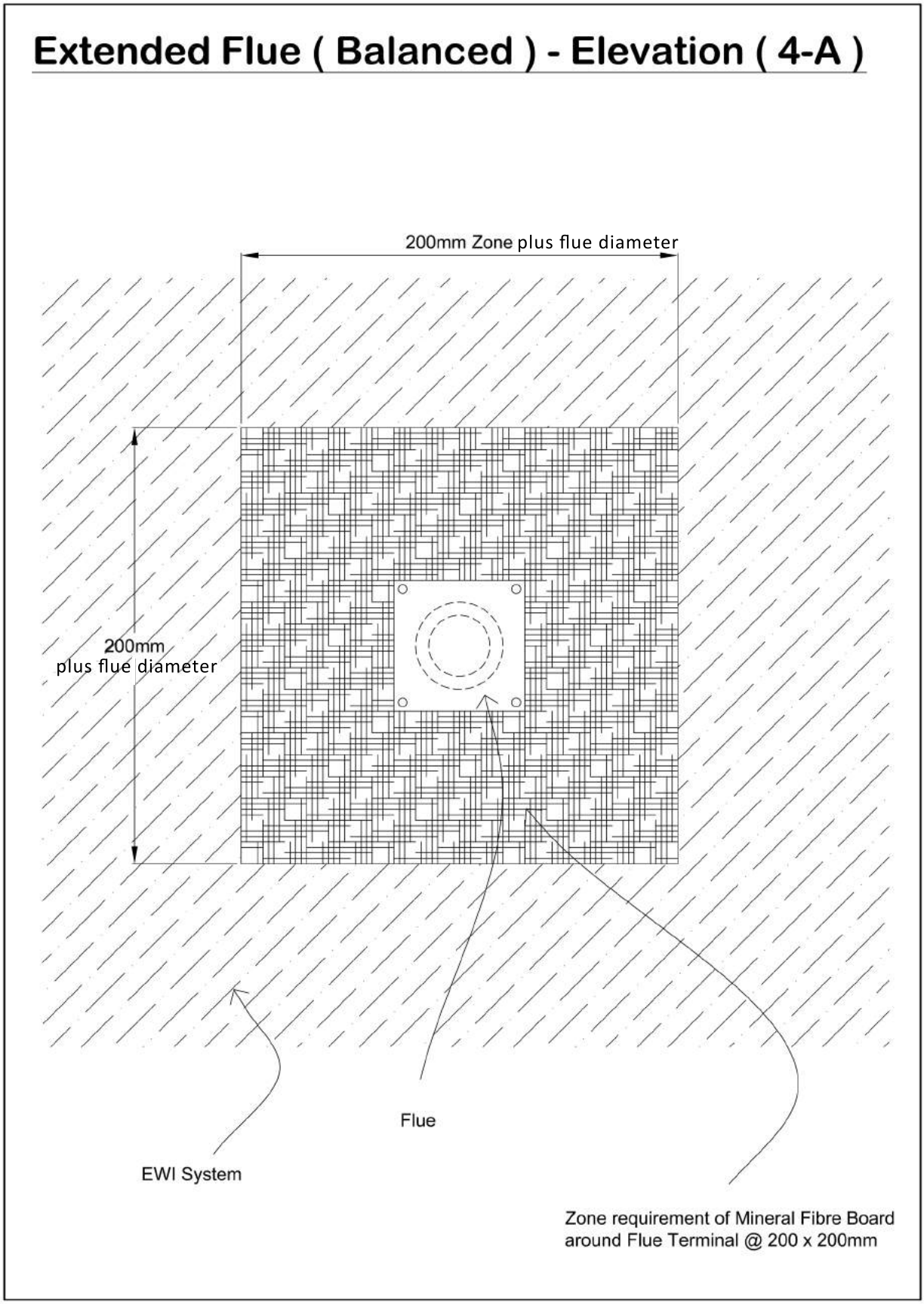
NOTE: Consideration also needs to be given to the appliance manufacturers instructions, which may detail a specific clearance from the flue/ air supply duct (s) and combustible materials, irrespective of flue-gas or duct temperature.

Figure 11 – Flue extended to accommodate EWI installation
11a Section view



Note: All flues serving oil fired boilers require 300mm minimum clearance around the flue terminal free from combustible material.

11b Elevation



combustible material.

3.7.1.2 Option 2

If Option 1 is not possible then construction of a recess in the EWI around the existing flue is permitted ensuring that all-round clearances between EWI system and flue are not less than;

- For a fan flue 300mm
- For a natural draft balanced flue (non-condensing boiler) 600mm

NOTE: The same all- round clearances are applicable to circular and square flue terminals and to the separate inlet and outlet terminals of a twin-flue system (i.e. a system consisting of one flue duct and a separate air inlet duct)

And the depth of the EWI system including the thickness of the render/ finish does not exceed 110mm from the face of the existing wall for all flue configurations.

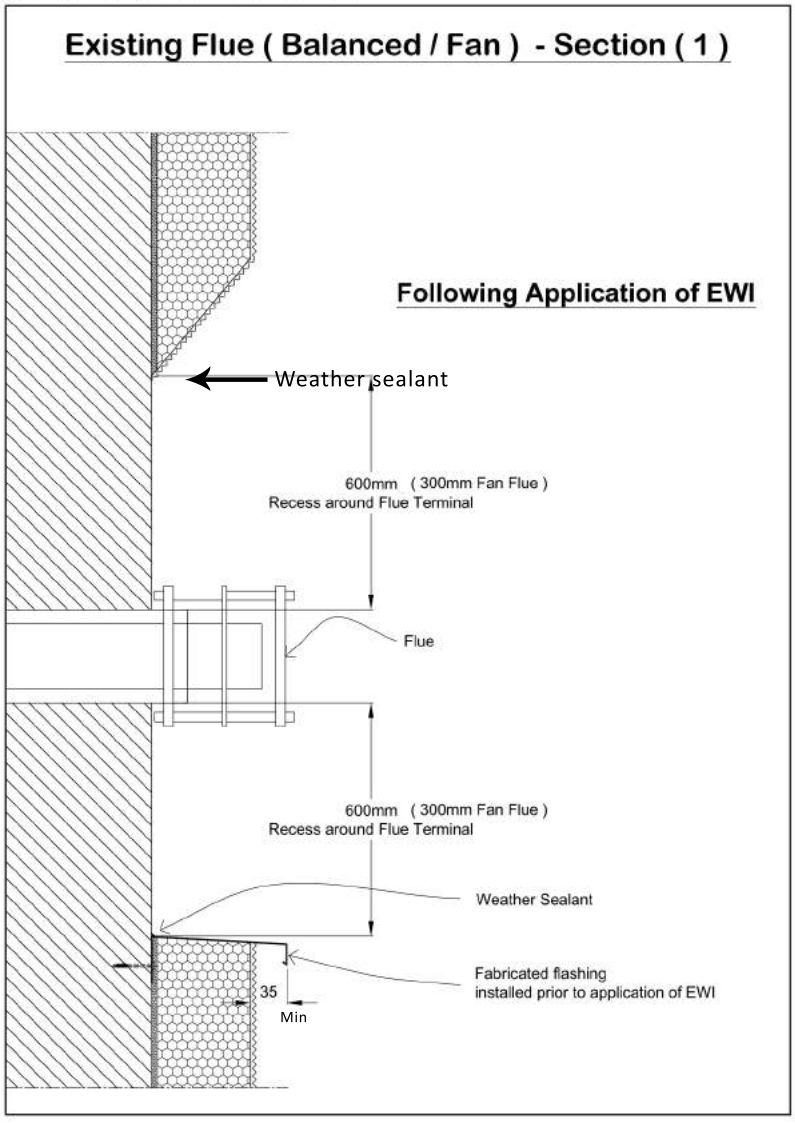
NOTE For any greater thickness of insulation, recessing is not acceptable and boiler/ flue replacement or flue extension with the terminal fitted flush with the EWI, is required.

In all cases ensure that water run-off from the vertical wall area above the flue cannot drip into the flue opening where it can be detrimental to both appliance and flue performance. This can be achieved by chamfering the upper edge (only possible with EPS insulation) or by the use of an appropriate flashing **see figures 12a to 12c.**

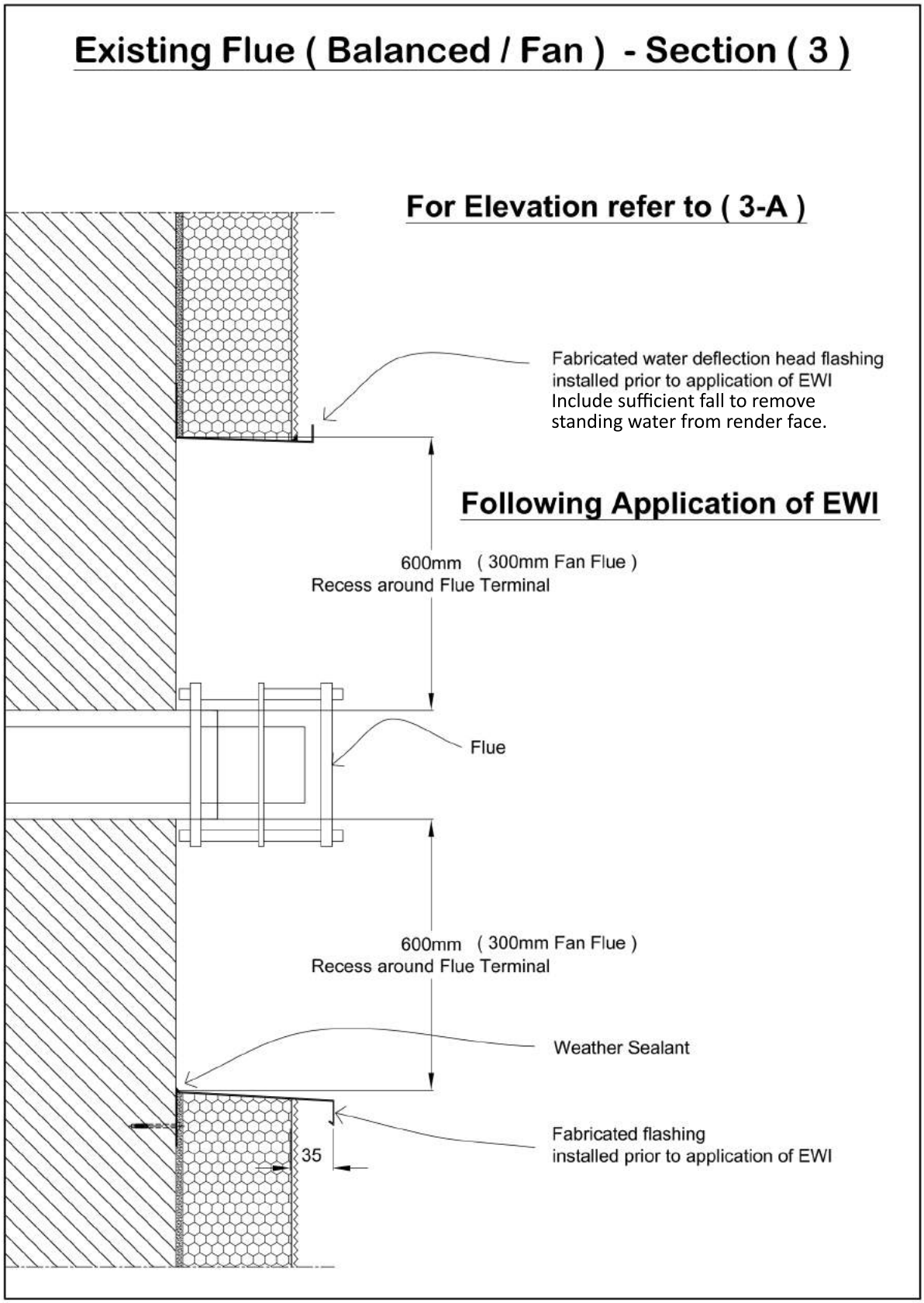
Ensure that all alteration work is checked and signed off, by a Competent Person.

Figure 12 – Balanced/ fan-flue

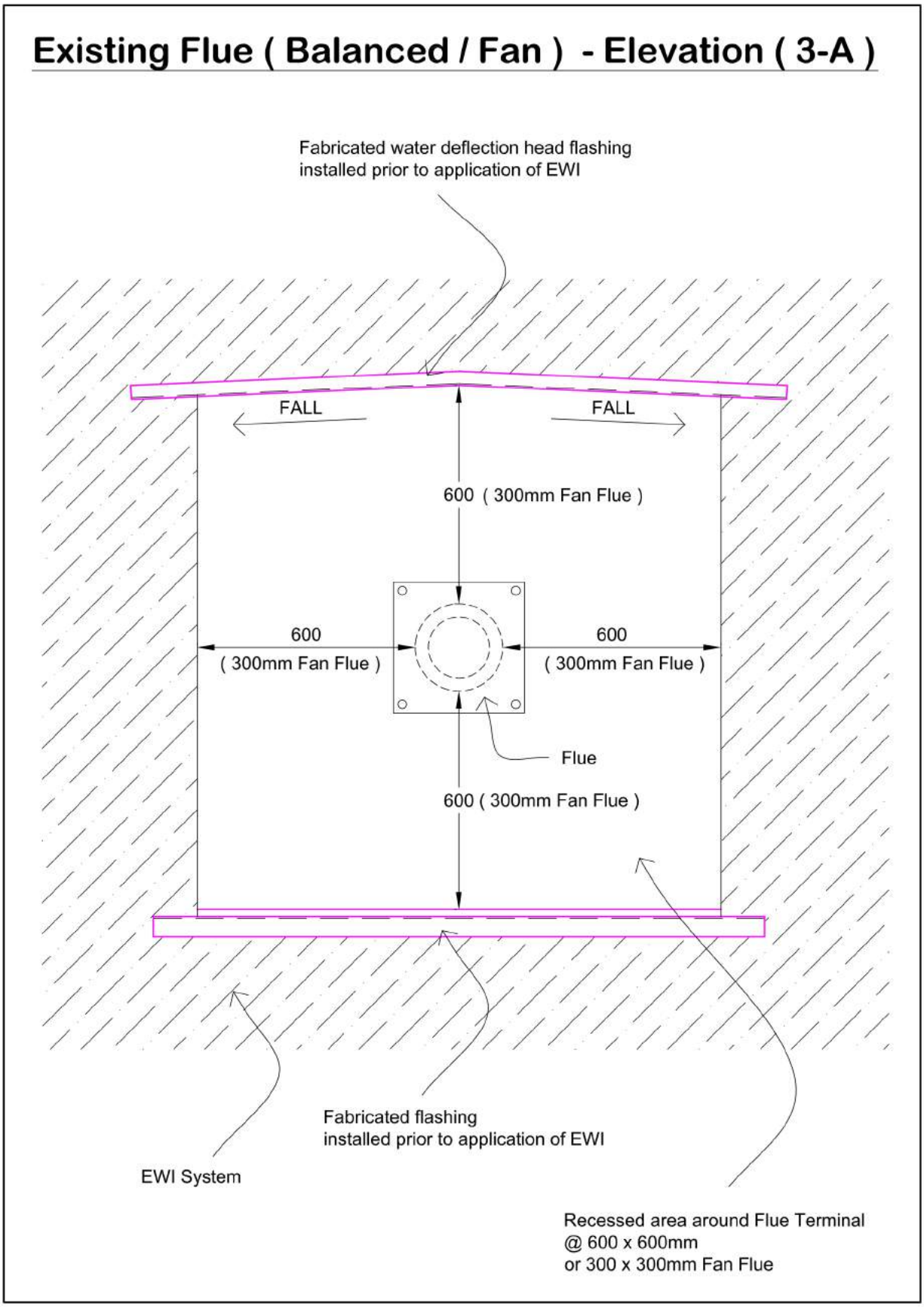
12a Section view with chamfered EWI above (The discontinuity in the insulation created by the recess constitutes a significant thermal bridge in the EWI system which may result in internal surface temperatures falling below the critical temperature for mould growth and/or condensation).



12b Section view- with pre-formed trim above (The discontinuity in the insulation created by the recess constitutes a significant thermal bridge in the EWI system which may result in internal surface temperatures falling below the critical temperature for mould growth and/or condensation).



12c Elevation with pre-formed trim above (The discontinuity in the insulation created by the recess constitutes a significant thermal bridge in the EWI system which may result in internal surface temperatures falling below the critical temperature for mould growth and/or condensation).



Note to figure 12C: Water run-off may result in staining of the render finish if not thrown clear of the render face - see page 35 of V9.

3 EWI INSTALLATION SAFETY CONSIDERATIONS

GAS BURNING APPLIANCES

3.7.2 Gas fire and wall heater flues

3.7.2.1 Overview

Most gas fires are installed in "conventional" fireplace situations, discharging combustion products through a vertical flue or chimney at roof level. These are unlikely to be affected by EWI installation (although some fires of this type may have a requirement for combustion air ventilation) **(see 3.9)**

Some gas fires models may have a "balanced flue" terminal which discharges through a wall directly behind the fire, or a "power flue" with a fan unit located on the external wall (see illustration below). Similar balanced flues will be found with individual wall heaters, which are small appliances designed to provide localised warm air heating within the property **(see Figure 13)**.

While a few gas fire designs can accommodate recessing around the balanced flue terminal, most gas fires and wall heaters are specifically designed for operation with a flue terminal fitted "flush" with the wall. Manufacturers therefore require a balanced flue or power flue terminal to be replaced or extended if EWI is being applied to the property **(As 3.7.2.1 Option 1)**.

NOTE: It is necessary that this be carried out by a Gas Safe registered engineer.

Unless the appliance manufacturer has been consulted and has given specified approval, with dimensions, it is not permissible to construct any form of recess in the EWI to accommodate a gas fire/wall heater terminal, regardless of the clearance distance between the terminal and the "edge" of the EWI layer.

Figure 13 – Examples of balanced flue terminals and typical wall heater/ gas fire designs.

3.7.2.2 Flueless Gas Fires:

Until recently, the vast majority of fixed gas fires in the UK have been fitted to a flue designed to discharge the combustion gases to the outside air. However, gas fires that do not have a flue have now been introduced in the UK. Most manufacturers of this type of appliance will advise in their instructions that they are only to be used as a secondary source of heating.

In place of a flue, these "flueless" gas fires have a catalytic converter that converts carbon monoxide into carbon dioxide. In addition they have built-in detectors that will shut down the fire if oxygen levels in the room change. All flueless fires require a purpose-provided permanent combustion air vent sized in accordance with manufacturer's instructions and positioned in the room in which the appliance is located, not less than 1m away from the appliance unless specified otherwise by the manufacturer. After installation of the EWI ensure that the air vent remains unobstructed, with free passage to outside air and is not compromised by the EWI in any way.

Flueless fires can be positioned on internal walls, and an external survey of the building may therefore not provide full information on the gas appliances that may be inside. **This emphasises the importance of a thorough internal and external survey before and after the EWI work.**

3.7.3 Working in the vicinity of flues

When EWI installation work is to be undertaken in the vicinity of any appliance flue terminal which is "live", it is essential that EWI Installers prepare and implement procedures to ensure that installation operatives are made aware of and work to the requirements in 3.7.1 to 3.7.2

3.7.3.1 There may be hot exhaust gases and/or a condensate "plume" emerging from flue terminals, the obstruction of which can cause poor combustion generating high concentrations of toxic carbon monoxide and placing the EWI installer and the occupants of the house at risk.

- Subject to a risk analysis, wearing a suitable, personal Carbon Monoxide (CO) alarm may be advisable
- During EWI fixing and rendering activity always protect flue terminals to ensure that debris does not enter the air inlet or flue outlet ducts and cause blockage or restricted flow e.g. by manually holding a deflector (such as a board, cut to appropriate size) adjacent to where rendering is being applied.

NOTE: The flue must not be covered, even temporarily, unless appropriate safety measures are in place – see below).

- If work is to be carried out under external weather protection (e.g. plastic sheeting over external scaffold) then wherever practicable the appliance should be switched off. Where this is not possible, a risk analysis or "permit to work" system provided by a competent person is required.

NOTE: Gas Safety (Installation and Use) Regulations require that appliances are allowed to discharge products of combustion freely into the open air.

3.7.3.2 appliance safety

Do not cover any flue, even temporarily, unless the associated appliance is shut down and disconnected from the gas supply during EWI installation work or appropriate measures (such as electrical isolation – with appropriate safety notices) are in place to ensure that it cannot be used, or does not start under automatic control, while work is in progress. Measures must also be taken to ensure that any covering is removed before the appliance is put back into operation.

3.8 Ventilation
3.8.1 Safeguarding the combustion air supply

If there is not enough combustion air, poisonous gases such as carbon monoxide may be produced by a gas appliance. These could build up and cause serious illness to the occupants. In severe cases, it could kill them.

3.8.1.1 Calculation of "free area" for ventilators:

Ensure that where ventilators are altered, extended or replaced, that the subsequent ventilation free-area provided is in accordance with the current version of relevant standards (e.g. BS 5440-2 for ventilators serving a domestic gas appliance), with due regard given to the requirements of manufacturers instructions.
An approximate ventilation free-area can be calculated using the following method **(See Figure.14a)**:

- Measure the slot horizontally
- Measure the slot vertically (right-angle to the louvres)
- Multiply width and height by number of slots – e.g. 10.2cm x 1cm x 14 slots = 142cm2

Where ventilators have free air-space information marked on them by the manufacturer this figure shall always be used, as it will often differ from the free-area that can actually be measured **(see Figure. 14b). Where physical measurement is undertaken, Gas-Safe Registered engineers would be expected to employ a more accurate method, as assessed by the ACS scheme (and equivalents), and incorporating a graduated probe.**

Figure 14 – Ventilator measurement and marking
14a Measurement method

14b Example of ventilator pre-marked with free air space information

3 EWI INSTALLATION SAFETY CONSIDERATIONS
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3.8.1.2 air bricks & ventilators

There are many air bricks and ventilators in external walls and when EWI is being installed in their vicinity it is essential that the following procedures be followed:

1. Locate, identify and note the position of combustion air ventilators for all fuel-burning appliances in the property. It is vital that these are thoroughly checked, kept clear, and adapted where necessary.

Identify, report and replace any pre-existing faults in air-bricks or ventilators, where required, in accordance with 2.5.3. Faults of particular concern are described in a) to c) below)

a) **vents in cavity walls** - If any wall cavity is present, the combustion air supply must be sleeved across the cavity to guarantee the correct supply of combustion air to the appliance(s). It is essential that the air ventilator is continuously sleeved across any cavity (see figure 15)

b) **'terracotta' air bricks** - Due to the tapered design of their vent holes, 'terracotta' air bricks provide limited free airflow and are unlikely to provide sufficient air supply for most appliances. It is recommended that terracotta air bricks be replaced with plastic air vents of appropriate free-area, ensuring that they are non-closable, and do not contain a fly-screen(see Figure 16)

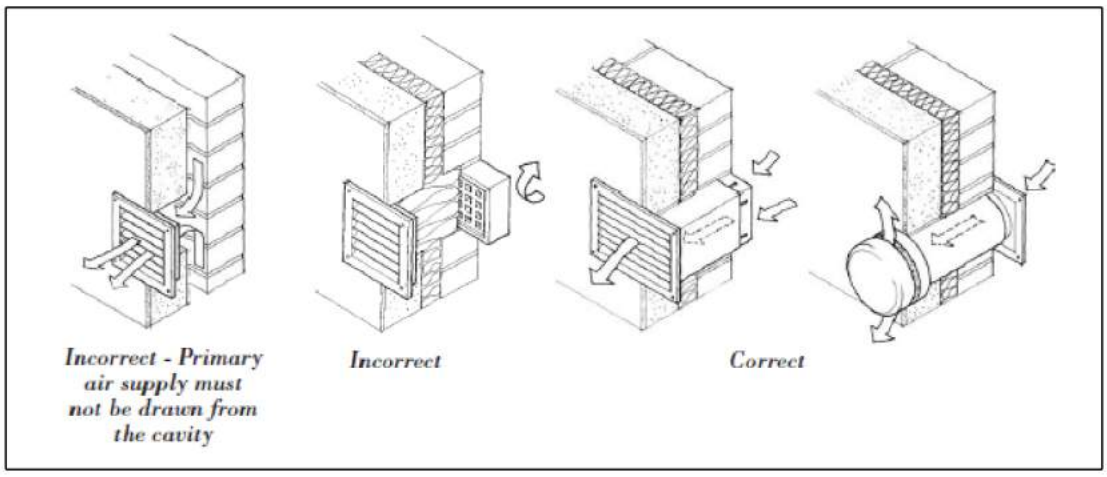
c) **redundant vents** - Following inspection and approval by an appropriate Competent Person such as a Gas Safe Registered Engineer or OFTEC Registered Technician, redundant vents may be sealed with an appropriate material to prevent water ingress and infestation.

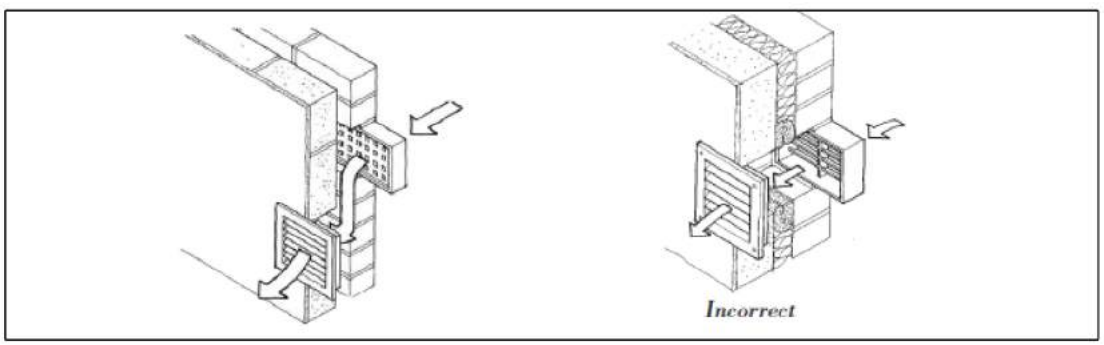
NOTE 1: Sleeving through solid wall construction is generally not required.

NOTE 2: Airbricks are not always aligned. It may be necessary to remove doubtful airbricks to check the position of the inner one. Do not assume that these are cavity ventilators, without checking the inner wall.

NOTE 3: Be careful not to confuse cavity vents with others, such as underfloor ventilators.

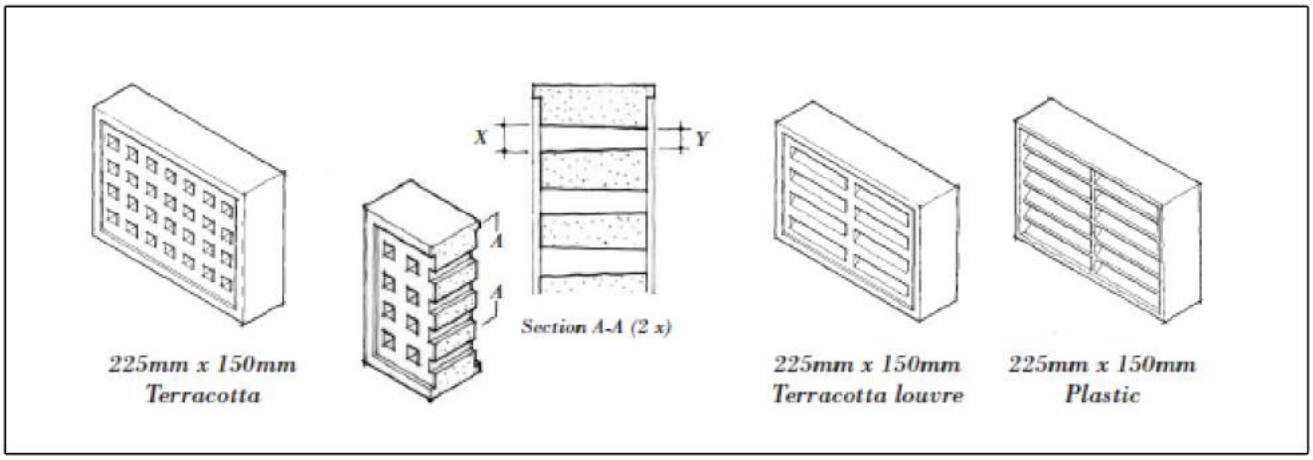
Figure 15 – Examples of correct and incorrect installation of combustion air ventilators





NOTE: Both drawings on previous are incorrect due to absence of sleeving.

Figure 16 – Air brick types



NOTE: Although the above information relates primarily to gas appliances, other fuel burning appliances may also be present, requiring a combustion air supply. Ventilation requirements for these appliances should be checked by an appropriate competent person.

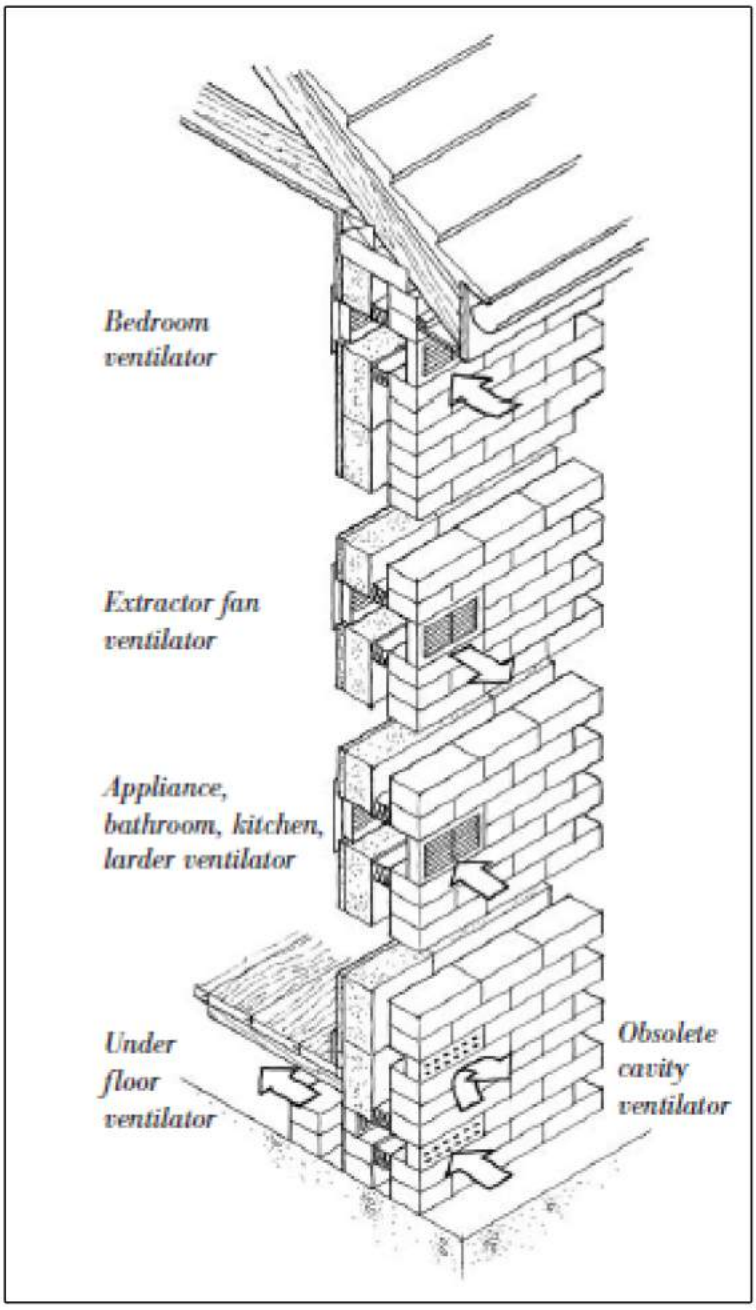
3.8.1.3 Other ventilators

Other ventilators **(Figure 17)** not relating to appliances but still requiring appropriate protective treatment can include:

- Those providing underfloor air (to suspended floors); cavity wall and roof ventilators, room ventilators, extractor fan ventilators, and air supply to larders or food storage cupboards.
- Bathroom, kitchen and air supply ventilators to larders or food storage cupboards.
- Gable end airbricks.
- Bedroom ventilators were originally intended to provide combustion air to an open fire and/or 'fresh air'. Due to changes in heating arrangements, many have been sealed off internally - and with the agreement of a competent person (e.g. Gas safe registered engineer), can be sealed off externally to prevent wind scour of the insulation, or infestation. The client should be consulted before sealing and their agreement obtained in writing.

*NOTE : ***Installers are reminded of the role potentially played by adventitious ventilation.** This is air infiltration to the property which occurs through minute cracks and gaps in and around the building fabric, such as window and door frames for example. Whilst not proprietary ventilation for combustion appliances, it is essential that the installation of EWI does not reduce the provision of adventitious air to the point where this could affect the safety of open-flued, or flue-less appliances. With this in mind, and due to the inherent difficulties in assessing air infiltration pre and post installation, it is strongly recommended that a competent person is consulted as part of the work, particularly upon completion. For gas appliances, this would be a Gas-Safe registered engineer.*

Figure 17 – Other ventilators



3.9 Other Items

3.9.2 External sensors for weather compensation controls:

Some modern boilers are equipped with controls which modify the operation of the boiler depending on outside temperatures. These boilers may use external temperature sensors, which may be wired to the boiler control system or may use a "wireless" link. Unfortunately it is not possible to give a single illustration of this type of sensor as its appearance varies considerably between boiler manufacturers.

If these sensors are encountered then they should be detached prior to EWI installation (ensuring that any electrical supply is safely isolated prior to removal) and replaced in the same location afterwards (this may require electrical work by a competent person). As sensor removal may affect the operation of the boiler, even if no disconnection took place, boiler operation should be checked by a competent person after EWI installation is completed.

3 EWI INSTALLATION SAFETY CONSIDERATIONS GAS BURNING APPLIANCES

3.10 Post-Installation checks

Undertake post installation checks on the basis of the pre-installation schedule, confirming that all items have been completed in accordance with the required standards and particularly that:

- All combustion air vents, flues and other gas/oil items on external walls are clear of obstruction and free from debris.
- All work on fuel burning items identified during planning/scheduling of the EWI work as requiring a competent person (see 2.1) have been "signed off" as complete and to required standards.

NOTE: This may need inspection and confirmation by a Gas Safe Registered engineer or other appropriate competent person

- Any post-installation combustion checks identified as necessary by the initial survey, risk analysis or the pre-installation schedule, have been completed
- Any existing open chimney or flueless, appliances where ventilation has been altered, have been checked for correct operation.

3.11 Advice provided to customers

If you are not sure about the operation of any fuel burning appliance or the effectiveness of the flues or combustion air vents, you must issue a Warning Notice (see Annex B for an example). Explain to the customer that the appliance must not be used until it has been thoroughly checked by a competent person such as a Gas Safe Registered engineer.Gas-Safe Registered engineers will follow the Gas Industry Unsafe Situations Procedure, as appropriate, where the issue is gas-related.

Also advise the customer that if the behaviour of any fuel burning appliance changes, even if some time has elapsed after EWI has been installed, they should turn off the fuel supply and contact the relevant emergency number (e.g. 0800 111 999 for gas).

4 EWI INSTALLATION SAFETY CONSIDERATIONS – OIL SUPPLY

4.1 Introduction

When installing EWI and whilst undertaking the EWI installers pre-installation building inspection, care should be taken to ensure oil supply pipework and any associated equipment mounted to the wall, such as isolation valves, fire valves, filters and de-aeration devices, remains appropriately supported and accessible for maintenance purposes.

4.2 Wall-surface mounted equipment

Any existing above ground oil supply pipework and associated equipment clipped/mounted to the wall being insulated **(see Figure 18a)** should be safely removed and refitted to the external surface of the EWI using an appropriate fixing method.

NOTE: Removal, replacement and alteration of oil supply pipework and associated equipment should be undertaken by an OFTEC registered technician (www.oftec,org) and re-fixed using fixings as recommended by the EWI supplier/designer.

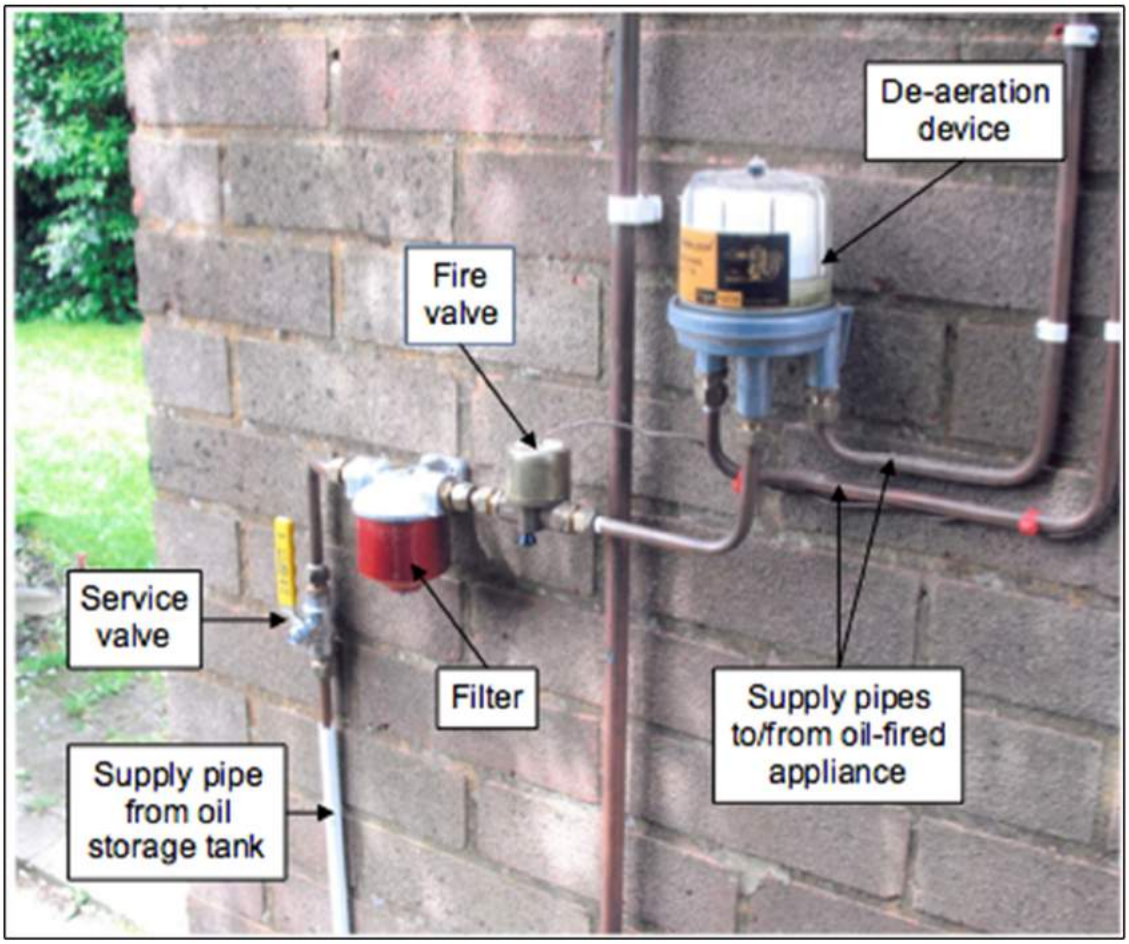
4.3 Wall-box mounted equipment

Where oil supply equipment is/will be installed in a wall box **(see Figure 18b)** provision should be made to allow:

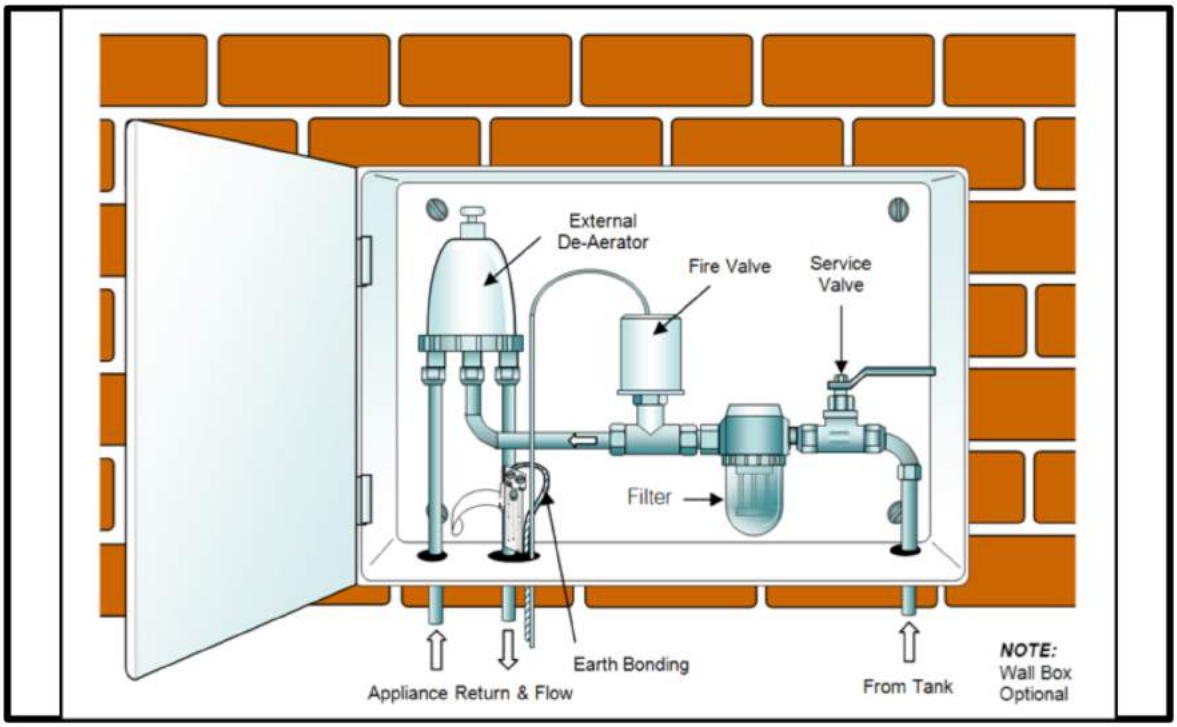
- Access the screws that fix the box to the wall;
- The box to be opened, as normal;
- Finishing of the rendered returns, where these form part of opening around the box;
- The EWI material and trim to be sealed, to prevent any potential oil leaks from entering the insulation or gaps behind it.

Figure 18 – Figure 18 EXAMPLES OF OIL SUPPLY EQUIPMENT MOUNTED TO AN EXTERNAL WALL

18a Oil supply equipment mounted on an external wall



18b Oil supply equipment in an external wall box



ANNEX A (informative)

EXAMPLE WALL MARKING SYSTEM - for use in preparation for the installation of EWI

A.1 Introduction:

Clause 2.2 of this specification requires the EWI installer to adopt and use a system of highly visible wall markings with durability of at least one month longer than the planned length of the installation process. The following system is provided by way of example for EWI installers to apply or use as a model for the development of their own system. All relevant staff should be trained in the use of the system.

A.2

It is recommended that to reduce the risk of misunderstanding, installers should adopt a consistent system of markings that all personnel likely to be working on installation sites share and are made aware of at induction.

NOTE: It is suggested that the markings could be made with a semi-permanent spot marking spray likely to last approximately 6 months before fading.

A.3 MARKING SYSTEM

A = Adapt.

A flue or vent or meter box needs to be adapted by other personnel. Dimensions may be included.

R = Remove/Redundant.

A combustion air vent or flue has been identified as redundant and can be removed or covered. (Only following inspection and agreement by a Gas Safe Engineer or OFTEC/ HETAS registered installer for oil or solid fuel appliances, respectively).

Note: It is essential that the associated appliance has been permanently disconnected from the fuel supply.

Tick = Ready to clad around.

A flue, vent or meter box has been appropriately adapted.

Cross = Do not continue cladding.

A flue, vent or meter box is unable to be adapted at current time.

Numbers = Required free air space

Numbers denote the correct free air space required for combustion air vents. The figure shall always be in cm2.

D = Dish.

The term used to describe an area of wall which is to be kept free of insulation such as the area around a flue terminal. Dimensions may be included.

ANNEX A (informative)

Figure A.2 EXAMPLES OF WALL MARKING SYSTEM APPLICATION

A1.1 Air vent needs to be adapted and needs to be 100 cm2

A1.2 Flue has been adapted and is ready for the insulating board stage.

A1.3 Flue cannot be extended and remains connected to the supply.

ANNEX A (informative)

A1.4 Air vent is not needed for combustion

A1.5 Flue needs to be "dished" with a minimum clearance of 300mm

ANNEX B (informative)

Annex B (informative)
EXAMPLE WARNING NOTICE

Installing firm's name, address and contact details
(or letterhead)

WARNING NOTICE - DANGER DO NOT USE

Important - this notice concerns your safety

Issued by: (print name) .....

Company: .....

Issuers' signature: .....

Date & time of issue: .....

Occupier's name:.....

Address:
.....

Postcode: ..... Telephone number:
.....

The appliance (make)..... (model) ..... (appliance type) .....

(location of appliance)..... at the above property,

is unsafe to use because: .....
.....

In the interest of safety the following action has been taken (please tick):

- The appliance has been turned off and labelled, with the instruction DANGER do not use.

- The occupier was not present so the appliance has been turned off and labelled, with the instruction DANGER do not use 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/appliance could present a danger so it must not be used until it has been safety checked by a competent person.

Signed: ..... Print name: ..... Date: .....

Note: Two copies of this notice must be produced. The Technician must retain the second copy and return it to the office.