PAS 2030:2017

Specification for the installation of energy efficiency measures (EEM) in existing buildings

Department for Business, Energy & Industrial Strategy

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Foreword

This revision of PAS 2030:2014 was sponsored by the Department for Business, Energy and Industrial Strategy (BEIS).

The revised PAS continues to provide a specification for the installation of energy efficiency measures in existing buildings, but has been expanded to include additional installer requirements relating to the validation of design content and includes other changes introduced in response to recommendations from users.

Recognition is given to the following organizations that, through nomination of experts have assisted with this revision through direct technical input and through the provision of liaison with other bodies not directly represented on the group:

- Baxi
- British Board of Agrément
- British Electrotechnical and Allied Manufacturers Association
- BSI Retrofit Task Group
- Building Engineering Services Association
- BlueFlame Services
- CertSure LLP
- Chartered Institute of Building Services Enguneers
- Cavity Insulation Guarantee Agency
- Construction Industry Training Board
- Construction Products Association
- Department for Business, Energy and Industrial Strategy
- Department for Communities and Local Government
- Electrical Contractors Association
- Energy Savings Trust
- FENSA Limited
- Federation of Master Builders
- Gas Safe Register
- Glass and Glazing Federation
- Insulated Render and Cladding Association
- Kingspan Group PLC
- Knauf Insulation Limited
- Mineral Wool Insulation Manufacturers Association
- National Federation of Roofing Contractors
- National Insulation Association
- National Inspection Council for Electrical Installation Contracting
- Ofgem
- Red Rose Consulting
- Rockwool Group
- St Gobain UK and Ireland
- SummitSkills
- Solid Wall Insulation Guarantee Association
- TrustMark
- United Kingdom Accreditation Service

Comments from other parties were also sought by BSI, particularly through the Expert Review and Public Comment process, which took place during October 2016. The expert contributions from all the organizations and individuals consulted in the development of this Publicly Available Specification (PAS) are gratefully acknowledged.

Publishing information

The revision of this PAS has been facilitated by BSI Standards Limited and is published under licence from The British Standards Institution which retains its ownership and copyright.

This edition of PAS 2030 is published on 1st February 2017 with the expectation that installers claiming compliance with PAS 2030 will be meeting its requirements by 31st May 2017.

BSI reserves the right to withdraw or amend this document on receipt of authoritative advice that it is appropriate to do so. Once published, this PAS will be reviewed at intervals not exceeding two years, and any amendments arising from the review will be published as an amended Publicly Available Specification and publicized in *Update Standards*.

Use of this document

It has been assumed in the preparation of this PAS that the execution of its provisions will be entrusted to a competent person or persons for whose use it has been produced.

This PAS is not to be regarded as a British Standard, European Standard or International Standard. In the event that this PAS is put forward to form the basis of a full British Standard, European Standard or International Standard, it will be withdrawn.

Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall". Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material, e.g. Notes, are presented in italic type, and do not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Attention is drawn to the principle, applicable in British Standards generally, that they do not require actions that are the subject of legal requirement. Therefore, this PAS does not include, for example, requirement to observe Health and Safety, Building Regulations, Gas Safety Regulations, Water Regulations, etc. with which it is assumed users of this PAS will be in compliance.

Where judged to be of assistance, this PAS includes notes drawing attention to the existence of such legislation or regulation.

Compliance with this PAS does not in itself confer immunity from legal obligations.

Introduction

This revision of PAS 2030 continues to provide a specification for the installation of energy efficiency measures (EEM) in existing buildings but has been modified in response to market changes that have altered the context in which it is applied.

Although this PAS was originally developed with support for the United Kingdom Green Deal Financing Mechanism as a primary objective, it has always been appropriate for application in respect of any EEM installation, irrespective of how that installation is to be funded.

In this latest edition, the independence of the PAS has been further clarified with the removal of all references to specific funding schemes of any type and reliance on the generally accepted use of accredited certification bodies to provide compliance assessment where this is required. **Figure 1** provides a graphic overview of the principle elements of the system and their various relationships.

The most significant area of change within the PAS is the inclusion of enhanced installer requirements for checking that no matter where the design has been sourced (inhouse design facility or independent EEM design source), the EEM design provided for any specific EEM installation they are to undertake is appropriate for the buildings in which they are to be installed and functionally compatible with other EEM installed or to be installed in the same building.

Attention is drawn to the fact that this PAS does not set out a specification for the design of EEM or for the assessment of buildings undertaken to inform such designs. It does however set out critical aspects of EEM design that EEM installers should expect to find addressed in the designs they work to and without which they should not commence installation. As such it may be found of assistance to those undertaking the preparation of EEM designs.

In addition, minor changes have been made to the PAS in response to comments received from users during the first 4 years of application. These are generally matters of clarification, simplification or updating and the basic principles and methodology of the PAS remain unchanged.

The primary objective for the PAS remains the provision of a robust, uniformly applicable specification that will assist installers that comply with its requirements in full, to demonstrate that their installation processes are capable of providing installation of energy efficiency improvement measures to specification and in accordance with the customer's expectations.

Each of the energy efficiency measures covered by this PAS is provided for in a measure-specific Annex. Compliance with this PAS requires that for each installation, the installer has to meet all the requirements of Clauses **1** to **9** of PAS 2030 together with those set out in the Annex relevant to each measure to be installed.

It is anticipated that the list of included measures will change over time and therefore future editions of this PAS should be anticipated.

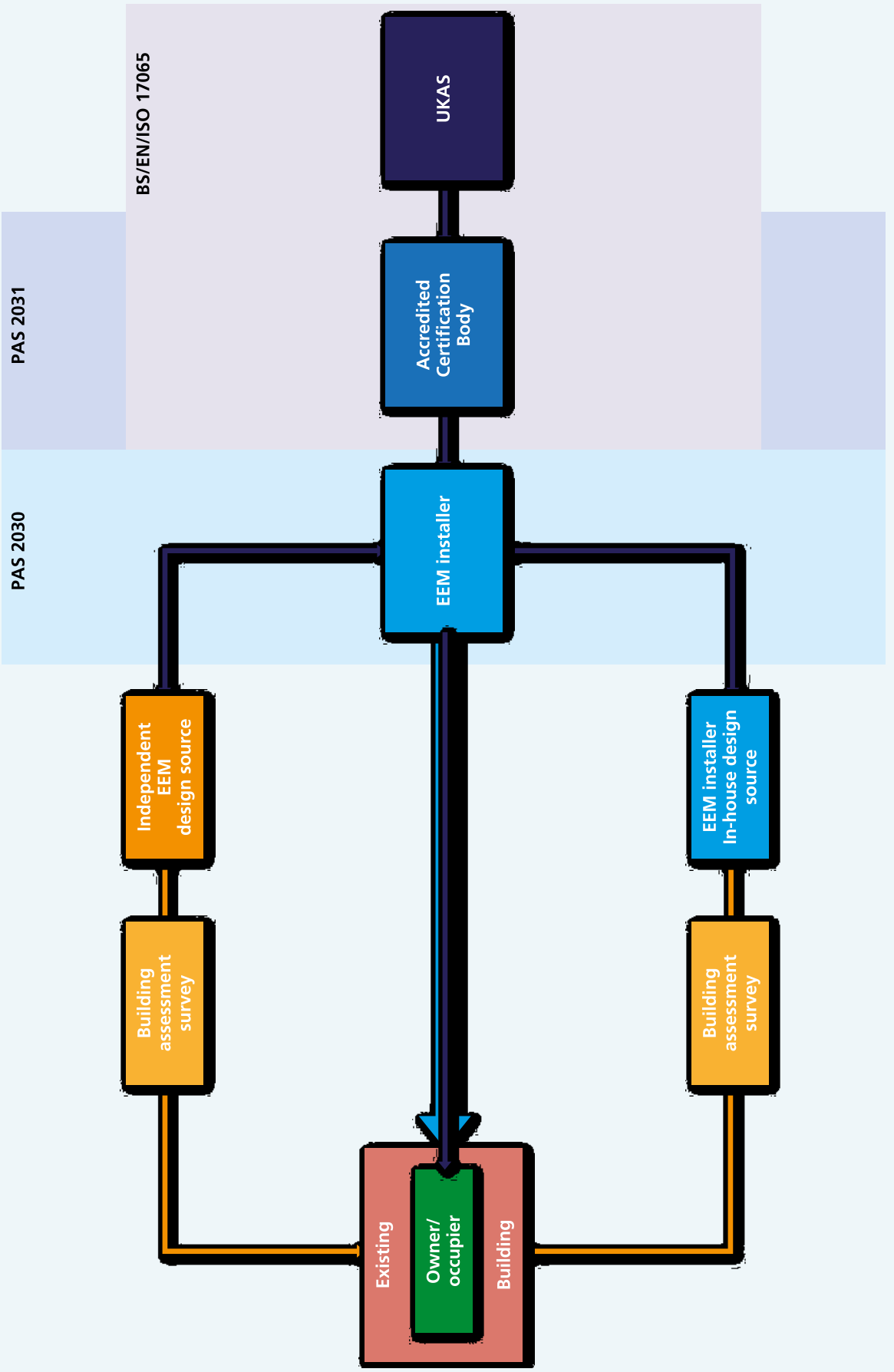


Figure 1 – EEM Installation and Monitoring System, Overview

1 Scope

This revision of PAS 2030:2014 specifies requirements for the installation of energy efficiency measures (EEM) in an existing building (not new build) and now includes definitive requirements for the design content to be expected and validated, by installers as well as the methods, processes and procedures to be employed in their installation, commissioning and handover.

This PAS continues to set out requirements for the installation of EEM in existing buildings used for both dwelling and non-dwelling purposes and is intended for use by any entity undertaking the installation of any products and/or systems designed to improve the energy efficiency of such buildings.

As with previous editions, this PAS includes requirements in respect of installation processes, process management and service provision and includes criteria relating to installation methods, equipment, tools, product or system and material suitability, the commissioning of installed measures and the training, skills and competence of the people undertaking such installation. In addition, this edition of the PAS includes information provided to assist installers to fulfil their responsibility to ensure the effective co-functioning of EEM installed in the same building.

This PAS is constituted of core requirements to be met by any entity claiming conformance to it, supplemented by Annexes setting out supplementary requirements for each included measure type.

This PAS requires claims of conformance to be in respect of the core requirements and all Annexes relevant to the installation to be undertaken by the claiming entity. The entity is also required to identify whether the claim is on the basis of self-assessment, other party assessment or independent third party validation and to differentiate between installation undertaken on the basis of an installer provided EEM design and that undertaken in accordance with an EEM design provided by an independent third party.

Annex A provides detail of the PAS 2030 measure specific Annex structure and its relationship to the list of specified measures and includes information to assist installers to fulfil their responsibility for ensuring the correct functional relationship between EEM installed in the same building.

Annexes B, C & D provide specific requirements relating to particular energy efficiency measures for application by installers undertaking installation of those measures. These Annexes also include additional requirements in respect of the provision of information to customers.

Annex E identifies the points of substantive change between PAS 2030:2014 and PAS 2030:2017.

Annex F sets out guidance on the use and application of PAS 2030:2017.

Annex G provides an example installation project information collation form that can be copied and used by installers to assist demonstration of their compliance with this PAS.

This PAS does not include requirements relating to the certification of PAS 2030 compliance by independent third parties, which subject is covered by PAS 2031:2017, developed in conjunction with this PAS.

2 Normative references

*NOTE The application of this PAS requires users to select measure-specific Annexes that are relevant to the measure to be installed from the range of Annexes provided. Because of this all normative references are Annex specific. Clause **9** lists all documents that are considered indispensable for the application of particular Annexes.*

3 Terms and definitions

The following terms and definitions are considered indispensable to the understanding and application of this PAS.

3.1 (pre-design) building survey

inspection and assessment of a building, undertaken prior to preparing an EEM design to identify the nature and characteristics of the building in sufficient detail to enable the preparation of a building specific EEM design meeting the requirements of this PAS

3.2 competence

having the necessary technical knowledge, skill and experience for the nature of the installation process undertaken

3.3 competence currency

period for which competence is to be considered as adequate without further training and/or knowledge acquisition

3.4 competence ratio

number of operatives below the required threshold and/or specialist competence level permitted to work on an EEM installation of a particular type relative to the number of operatives who meet the required threshold and/or specialist competence level working on the same installation

3.5 commissioning

activities that ensure that the installed measure operates within the boundaries and conditions of the design specification

3.6 customer

property owner, landlord and/or tenant of a building at which energy efficiency measures are being installed

NOTE Attention is drawn to the fact that in this PAS, the term customer refers to the recipient of an energy efficiency measure installation project.

3.7 (EEM) Design

entirety of information that determines the unique combination of EEM systems, products, materials and their interrelationship, to be installed as an EEM in a particular building in order to achieve specified energy efficiency outcomes for that building

NOTE *It is recommended that the design be prepared to meet the criteria of a whole house approach, where the introduction of a measure does not negate the correct application of another measure in due course (see also Clause 4).*

3.8 (EEM) product

item intended for installation in existing buildings for the purpose of enhancing the energy efficiency of those buildings, that is not made available as an (EEM) system

3.9 proprietary (EEM) system

combination of particular products and materials together with any related installation method, equipment requirements and performance objectives, placed on the market exclusively by a specific supplier, for installation in existing buildings for the purpose of enhancing the energy efficiency of those buildings

3.10 energy efficiency measure (EEM)

planned work undertaken to improve the energy performance of a building by saving or generating energy

3.11 installer

entity undertaking the physical placement of an energy efficiency measure(s) in an existing building

3.12 installation

location, placement and/or fixing of an energy efficiency measure in, or connected to, an existing building excluding any related work to enable the installation of the measure

3.13 (installation) location

building or group of buildings that are the subject of EEM installation(s) under the supervision of a single, designated, competent person

3.14 (installation) method statement

sequence of actions to be undertaken in installing one or more EEM products or systems in accordance with their particular specification, in a safe manner at a particular building

NOTE *An installation method statement can be a single document prepared specifically for this purpose or could consist of a collection of documents, in the sequence of required application, contributing to the complete definition of the intended method.*

3.15 operative

person employed by the installer, either directly or under a subcontract arrangement, to undertake installation tasks on an energy efficiency measure in accordance with the relevant method statement and the related requirements of this PAS

NOTE *Individuals employed to provide labouring, carrying or loading/unloading capability do not constitute operatives in the terms of this PAS.*

3.16 pre-installation building inspection

inspection and assessment undertaken by or on behalf of, the installer prior to commencement of installation, to confirm that the EEM design provided by the design source is complete, complies with this PAS, can be fulfilled at the location specified and that the proposed installation will not result in non-compliance with statutory requirements and/or generally accepted industry good practice.

NOTE *The application of this inspection to particular measures is addressed through the pre-installation building inspection requirements and the inspector competence requirements in the relevant measure-specific Annex.*

3.17 supervision

provision of operational oversight by an operative who meets the threshold and/or specialist competence level required for the installation of a particular EEM type and is authorized by the installer to do so

4 The EEM design

4.1 Installer responsibility to be in possession of a location specific EEM design

The design for an EEM installation may be produced by a third party EEM design source (an individual or an organization) or by a person or persons responsible for the design function within an Installer's organization. But in either situation for each planned installation, the Installer shall obtain from an EEM design source, a location specific design for the complete package of energy efficiency measures to be installed by that installer at that location, in accordance with **4.2** and **4.3** of this PAS. The installer shall not commence installation until all of the specified information has been obtained and confirmed. An installer claiming compliance with PAS 2030 shall not undertake installation of EEM on the basis of designs that do not provide information meeting the requirements of **4.2** and **4.3**.

4.2 EEM design validation

4.2.1 Design Information source

Before incorporating the design into the EEM installation method statement and commencing an EEM installation, the EEM installer shall satisfy himself/ herself, that any information that has been relied on in preparation of the design, is relevant and sufficient to adequately inform that design, especially if it is provided by a third party such as a surveyor or energy assessor. If the information first provided is considered to be inadequate, further evidence shall be obtained from the design source and installation shall not proceed until the installer is satisfied that all relevant aspects of the building in which the proposed EEM measure is to be installed, particularly those identified in this Clause, have been addressed, including:

- constraints imposed by the local planning authority (including requirements for planning permission, Listing as of Special Architectural or Historic Interest, Conservation Area constraints, Tree Preservation orders, etc.);

  ***NOTE** Installers should be aware that designs for installation of EEM in a building of special architectural or historic interest will be likely to include reference to BS 7913 Guide to the conservation of historic buildings.*

- constraints imposed by the site, e.g. elevation and exposure (to sun, wind and rain); access, party walls, rights of light, consideration of adjoining properties, etc.;
- its heritage, architectural features, structure, construction and condition;
- any existing structural defects, leaks or damp;
- any other energy efficiency measures already installed or proposed;
- the occupants, and any special considerations relevant to them, such as with vulnerable persons e.g. children and elderly people or those with disabilities.

4.2.2 Identification of suitable EEM

In confirming the suitability of the EEM design provided, the EEM installer shall give specific attention to whether or not:

- the energy efficiency measures identified, meet the householders' expressed requirements and are appropriate to their pattern of occupancy;
- any EEM products and or systems specified are suitable for the designated location, taking account of its features as listed in **4.2.1** above;

***NOTE** See reference to BS 7913 at **4.2.1**.*

and where either or both of these conditions have not been clearly demonstrated, to refer the design back to the design source for amendment or justification.

4.2.3 Reference to external standards or other documents

In including the EEM design in the location specific EEM installation method statement, the EEM installer shall take note of all normatively referenced standards and/ or other similar documents, particularly those referred to in this Clause, and where these are relevant to the installation to be undertaken shall be able to demonstrate how these have been incorporated in the installation method statement. In the event that one or more items identified are not addressed in the received design, the installer shall consult with the design source as to whether or not this was intended, obtaining amendment or correction to the design, where necessary.

- any conditions attached to planning permission or Listed Building Consent;
- the relevant Building Regulations requirements;

- the standards imposed by any relevant Building Regulations Competent Person Scheme (CPS);
- the Microgeneration Certification Scheme (MCS) standards;
- any other relevant standards identified in this PAS, including its annexes.

NOTE *Should the installer be aware of potentially relevant standards or other similar documents that have not been referenced in the design, it is recommended that the installer draw these to the attention of the design source.*

4.2.4 Relationship between the EEM to be installed, other measures already or about to be installed and the building in which installation is to take place

In incorporating the EEM design in the location specific installation method statement, the EEM installer shall confirm the inclusion of, take into account and make provision for the requirements set out in this Clause as specified in the design. Where any of these elements has not been accounted for, the installer shall consult with the design source as to whether or not this was intended:

- construction details at all corners, junctions, and edges of installed measures, and all interfaces between measures (both physical junctions and technical interactions as identified by the *Measures Interaction Matrix* (**Annex A4**);
- improvement of the air-tightness of the building envelope, i.e. reduction of wind-driven infiltration and air leakage;
- provision of deliberate ventilation sufficient to ensure adequate internal air quality and minimise internal surface condensation risk, especially where the air-tightness of the building envelope will be improved by the installation of insulation, draught stripping, new windows or any other measure (see also **4.2.5** and **Annex A.5**);
- management of moisture within the construction, and of the dynamic equilibrium between the internal and external relative humidity and the moisture content of construction materials, using vapour permeable materials as appropriate, such that moisture will not become trapped within any construction leading to risk of interstitial condensation and consequent damp and deterioration;

  NOTE *Installers should be aware that designs for installation of EEM in a building where condensation could be an issue will be likely to include reference to BS 5250 Code of practice for the control of condensation in buildings.*

- minimising thermal bridging at the corners, junctions and edges of installed measures, and at interfaces between them, to an acceptable standard **(Annex A.6)**;
- eliminating thermal bypass, i.e. the uncontrolled penetration of cold external air to the warm side of any insulation layer;
- resilience against rainwater ingress (including ingress due to failure of any critical element or construction detail);
- provision of combustion air supplies for any open-flued combustion appliances located within the dwelling;
- mitigation of the risk of summer overheating, with regard to the temperature predictions for the period to 2050 published by the UK Climate Impact Programme (UKCIP);
- maintenance requirements to ensure the long-term integrity of the installation;
- protection of the building against the impact of fire occasioned by the installation of EEM;
- resilience of installed EEM to flood risk.

4.2.5 Minimum acceptable ventilation

For any design in which one or more EEM with the potential to reduce the level of background ventilation in habitable rooms, is included (e.g. wall insulation, floor insulation, roof and loft insulation, draught stripping or replacement windows), the EEM installer shall confirm that the design includes detailed instruction as to how an appropriate level of ventilation is to be identified, maintained or provided, taking account of the generic provisions included in **Annex A.5** and any additional measure specific ventilation related requirements in the respective measure specific Annex of this PAS. Where such detail is not included or is perceived as being inadequate, the installer shall refer back to the design source for clarification or confirmation of clearance to proceed with the installation.

4.2.6 Commissioning and handover of installed EEM

The EEM installer shall confirm that the design for each EEM to be installed includes instruction as to how each installed measure is to be commissioned and tested and that such instruction takes account of any relevant manufacturer's instructions and/ or measure specific requirements in the relevant Annex in this PAS.

4.2.7 EEM design documentation

The EEM installer shall confirm that the design documents received from the design source, include the items identified in this Clause, where relevant to the EEM installation to be undertaken:

- identification of the specific location of the building in which the EEM is to be installed;
- identification of any access constraints and instructions;
- any assumptions on which the design is based;
- confirmation of the compliance of the design with the relevant standards, and identification of any standards that have been deemed irrelevant;
- specification of the products and systems to be used, and where they are to be installed within the dwelling or on its exterior;
- identification of any standard construction details to be used;
- provision or identification of any bespoke construction details to be used (whether prepared by the Designer or obtained from a system designer);
- installation instructions;
- commissioning requirements;
- testing requirements, e.g. testing of new gas systems and electrical installations, thermography to confirm the integrity of the insulated envelope, fan pressurisation testing to demonstrate compliance with any air-tightness standard, etc.;
- handover requirements;
- maintenance instructions;
- guarantee and warranty requirements;
- identification of information required by any applicable quality assurance scheme;
- Specific requirements In respect of the maintenance/ improvement of ventilation.

5 Installation process

5.1 Installation method statement

Prior to commencement of any installation work the installer shall, define and record in an installation method statement the complete installation process to be followed for each energy efficiency measure to be installed at a particular location, under the scope of this PAS. The method statement shall include and take account of the elements specified in **5.1.1** to **5.1.4** of this PAS.

5.1.1 Energy efficiency measure design specification

The location specific design for each energy efficiency measure to be installed (Clause **4**).

5.1.2 Identification of the relevant measure-specific annexes and measure types

The installer shall identify from the measure-specific Annex(es) included in this PAS (see **Annex A1**, **Tables A1** to **A3**) the measures relevant to the design specification for each installation to be undertaken, including any reference to measure type that could limit the scope of required competence for that installation. The Installer shall make provision in the method statement for implementation of the requirements set out in the identified annexes.

5.1.3 Installation methods

The method(s) for the installation of the EEM(s) originating from the product/system specification sheets or other such guidelines and information provided by the product or system manufacturer, supplier or design source for this purpose. Preference shall be given to material provided by the manufacturer or set out in the relevant Annex in this PAS.

Where an installation method is not provided with the product or system, the installer shall, prior to commencing the installation, contact the manufacturer, supplier or design source, as applicable, to obtain the required information.

In the event that installation methods cannot be obtained, commencement of the installation shall be deferred until the required alternative or customised method has been agreed and issued to the installer by the design source.

5.1.4 Intermediate inspections

The installer shall include in the method statement the necessary facility to accommodate any intermediate inspections required by external parties.

5.2 Installation equipment and tools

5.2.1 Availability

The installer shall determine and make available, the equipment necessary for the installation process to be correctly undertaken, including any requirements for selection and/ or use of that equipment.

NOTE *Attention is drawn to the existence of health and safety at work legislation in relation to the provision and use of tools and equipment.*

5.2.2 Calibration

5.2.2.1 Equipment requiring calibration shall be calibrated in accordance with the manufacturer's instruction or verified at intervals determined by the installer prior to use. The interval between such calibrations shall not exceed that recommended by the equipment manufacturer. Where equipment requiring calibration is hired, copies of calibration certificates shall be obtained and retained as a record.

5.2.2.2 Calibration and verification records for equipment, gauges, measuring and test equipment shall include:

a) equipment identification, including the measurement reference standard against which the equipment is calibrated;

b) any out-of-specification readings when equipment is submitted for calibration;

c) a statement of conformity to specification after each calibration or verification.

5.2.2.3 In the event that the installer has reason to believe that a calibrated item may be out of calibration (e.g. the item has been dropped or mistreated), the installer shall have in place instruction that operatives cease using the item immediately and arrangement for its recalibration or replacement at the earliest practicable time. The installer shall record the date and time of all instances where recalibration or replacement is required during an installation, and take action to

confirm any measurements that may have been made while the item was out of calibration.

5.2.3 Equipment and tool maintenance

The installer shall ensure that all equipment and tools used for installation work shall be maintained in a fit-for-purpose and safe condition, providing resources for this purpose as required.

5.3 Checking, handling and storage of materials and supplies

The installer shall operate a procedure to ensure that operatives are aware of any particular handling instructions and storage conditions for the measure(s)/products or systems that they are installing under the scope of this PAS and that those requirements are effectively implemented.

5.4 Provision of installation instructions to operatives

The installer shall make available to the operative(s) for every installation undertaken, the necessary product/system specifications, work instructions, installation methods and relevant standards, repair requirements and location-specific information to enable the installation to be completed to the specification provided by the design source.

Location-specific information shall include at least the following:

a) installation times agreed by the customer and any commitments made;

b) known special needs/expectations in respect of the customer;

c) notification of any interrelationship between measures and measure installation at the same location, particularly in respect of the mutual efficiency and effectiveness of measures, working procedures and timing.

5.5 People

5.5.1 Operative selection, training and work assignment

The installer shall establish and operate procedures to:

a) determine the skills and competence levels required by operatives to undertake the required installation tasks;

b) recruit and retain a sufficient number of operatives possessing the required skills at the required level of competence, or capable of acquiring those attributes with appropriate training, as specified in the relevant measure-specific Annex;

c) provide or arrange access to any training required;

d) assign operatives to installation projects commensurate with the levels of skill and competence specified in the relevant measure-specific Annex and maintain a record of the operatives assigned to and working on each project;

e) ensure that operatives undertaking installation tasks are informed of and understand the importance of their installation activities and how they contribute to the achievement of the efficiencies specified;

f) assess the effectiveness of procedures operated under **a), b), c), d)** and **e)**;

g) maintain records of current capability, training, competence and identified route to competence for each operative.

NOTE *Attention is drawn to the requirements relating to the employment and registration of competent operatives engaged in EEM installations under some funding schemes.*

5.5.2 Installation supervision

5.5.2.1 The installer shall assess the respective skills and competence of operatives assigned to the installation tasks required for each installation and provide a level of supervision in accordance with the competence ratio provided in the relevant measure-specific Annex of this PAS.

5.5.2.2 Supervision shall include monitoring and inspecting operatives at location to ensure that:

- they routinely comply with the requirements of this PAS and that measures are installed at the designated location in accordance with the relevant EEM specification and to the satisfaction of the customer;
- no actions are taken during the installation that might reasonably be judged as being wrong (i.e. detrimental to the health or welfare of the occupants, the installer's operatives or other members of the public, or detrimental to the integrity of the building) even if specified in the design, and instead to bring such issues to the attention of the Designer and request appropriate amendments.

5.6 Engagement of subcontract installers

Where the installer subcontracts any part of the installation to another installer by way of a subcontract, the installer shall include in the contractual requirement that the subcontractor complies with all requirements of this PAS that are relevant to the installation related tasks to be undertaken and

ensure that the subcontractor has the necessary skills and competence for the installation tasks subcontracted. The subcontracting installer shall retain responsibility for compliance with this PAS for all work subcontracted."

5.7 Commissioning

The installer shall be responsible for ensuring that:

- the installed measure(s) is commissioned, in accordance with, the EEM design;
- any required test certificates confirming satisfactory results are obtained/ prepared as appropriate; and
- record is made of commissioning action undertaken, including any performance measurement results obtained.

5.8 Handover

5.8.1 Timing and extent of handover

When the measure is fully installed and commissioned and with any operationally material defects corrected, the installer shall undertake a handover procedure with the customer in accordance with the instructions provided in the EEM specification and the relevant measure specific Annex, including the handover of any documentation identified by them.

The handover process shall where practicable, involve a physical viewing of the installed measure and an explanation of its function and operation, including where appropriate demonstrations of the operation of components, devices and controls. The use of any user guides, maintenance manuals and other documents necessary for the safe, efficient and effective care, operation and maintenance of the installed measures, shall also be explained. All guides, manuals and other relevant documentation shall be provided to the customer(s) and/or located adjacent to the installed measures where appropriate and convenient to do so. The Installer shall retain or ensure access to copies of these documents for future reference.

Wherever practicable, the handover shall include a visual check that the person receiving the instruction is able to operate components and controls.

***NOTE** By way of example, it is expected that where relevant, the handover would include:*

a) the safe operation of the installed measure including operable components (e.g. windows, including any restrictor hardware), electrical equipment, mechanical equipment and associated control devices (e.g. boilers and heating controls). Where practicable, this shall include both demonstration and a visual check that the person receiving the instruction is able to operate components and controls;

b) the care of the installed measure to avoid detrimental effects (e.g. avoidance of penetrating air barriers by inserting fixings into internally insulated walls, regular cleaning and replacement of air filters in mechanical ventilation systems);

c) the regular maintenance of the installation to ensure that it operates safely, efficiently and effectively, in accordance with the requirements of any guarantees or warranties provided by the manufacturer and/or the design source or the relevant measure specific Annex;

d) the efficient operation of the installation to facilitate the delivery of the expected reduction in energy use.

5.8.2 Personnel undertaking the handover

Prior to the handover process the installer shall ensure that the operatives undertaking the handover are competent to do so and have access to adequate knowledge on the measures involved in the installation together with the behaviour required for their safe, efficient and effective operation and maintenance. Information provided to assist operatives in the handover process shall be clear, structured, relevant and appropriate.

5.9 Installation control

The installer shall have in place and operate a documented installation control procedure appropriate for validating that:

- the installations undertaken conform to the design source's specification and/or the relevant installation methods;
- Nothing has been done during the installation that could invalidate any manufacturer's or system supplier's guarantee or warranty.

Record of the installation control outcomes for each installation undertaken shall be made and signed off by the supervisor appointed to that installation or other person authorized to do so on behalf of the installer.

5.10 Installation documents and record keeping

The installer shall have in place and operate a documented procedure to demonstrate that the information contained in the installation method statement (**5.1**) for each installation is available to, and has been used by, the operatives undertaking that installation.

Records relating to the use of work instructions, relevant installation methods and constituent tasks shall include the nature and timing of any changes to installation related activities that may be authorized (**6.4**).

6 Installation process management

6.1 Operation and process oversight

The installer shall have in place, and operate, procedures designed to ensure that pre-installation building inspection and installation, processes undertaken in relation to the installation of EEM measures are undertaken and completed in accordance with the relevant EEM design issued by the design source, to the satisfaction of the customer and in accordance with the requirements of this PAS, particularly in respect of:

- The measures installed;
- the use of specified installation methods;
- any required ventilation upgrade including where necessary the procurement of any required ventilation upgrade from a ventilation specialist;
- avoidance of thermal bridging;
- EEM commissioning; and
- EEM handover.

6.2 Pre-installation building inspection

6.2.1 Undertaking the inspection

The installer shall undertake a pre-installation inspection of the designated location on the basis of the installation method statement prepared under **5.1**, using a competent person as defined in the relevant measure-specific Annex of this PAS.

The inspection shall be undertaken at a level of detail sufficient to confirm that the specified EEM can be safely and effectively installed at the designated location paying particular attention to potential moisture buildup as a result of the installation and taking into account the functionality and/or safety of installed services (gas, electricity, water, telecommunications, etc.); The inspection shall include any specific pre-installation inspection requirements from the relevant measure-specific Annex of this PAS.

6.2.2 Notification of pre-installation building inspection

The installer shall provide information as to the location and timing of forthcoming pre-installation building inspections to any relevant certification body, upon request by that body to do so.

6.2.3 The suitability and completeness of the installation method statement

The suitability and completeness of the installation method statement (**5.1**) shall be checked as part of the pre-installation building inspection. In the event that the method statement is found to be inadequate, the findings of the pre-installation inspection shall be used to inform the correction or further development of the method statement.

6.2.4 The suitability and completeness of the EEM design

The suitability and completeness of the EEM design (**4.2**) shall be reviewed as part of the pre-installation building inspection and action taken to bring to the attention of the design source:

- anything missing from the design that might reasonably be expected to be included (see Clause **4**);
- anything that is contrary to the stated design assumptions (e.g. assumptions about areas that can only be examined after opening-up the construction);
- any aspect of the design and specification that cannot be implemented, for whatever reason, and request an appropriate amendment or written confirmation that installation can proceed without amendment.

6.2.5 Confirmation with the customer

Before conclusion of the pre-installation building inspection, the installer shall confirm with the customer that:

- the nature and extent of the specified installation is known to the customer and is in line with that customer's expectations;
- the arrangements made for site access and installation materials storage are adequate and appropriate for the installation to be undertaken.

6.2.6 Pre-installation building inspection records

Record of the pre-installation building inspection and its findings, including those relating to the suitability and completeness of the installation method statement, the EEM design and any customer-related issues, shall be made by the inspector and retained by the installer, with copy being made available to the design source and/or any relevant validation body, on request.

NOTE 1 For some measures, the pre-installation building inspection could be included as a first stage of an installation visit provided provision is made for actual installation not to proceed until any identified problems have been resolved.

NOTE 2 Attention is drawn to the need to comply with applicable statutory requirements e.g. building regulations.

NOTE 3 Attention is drawn to the need for the pre-installation building inspection to note any potential risk in relation to the ongoing performance of installed services so as to enable liaison with the design source and/or service providers where relevant.

NOTE 4 Installers should encourage competent persons appointed to undertake pre-installation inspections to familiarise themselves with the guidance provided in BS 7913 Guide to the conservation of historic buildings and BS 5250 Code of practice for the control of condensation in buildings.

6.2.7 Safety alarms

Where carbon monoxide (CO) or other safety alarm(s) have already been installed at the designated location, the Inspector shall ascertain by enquiry of the customer whether or not they have been tested in accordance with the alarm system design specification and/or the manufacturer's instructions and include report of the customer's response in the pre-installation building inspection record.

6.2.8 Presence of protected species

In the event that species (e.g. bats, birds, butterflies, dormice) or plants that could be subject to special protection are found to be present at the designated location, the inspector shall include report of that presence in the inspection record and make the presence known to the installer and design source.

6.2.9 Action in response to inspection findings

In the event that the pre-installation building inspection findings reveal potential installation problems, the installer shall notify the design source and any relevant statutory authorities, and work with the design source as necessary to develop a mutually agreed solution. Installation shall not commence until such solution has been agreed by the design source and confirmed with the customer. The installer shall always obtain the written agreement of the design source to any introduction of changes to the defined installation process.

6.3 Action in respect of Intermediate inspection

Where an intermediate inspection is required by particular measures as part of the overall installation process, the installer shall establish and operate procedures to ensure that work that might impede subsequent inspection cannot continue until the intermediate inspection has been completed and clearance to continue issued.

6.4 Installation process change

6.4.1 Introduction of new or modified method statement and/or installation methods

Any variation to the method statement and/or installation methods shall be defined, documented and agreed with the design source and confirmed with the customer, before proceeding with the installation.

6.4.2 Compatibility of installation process change

Any change to an installation process shall be accompanied by a review of related tasks and methods to ensure compatibility with the installation of other measures being installed at the same premises.

6.4.3 Internal feedback

Installers shall encourage internal feedback on the installation process, whether positive or negative, from inspectors and installation operatives. Any feedback received shall be documented and acknowledged prior to being investigated and corrected where judged beneficial. Any decision not to take corrective action in relation to negative feedback shall be documented, including the reasons for reaching that decision.

6.5 Process continuity plan

When not otherwise arranged by the design source, the installer shall have in place and operate arrangements that, in the event of an unforeseen circumstance that prevents the installer completing an installation, all uncompleted installations can be transferred to another installer and completed in accordance with the relevant design specification and in accordance with this PAS. Where the installer is providing sub contracted services to a main contractor it shall be the responsibility of the main contractor to ensure there is a process continuity plan in place.

6.6 Process control

The installer shall have in place and operate a documented installation process control procedure capable of demonstrating that the requirements of this PAS have been met for each installation undertaken, including the completion of the installation control procedure (**5.9**). Record of the application of the installation process control procedure shall be maintained for each installation and signed off by a competent person authorized to do so on behalf of the installer.

6.7 Internal audit and corrective action

6.7.1 Procedure

The installer shall conduct a review of their operating system(s) at least once per annum for each type of installation undertaken to ensure conformity with the requirements of this PAS. Records of the review and any resulting actions taken to correct and prevent any future non-compliance shall be made and retained.

NOTE *It is recommended that installers carrying out large numbers of installations of the same type consider undertaking audits more frequently on a percentage basis, in preference to the maximum interval specified above.*

6.7.2 Investigation

The cause and consequences of issues raised during internal audit (**6.7.1**) shall be identified, systematically examined and the findings documented.

6.7.3 Corrective action

Corrective action shall include rectification of the particular occurrence identified under **6.7.2** and initiation of measures to prevent recurrence.

6.7.4 Verification of corrective action

The effectiveness of corrective actions undertaken (**6.7.3**) shall be assessed by the installer and outcomes documented.

6.8 Installation process records

The installer shall establish and maintain records containing at least the information identified in **a)** through **l)** of this Clause, in relation to each installation undertaken for which compliance with this PAS is claimed. Installation process records shall be retained for not less than six years and shall be made available to the installer's PAS 2030 certification body and/ or the relevant design source, when requested.

a) location of the installation;
b) type of measure(s) installed;
c) dates of installation commencement, completion and commissioning;
d) identification of specific products/systems installed;
e) the installation method statement including all related EEM design documents;
f) details of any problems encountered, corrections agreed and remedial work undertaken;
g) records of inclement weather and duration of delay or hold up experienced when installing EEM;
h) name(s) of operatives undertaking the installation and their competence level;
i) results of performance testing carried out;
j) commissioning records;
k) relevant installation certificates;
l) written confirmation that the installation process has been undertaken in accordance with this PAS signed off by a competent person authorized to do so on behalf of the installer.

6.9 Business and financial probity

6.9.1 Financial resource and insurance

The installer shall be able to demonstrate the financial stability and business resources likely to sustain the operation of an EEM installation service and shall have adequate arrangements including insurance, to underwrite the liabilities arising from any claims resulting from deficiencies of product or system selection, design, detailing or installation. together with appropriate guarantees and warranties of the work, as required by the design and specification or by any applicable quality assurance scheme, in respect of its operations and/or activities undertaken under the scope of this PAS.

6.9.2 Clarity of contractual liability

Where the Installer is contracted to the client on a 'design and build' basis, the roles of the designer and Installer shall be sufficiently clearly defined and distinguished in the contract documentation to permit claims against either or both of them, as appropriate, in the event of a defective installation.

7 Service provision

7.1 Complaints procedure

The installer shall have in place and operate a documented complaints procedure appropriate for receiving, recording, acknowledging and resolving all complaints from customers.

7.2 Complaints records

The installer shall maintain records of all complaints and their resolution for not less than six years and shall make copies of such records available to the installer's PAS 2030 certification body or the relevant design source, when requested.

7.3 Interaction with customers

The installer shall have in place and operate a procedure to instruct each operative likely to have direct contact with customers, as to how to act in response to an approach from customers especially, but not exclusively, in respect of:

- pre-notified customer requirements and expectations particularly issues of work timing and access;
- agreed customer service requirements;
- customer questions or requests for information;
- customer request for additional measure-related work extending beyond the installation process definition;
- customer complaint or other customer feedback in respect of some aspects of the installation or installation process;

8 Claims of compliance

8.1 Requirement to claim

The installation of each energy efficiency measure claimed to be in compliance with the requirements of this PAS shall be supported by a declaration of conformity to this PAS, issued to the customer and expressed in the form provided in either **8.2** or **8.3**, as appropriate.

8.2 Claims in respect of installer designed installations

8.2.1 Independent third party certification

Where the EEM design/ specification is provided by the installer and compliance with PAS 2030 validated by an independent third party certification body:

> The design and installation of [*energy efficiency measure(s)*] at [*location of installation*] and handed over on [*date of handover*] has been undertaken by [*name of installer*] using a process complying with PAS 2030:2017, including Annex(es) [*insert references to relevant measure-specific Annex(es)*]. [*Insert unambiguous identification of the certification body*] certified.

8.2.2 Other party validation

Where the EEM design/ specification is provided by the installer and compliance with PAS 2030 validated by an alternative method of validation relying on parties other than those qualifying as an accredited independent third party certification body:

> The design and installation of [*energy efficiency measure(s)*] at [*location of installation*] and handed over on [*date of handover*] has been undertaken by [*name of installer*] using a process complying with PAS 2030:2017, including Annex(es) [*insert references to relevant measure-specific Annex(es)*]. [*Insert unambiguous identification of the validation body*] validated.

8.2.3 Installer validation

Where the EEM design/ specification is provided by the installer and compliance with PAS 2030 validated by the installer:

> The design and installation of [*energy efficiency measure(s)*] at [*location of installation*] and handed over on [*date of handover*] has been undertaken by [*name of installer*] using a process complying with PAS 2030:2017, including Annex(es) [*insert references to relevant measure-specific Annex(es)*]. Self-validated.

NOTE *The inclusion of reference to PAS 2030:2017 in relation to a particular installed measure represents the installer's declaration that the process used meets the requirements of this PAS. The accuracy of the claim is solely the claimant's responsibility and is not to be confused with third party certification of conformity.*

8.3 Claims in respect of independent third party designed installations

8.3.1 Independent third party certification

Where the EEM design/ specification is provided by an independent third party and compliance with PAS 2030 validated by an independent third party certification body:

> The installation of [*energy efficiency measure(s)*] at [*location of installation*] and handed over on [*date of handover*] has been undertaken by [*name of installer*] in accordance with a design provided by [*name of* designer] using a process complying with PAS 2030:2017, including Annex(es) [*insert references to relevant measure-specific Annex(es)*]. [*Insert unambiguous identification of the certification body*] certified.

8.3.2 Other party validation

Where the EEM design/ specification is provided by an independent third party and compliance with PAS 2030 validated by an alternative method of validation relying on parties other than those qualifying as an accredited independent third party certification body:

> The installation of [*energy efficiency measure(s)*] at [*location of installation*] and handed over on [*date of handover*] has been undertaken by [*name of installer*] in accordance with a design provided by [*name of* designer] using a process complying with PAS 2030:2017, including Annex(es) [*insert references to relevant measure-specific Annex(es)*]. [*Insert unambiguous identification of the validation body*] validated.

8.3.3 Installer validation

Where the EEM design/ specification is provided by an independent third party and compliance with PAS 2030 validated by the installer:

> The installation of [*energy efficiency measure(s)*] at [*location of installation*] and handed over on [*date of handover*] has been undertaken by [*name of installer*] in accordance with a design provided by [*name of* designer] using a process complying with PAS 2030:2017, including Annex(es) [*insert references to relevant measure-specific Annex(es)*]. Self-validated.

9 Documents essential to the application of the Annexes of this PAS

9.1 Use of the identified documents

1. The documents listed in **9.2** to **9.9** are cited in one or more of the measure-specific Annexes of this PAS and shall be used as required in the application of any Annex in which they are cited. For dated or edition specific references, only the edition cited shall apply. For undated references or references that are not edition specific, the latest edition of the referenced document (including any amendments) shall apply.

***NOTE** At the time of publication of the 2017 edition of PAS 2030, several of the standards listed in **9.2** have been updated from the versions applying in the 2014 edition. However, because the references to these documents in this PAS are undated those references remain unchanged. Attention is therefore drawn to the requirement to use the latest edition where references to documents are undated. To assist users of this PAS to identify the correct document, a list of the most recent editions of these standards is available from the PAS 2030 website.*

9.2 British Standards

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

BS 5410-2, *Code of practice for oil firing – Part 2:Installations of 45 kW and above output capacity for space heating, hot water and steam supply service.*

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

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

BS 5482-1, *Code of practice for domestic butane and propane gas burning installations – Part 1:Permanent dwellings.*

BS 5864, *Installation and maintenance of gas-fired ducted air heaters of rated heat input not exceeding 70 kW net (2nd and 3rd family gases). Specification.*

BS 5970, *Code of practice for thermal insulation of pipework and equipment in the temperature range of -100°C to +870°C*

BS 6100-1, *Building and civil engineering – Vocabulary – Part 1 General terms*

BS 6262-2, *Glazing for buildings- Part 2:Code of practice for energy light and sound*

BS 6262-3, *Glazing for buildings- Part 3:Code of practice for fire security and wind loading*

BS 6262-4, *Glazing for buildings- Part 4:Code of practice for safety related to human impact*

BS 6262-6, *Glazing for buildings- Part 6:Code of practice for special applications*

BS 6262-7, *Glazing for buildings- Part 7:Code of practice for the provision of information*

BS 6644, *Specification for installation of gas-fired boilers of rated inputs between 70 kW (net) and 1.8 MW (net) (2nd and 3rd family gases).*

BS 6798, *Specification for installation and maintenance of gas-fired boilers of rated input not exceeding 70 kW net.*

BS 6891, *Installation of low pressure gas pipework of up to 35 mm (R1 1/4) on premises.*

BS 6896, *Specification for installation and maintenance of gas-fired overhead radiant heaters for industrial and commercial heating (2nd and 3rd family gases)*

BS 7386 *Draughtstrips for the draught control of existing doors and windows in housing (including test methods)*

BS 7593, *Code of practice for treatment of water in domestic hot water central heating systems.*

BS 7619, *Specification for extruded cellular unplasticised PVC (PVCU) profiles*

BS 7671:*Requirements for electrical installations. IET Wiring Regulations.*

BS 7880 *Draught control of existing doors and windows in housing using draught strips.*

BS 8000-0, *Workmanship on building sites- Part 0:Introduction and general principles*

BS 8558, *Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages. Complimentary guidance to BS EN 806.*

BS 8123-4, *Windows and doors. Code of practice for the survey and installation of windows and external doorsets*

BS 8660-1, *Gas-fired micro-cogeneration appliances of rated thermal input not exceeding 70 kW net – Part 1:Specification for selection, installation, inspection, commissioning, servicing and maintenance of Stirling engine micro-cogeneration appliances.*

BS EN 378-1 *Refrigerating systems and heat pumps. Safety and environmental requirements. Basic requirements, definitions, classification and selection criteria*

BS EN 378-3 *Refrigerating systems and heat pumps. Safety and environmental requirements. Installatiat location and personal protection.*

BS EN 378-4 *Refrigerating systems and heat pumps. Safety and environmental requirements. Operation, maintenance, repair and recovery.*

BS EN 806-1 *Specifications for installations inside buildings conveying water for human consumption. General*

BS EN 806-4 *Specifications for installations inside buildings conveying water for human consumption. Installation*

BS EN 806-5 *Specifications for installations inside buildings conveying water for human consumption. Operation and maintenance*

BS EN 1264-1: *Water based surface embedded heating and cooling systems – Part 1:Definitions and symbols*

BS EN 1264-2: *Water based surface embedded heating and cooling systems – Part 2:Floor heating: Prove methods for the determination of the thermal output using calculation and test methods*

BS EN 1264-3: *Water based surface embedded heating and cooling systems – Part 3:Dimensioning*

BS EN 1264-4: *Water based surface embedded heating and cooling systems – Part 4:Installation.*

BS EN 1264-5: *Water based surface embedded heating and cooling systems – Part 5:Heating and cooling surfaces embedded in floors. Determination of the thermal output*

BS EN 1670, *Building hardware- Corrosion resistance- Requirements and test methods*

BS EN 12828: *Heating systems in Buildings. Design for water based heating systems*

BS EN 12831: *Heating systems in Buildings: Method for calculation of the design heat load*

BS EN 13120 *Internal blinds – Performance requirements including safety*

BS EN 13410, *Gas fired overhead radiant heaters. Ventilation requirements for non-domestic premises*

BS EN 13561, *External blinds and awnings– Performance requirements including safety*

BS EN 13659, *Shutters and external venetian blinds – Performance requirements including safety*

BS EN 14336, *including Corrigendum January 2009 Heating systems in buildings – Installation and commissioning of water based systems*

BS EN 15316-4-8, *Heating systems in buildings. Method for calculation of system energy requirements and system efficiencies. Space heating generation systems, air heating and overhead radiant heating systems.*

BS EN 16484, *Building automation and control systems (BACS). Project specification and implementation*

BS EN 62446-1, *Photovoltaic (PV) systems. Requirements for testing, documentation and maintenance. Grid connected systems. Documentation, commissioning tests and inspection.*

BS EN ISO 11600, *Building construction-Jointing products- Classification and requirements for sealants*

9.3 Institution of Gas Engineer and Managers – Standards

(available from www.igem.org.uk/technical-standards/standards/)

IGEM UP/1, 1A & 1B, *Strength testing, tightness testing and direct purging each standard covers industrial commercial and domestic testing and purging requirements*.

IGEM/UP/2, *Installation of pipework on industrial and commercial premises*.

IGEM/UP/7, *Gas installations in timber-framed and light steel buildings*.

IGEM UP/10, *Installation of flued gas appliances in industrial and commercial premises incorporating specific requirements for appliances fired by bio-fuels*.

9.4 Energy Networks Association Engineering Recommendations

(available from www.energynetworks.org/electricity/engineering/distributed-generation.html)

G59/3, *Distributed Generation Connection Guide – A guide for connecting generation that falls under G59/3 to the distribution network*.

G83/1-1, *Stage 1:Distributed Generation Connection Guide – A guide for connecting generation that falls under G83/1-1 STAGE 1 to the distribution network*.

G83/2-1, *Stage 2:Distributed Generation Connection Guide – A Guide for connecting generation that falls under G83/1-1 STAGE 2 to the distribution network*.

Recommendations for the Connection of Small-scale Embedded Generators (up to 16 A per phase) in Parallel with Public Low-voltage Distribution Networks

9.5 UKLPG

(available from www.uklpg.org/shop/codes-of-practice/)

Code of Practice 22, *Design installation and testing of LPG Piping Systems*.

9.6 Department of Communities and Local Government

Non-Domestic Building Services Compliance Guide (available from www.planningportal.gov.uk/uploads/br/non-domestic_building_compliance_guide_2013.pdf

Domestic Building Services Compliance Guide (available from www.planningportal.gov.uk/uploads/br/domestic_building_compliance_guide_2013.pdf

9.7 Common, Minimum Technical Competence (MTC) Annexes

NOTE *At the time of PAS 2030 publication (February 2017), the United Kingdom structure for coordinating skills and competences is in evolution with the introduction of the new 'Post 16 Skills Plan' which details an approach whereby technical training within 15 work areas is spear-headed by industry and approved by a Board at the Institute for Apprenticeships (IfA). This Board is currently being established and is due to take up its new role in April 2017.*

As a result, the 2017 edition of PAS 2030 retains its references to the previously established structure of Minimum Technical Competence Annexes, supported where relevant by National Occupational Standards (NOS) and National Vocational Qualifications (NVQ). Installers working to PAS 2030:2017 should therefore be aware of this evolving situation and be prepared to make adjustments accordingly. PAS 2030 will make appropriate reference to this newly evolved structure at its next iteration.

The CMTC annexes listed below are available from: https://www.gov.uk/guidance/competent-person-scheme current-schemes-and-how-schemes-are-authorised

CMTC Annex 2A – Common Process for HW, CW and 'Wet' Heating Systems (Domestic)

CMTC Annex 2B – Common Processes for HW, CW and 'Wet' Heating Systems (Non-domestic)

CMTC Annex 2C – Common Processes (Compressed Gas Welded Pipework)

CMTC Annex 2D – Common Processes (Manual Arc Welded Pipework)

CMTC Annex 4A – Oil Appliance Installation (Domestic)

CMTC Annex 4B – Oil Appliance Installation (Non-domestic)

CMTC Annex 4C – Oil Storage and Tank Systems

CMTC Annex 6A – Backflow Prevention

CMTC Annex 7A – Cold Water Systems (Domestic)

CMTC Annex 7B – Cold Water Systems (Non-Domestic)

CMTC Annex 9A – Hot Water Systems (Domestic)

CMTC Annex 9B – Unvented Hot Water Storage Systems

CMTC Annex 9C – Hot Water Systems (Non-domestic)

CMTC Annex 10A – 'Wet' Heating Systems (Domestic)

CMTC Annex 10B – Underfloor Heating

CMTC Annex 10C – 'Wet' Central Heating systems (Non-domestic)

CMTC Annex 10D – Warm Air Heating (Domestic)

CMTC Annex 10E – Warm Air Heating (Non-Domestic)

CMTC Annex 13A – Energy Efficiency (Domestic)

CMTC Annex 13B – Energy Efficiency (Non-domestic)

CMTC Annex 15A – Domestic Ventilation Systems Installation

CMTC Annex 15B – Mechanical Ventilation Systems Installation

CMTC Annex 15C – Air Handling Unit (Non-domestic)

CMTC Annex 15D – Plastic Ductwork Systems

CMTC Annex 15E – Fire-rated Ductwork Systems

CMTC Annex 16A – Air Conditioning Installation

CMTC Annex BSS 1 – Install Door Systems, Blinds and Shutters

CMTC Annex CWI 1 – Determine the Suitability of the Building for Cavity Wall Insulation

CMTC Annex CWI 2 – Install Cavity Wall Insulation

CMTC Annex DP 1 – Determine the Suitability of a Building for Draught Proofing Work

CMTC Annex DP 2 – Install Draught Proofing to Doors, Windows and Access Hatches

CMTC Annex EWI 1 – Determine the Suitability of the Building for External Wall Insulation

CMTC Annex EWI 2 – Install External Wall Insulation

CMTC Annex EWI 3 – Apply Surface Finishes to External Wall Insulation

CMTC Annex HSI 1 – Determine the Suitability of a Building for Heating System Pipework and Cylinder Insulation

CMTC Annex HSI 2 – Install Insulation to Heating System Pipes and Cylinders

CMTC Annex INS 1 – Determine the Suitability of a Building for Roof, Loft or Floor Insulation Work

CMTC Annex INS 2 – Install Insulation to Framed Sections of Buildings

CMTC Annex IWI 1 – Determine the Suitability of a Building for Internal Wall Insulation Work

CMTC Annex LFT 1 – Install Loft Insulation

The following fenestration annexes are available as follows:

Fenestration minimum technical competencies for surveyors, from

Download the ‘fenestration minimum technical competencies for surveyors’ (PDF, 448 KB).

Fenestration minimum technical competencies for installers, from

Download the ‘fenestration minimum technical competencies for installers’ (PDF, 414 KB).

9.8 National occupational Standards (NOS)

The NOS listed below are available from:
http://www.ukstandards.org.uk/Pages/index.aspx

9.8.1 Building Fabric Disciplnes NOS

COSVR448	Install external wall insulation
COSVR449	Apply surface finishes to external wall insulation
COSVR450	Install cavity wall insulation
COSVR451	Install insulation to cold roofs
COSVR452	Install draft proofing to openings
COSVR641	Conform to general workplace health, safety and welfare
COSVR644	Install internal insulation to walls
COSVR645	Install insulation to framed sections of buildings

9.8.2 Building Services Engineering NOS

Group 9.8.2.1 Core/ Generic

SUMBSE01	*Apply health and safety and environmental legislation in the building services engineering sector*
SUMBSE02	*Establish and maintain relationships in the building services engineering sector*
SUMBSE03	*Coordinate a work site in the building services engineering sector*
SUMBSE04	*Perform electrical work on mechanical building services systems*

Group 9.8.2.2 Electrical Disciplines

SUMET04	*Install enclosures for Electrical cables, conductors and wiring systems*
SUMET05	*Install and connect Electrical cables, conductors, wiring systems and equipment*
SUMET06	*Inspect and test electrical systems and equipment*
SUMET07	*Commission electrical systems and equipment*
SUMET08	*Identify and rectify faults in electrical systems and equipment*
SUMET09	*Maintain electrical systems and equipment*

Group 9.8.2.3 Plumbing Disciplines

SUMPH04	*Install and test domestic plumbing and heating systems*
SUMPH05	*Service and maintain domestic plumbing and heating systems*
SUMPH06	*Inspect and pre-commission domestic plumbing and heating systems*
SUMPH07	*Commission domestic plumbing and heating systems*
SUMPH08	*Decommission domestic plumbing and heating systems*
SUMPH09	*Install sheet weathering protection*

Group 9.8.2.4 Heating & Ventilating

SUMHV04	*Install and test industrial and commercial heating and ventilating pipework systems*
SUMHV05	*Install and test industrial and commercial heating and ventilating ductwork systems*
SUMHV06	*Inspect and pre-commission industrial and commercial heating and ventilating systems*
SUMHV07	*Commission industrial and commercial heating and ventilating systems*
SUMHV08	*Decommission industrial and commercial heating and ventilating systems*
SUMHV09	*Service and maintain industrial and commercial heating and ventilating systems*
SUMHV10	*Weld industrial and commercial heating and ventilating pipework*
SUMHV11	*Clean industrial and commercial ventilating systems*

Group 9.8.2.5 Environmental Technologies

SUMETS01	*Install test and commission environmental technology*
SUMETS02	*Service and maintain environmental technology systems*
SUMETS03	*Diagnose and rectify faults in environmental technology*

Group 9.8.2.6 Refrigeration & Air Conditioning (including Heat Pumps)

SUMRAC04	*Install refrigeration systems*
SUMRAC05	*Service and maintain refrigeration systems*
SUMRAC06	*Decommission refrigeration systems*
SUMRAC07	*Commission refrigeration systems*
SUMRAC08	*Install air conditioning and heat pump systems*
SUMRAC09	*Service and maintain air conditioning and heat pump systems*
SUMRAC10	*Decommission air conditioning and heat pump systems*
SUMRAC11	*Commission air conditioning and heat pump systems*

9.9 Other insulation installation guidance references

At the time of publication of this PAS, the cross referenced documents listed below are understood to be in preparation for publication by not later than 31st March 2017.

9.9.1 External wall insulation (Annex B.4)

Specification for the installation of external wall insulation ensuring the safety and operation of fuel burning appliances

External Wall Insulation Thermal Bridging Detailing

External Wall Insulation pre-installation building inspection checklist

All External Wall Insulation documents available from National Insulation Association, Insulated Render and Cladding Association and Solid Wall Insulation Guarantee Agency

9.9.2 Loft Insulation (Annex B.9)

General requirements and guidance for the installation of cold roof loft insulation

http://www.glidevale.com/uploads/dab79298b0219093005220b716485704.pdf

9.9.3 Room in Roof Insulation (Annex B.12)

A Guide to Retrofit Room In Roof Insulation

Room in Roof Insulation pre-installation checklist

Both available from the National Insulation Association and Association for Technical Monitoring Agents

NOTE *The foreword of this PAS includes the following: This edition of PAS 2030 is published on 1st February 2017 with the expectation that installers claiming compliance with PAS 2030 will be meeting its requirements by 31st May 2017.*

It is recommended that installers commence implementation of PAS 2030 at the earliest opportunity, incorporating the relevant documents as soon as they become available.

PAS 2030:2017 – Specification for the installation of energy efficiency measures (EEM) in existing buildings

Measure-specific annex selection and co-installation requirements

Measure-specific annexes

PAS 2030:2014/ PAS 2030:2017 – Substantive change

Installer guidance on the use and application of PAS 2030:2017

Example installation project information collation form

Annex A
Measure specific Annex selection and co-installation requirements

A.1 Introduction

The clauses of this Annex provide:

in **A.2** and **A.3,** information to facilitate the inclusion of measures specified in each EEM design in the installation method statement (**5.1**);

in **A.4**, information in respect of the potential for relationship between installed measures and between installed measures and the building in which they are installed;

in **A.5**, information in respect of possible actions to provide or improve ventilation in situations where the installation of one or more EEM has resulted in improvement in the air-tightness of the building in which they are installed (**4.2.6**);

in **A.6,** information to assist the avoidance of thermal bridging (**4.2.5**).

A.2 Energy efficiency measures and types arranged by measure category.

Table A.1 – Category BFM (Building Fabric Measures)

Measure	Measure type	Measure reference	Current Annex
Cavity wall insulation including that installed in party walls	As measure	BFM.1	B1
Draught proofing	As measure	BFM.2	B2
Energy efficient glazing and doors including replacement insulating glass units (IGU)	As measure	BFM.3	B3
External wall insulation	1. Site rendered external wall insulation systems	BFM.4.1	B4
	2. Pre-finished external wall insulation systems	BFM.4.2	
Flat roof insulation	As measure	BFM.5	B5
Floor Insulation	As measure	BFM.6	B6
Hybrid wall insulation	As measure	BFM.7	B7
Internal wall insulation	As measure	BFM.8	B8
Loft insulation	1. Roll insulation 2. Blown insulation	BFM.9.1	B9
		BFM.9.2	
Pitched roof insulation	As measure	BFM.10	B10
Solar blind, shutters and shading devices (internal and external)	1. Mechanically operated devices 2. Electrically operated devices	BFM.11.1	B11
		BFM.11.2	
Room-in-roof insulation	As measure	BFM 12	B12

Table A.2 – Category BSM (Building Services Mechanical)

Measure	Measure type	Measure reference	Current Annex
Chillers	As measure	BSM.1	C1
Condensing boilers, natural gas-fired and liquefied petroleum gas-fired (domestic and non-domestic)	As measure	BSM.2	C2
Condensing boilers, oil-fired (domestic and non-domestic)	As measure	BSM.3	C3
Flue gas heat recovery devices	Devices for use with gas-fired condensing boilers (domestic scale)	BSM.4	C4
Heating system insulation	As measure	BSM.5	C5
Heating, hot water system, air conditioning or ventilation system controls and components	1. Heating and hot water system controls (domestic)	BSM.6.1	C6
	2. Heating and hot water system controls (non-domestic)	BSM.6.2	
	3. Air conditioning controls	BSM.6.3	
	4. Ventilation controls	BSM.6.4	
	5. Low energy circulator pumps	BSM.6.5	
	6. Low temperature radiators and fan convectors	BSM.6.6	
Hot water systems	1. Domestic hot water systems	BSM.7.1	C7
	2. Non-domestic hot water systems	BSM.7.2	
Mechanical ventilation with heat recovery	1. Domestic ventilation systems with heat recovery	BSM.8.1	C8
	2. Non-domestic ventilation systems with heat recovery	BSM.8.2	
Radiant heating	Natural gas-fired and liquefied petroleum gas-fired radiant heating systems.	BSM.9	C9
Underfloor heating	Hydraulic (wet) systems*	BSM.10	C10
Warm-air heating	1. Natural gas-fired and liquefied petroleum gas-fired warm air heating systems	BSM.11.1	C11
	2. Oil-fired warm air heating systems	BSM.11.2	
	***NOTE** Electric warm air heating systems are included under the measure electric storage heaters (see Annex D1*		
Water efficient taps and showers	As measure	BSM.12	C12

Table A.3 – Category BSE (Building Services Electrical)

Measure	Measure type	Measure reference	New Annex
Electric storage heaters (including electric warm air heating units that incorporate heat storage)	1. Domestic electric storage heaters	BSE.1.1	D1
	2. Non-domestic electric storage heaters	BSE.1.2	
	3. Domestic electric storage heaters with warm air heat distribution	BSE.1.3	
	4. Non-domestic electric storage heaters with warm air heat distribution	BSE.1.4	
Light fittings, lighting systems and lighting system controls	1. Domestic	BSE.2.1	D2
	2. Non-domestic	BSE.2.2	
Variable speed drives for fans and pumps (non-domestic)	As measure	BSE.3	D3

A.3 Explanation of PAS 2030 measure specific Annex referencing system.

EEM included in PAS 2030 are organised in three groups, building fabric measures (BFM), building services mechanical (BSM and building services electrical (BSE). These groups are each presented in an Annex referenced as **Annex B** for BFM, **Annex C** for BSM and **Annex D** for BSE. Within these annexes, the related measures are each allocated a separate sub-Annex e.g. **B1**, **B2**, **B3** etc. Referencing within each sub-Annex is provided for as follows:

Annex B (normative) BFM energy efficiency measures

B1 Measure BFM.1 Cavity wall insulation including that installed in party walls

B, C, D *There are three annexes each presenting a single category of energy efficiency measures (e.g. BFM, BSM, and BEM).*

B1, B2, C1, D1 etc. *Measure specific sub-Annex reference, presented alongside title*

B1.1, B1.2, B1.3 etc. – *Measure focussed requirements clauses within each sub-Annex B1.*

Table B1 *– Table of required technical, competence and other requirements for sub-Annex B1*

B1-l1, B1-l2, B1-l3 B1-l4 **etc.** – *line references within the* **Table B1**.

A.4 Relationships between installed measures and between installed measures and the building in which they are installed

A.4.1 Introduction

Throughout the planning and installation of EEM in any existing building it is essential to recognise and take account of the fact that some measures when they are installed, can negatively impact upon the energy efficiency performance of other installed measures or can themselves be similarly negatively influenced by those measures. In addition there are measures that when installed in a building without appropriate planning and preparation, can significantly impair the functionality of the building in a variety of ways.

For this reason **Clause 4** *Design and specification of EEM* places considerable emphasis on the need to make adequate provision for the correct interface between installed measures in the EEM specification and **Clause 5** *Installation process* imposes specific responsibilities on installers to be alert to these potential issues and to closely follow the EEM specification in this respect throughout the installation process. This extends to the requirement for installers to pay particular attention to such matters during the pre-installation building inspection (**6.2**) and to refer back to the design source with any perceived issues that they believe not to have been adequately provided for in the specification

A.4.2 The measures interaction matrix

Figures A1 and **A.2** provide information as to the nature of relationships between co-installed measures, providing clear identification of measures that are independent and do not interact and measures that are not appropriate together and should not be combined, with other intermediate relationships also identified. These relationships shall be taken into account in developing the EEM specification and when undertaking the pre-installation building inspection.

Figure A.1 – Key to EEM interaction matrix

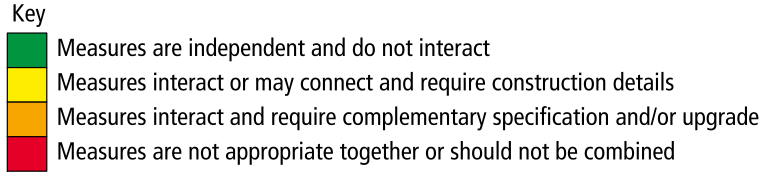
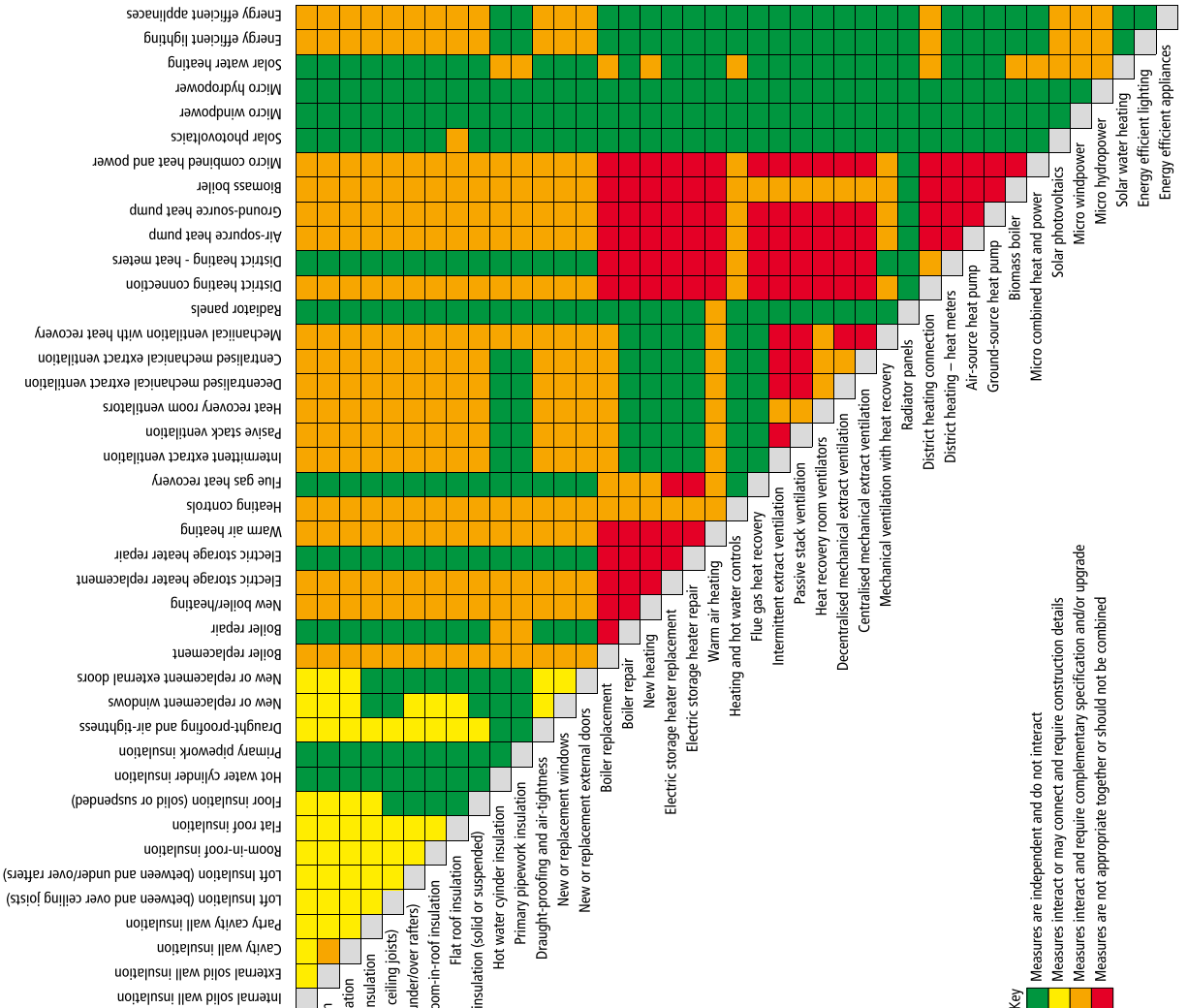


Figure A.2 – EEM interaction matrix



NOTE 1 *to* ***Figure A2****: This matrix was developed from source material provided by Peter Rickaby of Rickaby Thompson Associates Ltd.*

NOTE 2 *to* ***Figure A2****: BSI permits the reproduction of BS 2030:* ***Figure A2****. This reproduction is permitted to facilitate decision making around the installation of energy efficiency measures in support of the application of the PAS.*

A.5 Maintenance/provision of adequate ventilation

A.5.1 Introduction

Clauses **4.2.4** and **4.2.5** of this PAS impose on the installer the responsibility for ensuring that the EEM design/ specification for any building in which one or more EEM with the potential to reduce the level of background ventilation in habitable rooms, is to be installed (e.g. cavity wall insulation, solid wall insulation, floor insulation, draught stripping or replacement windows), includes detailed instruction as to how an appropriate level of ventilation is to be identified, maintained or provided. The installer is also responsible for ensuring that such instruction is included in the installation method statement (**5.1**).

The information in **A.5.2** to **A.5.4** is provided to assist the installer in undertaking the required assessment of the design in this respect and to provide guidance as to generally accepted good practice in the provision of appropriate levels of ventilation in buildings. Where action in response to this guidance is found not to be relevant, the installer should obtain formal confirmation from the design source of the reasons for this guidance not having been implemented in the design.

A.5.2 Intermittent extract ventilation

Intermittent extract ventilation can be provided by means of trickle ventilators in window heads or air inlet ventilators in walls combined with extract ventilation from all 'wet' rooms (i.e. kitchens, bathrooms, utility rooms and WCs), where such ventilation does not already exist, in order to draw fresh air into the building via the habitable rooms. It is recommended that the provision of ventilation be consistent with the guidance and minimum levels of background and intermittent extract ventilation set out in **Tables A.4**, and **A.5**, below.

Table A.4 – Guidance for the provision of ventilation when installing EEM in existing buildings with air permeability levels >5m³/hr/m²

Intended EEM installation		Condition of existing building		
		A:No existing background ventilation in some or all habitable rooms; extract ventilation not provided in all wet rooms	**B:Existing purpose provided background ventilation in every habitable room; extract ventilation not provided in all wet rooms.**	**C:Existing purpose provided background ventilation in every habitable room. Extract ventilation provided in all wet rooms.**
1	Internal/ External/ Cavity Insulation for walls	Background ventilation should be provided for rooms without background ventilation in accordance with **Table A.5**, Column 2 also It is advisable to provide extract ventilation in all wet rooms in accordance with **Table A.5**, Column 3 and Where evidence of inadequate ventilation exists (e.g. as evidenced by the presence of mould and/ or , condensation) – continuous ventilation should be provided from all wet rooms in accordance with **A.5.3** and **Table A.6**.	No requirement to upgrade background ventilation but It is essential to provide extract ventilation from all wet rooms in accordance with **Table A.4**, Column 3 and Where evidence of inadequate ventilation exists (e.g. as evidenced by the presence of mould and/ or condensation) – continuous ventilation should be provided from all wet rooms in accordance with **A.5.3** and **Table A.6**.	No requirement to provide further ventilation
2	Replacement of windows			
3	Sealing/ insulating of timber suspended floors			
4	Two or more of the above measures done in combination or separately	Background and extract ventilation should be provided in accordance with **Table A.5**	No requirement to upgrade background ventilation but It is essential to provide extract ventilation from all wet rooms in accordance with **Table A.5**	No requirement to provide further ventilation

NOTE 1 *to Table A.4:Covered/ damaged covers on ventilators should be replaced with equivalent or better. Deficiencies or faults in ventilator grills or fans should be rectified and returned at least to intended working condition.*

NOTE 2 *to Table A.4:Where ventilation exists and severe conditions of condensation or mould growth have developed, specialist advice should be sought.*

Table A.5 – Minimum levels of background and extract ventilation in conditions described in Table A.4

Room type	**Minimum background ventilation** (mm^2)[d]	**Intermittent extract fan rating** (l/s)
Habitable room	6500	Not required
Kitchen[1]	6500	60 (reduced to 30 for suitably sited extracting cooker hood)
Utility room[1]	6500	30
Bath or shower room[2]	Not required	15
WC only[3]	Not required	6

***NOTE 1** to **Table A.5**: Where the room has no external wall, a floor area of less than 6,5 m^2 and background ventilation cannot be provided then an extraction fan operating with a minimum 15 minute overrun should be installed.*

***NOTE 2** to **Table A.5**: Where the room has no external wall and background and purge ventilation cannot be provided, then the extraction fan operating with a minimum 15 minute overrun should be installed.*

***NOTE 3** to **Table A.5**: Where a window opening for purge ventilation exists then the window alone may be relied upon to provide extract ventilation*

***NOTE 4** to **Table A.5**: The ventilation area identified above is 'free area'. Equivalent area should be measured in accordance with BS EN 13141-1. The above values should be multiplied by 0,8 to obtain equivalent areas.*

A.5.3 Continuous Extract Ventilation

Where there is evidence of condensation within the unimproved building, or the installation of measure(s) is intended to lower the air permeability of the building envelope below 5 m^3/m^2h @ 50 Pa (or is likely to do so) then intermittent extract ventilation is not sufficient and it is recommended that the EEM include the provision of background ventilation as above combined with continuous extract ventilation from wet rooms (with intermittent boost). In these cases it is necessary that the provision of ventilation be consistent with the guidance and minimum levels of extract and supply ventilation specified in **Table A.6**.

***NOTE** The ventilation rate derived from **Table A.6** should be whichever is the higher of either the 'room type' rate or 'number of bedrooms' rate, subject to a minimum of 0.3 l/s for every 1 m^2 of floor space in the dwelling.*

Table A.6 – Minimum levels of extract and supply ventilation when continuous extraction is used

Room type	Continuous extraction rating (l/s)		Number of Bedrooms	Minimum whole house ventilation rate (l/s)
Kitchen	13		1	13
Utility Room	8		2	17
Bath or shower room	8	or	3	21
WC (only)	6[2]		4	25
			5	29

NOTE 1 *to* ***Table A.6****: Each habitable rom should be provided with minimum background ventilation of 3125 mm² free area.*

NOTE 2 *to* ***Table A.6****: Where the window opening size is 10% of the floor area of the WC and is relied upon to provide extract ventilation then this should not be included in the sum of total extraction rate calculation.*

A.5.4 Permitted exclusions

Where there is no evidence of condensation within the unimproved dwelling and it can be demonstrated by fan pressurisation testing in accordance with IS EN 13829:200 'Thermal performance of buildings: determination of air permeability of buildings: fan pressurisation method' or ATTMA Technical Standard 1 'Measuring air permeability of building envelopes' before and after the installation of measure(s), that the air permeability of the building envelope has not been lowered by the installation, then the existing ventilation need not be upgraded. Similarly, if it can be demonstrated by one of the same methods, that the air permeability of the building envelope after the installation of measure(s) is not less than 5 m^3/m^2h @ 50 Pa then intermittent extract ventilation is acceptable and continuous extract ventilation need not be provided.

NOTE *It is anticipated that during the lifetime of this edition of PAS 2030, new specifications and guidance on the provision and maintenance of appropriate ventilation in existing buildings, will be developed. Users of PAS 2030 are strongly encouraged to periodically check for updated information as to progress, with the BSI PAS 2030 web-pages.*

A.6 Avoidance of thermal bridging

As required in **4.2.4 e)**, installers should satisfy themselves that the design provided by the design source, includes where practicable construction details for ameliorating the negative effects of all thermal bridges[1] at corners, junctions and edges of insulation layers either occurring as a consequence of geometry or resulting from discontinuity of the insulation or from insulation being thinner than in the adjacent area (meter box's, etc). It is recommended that these construction details be based on accepted industry guidance or standards, e.g. External Wall Insulation Thermal Bridging Detailing (see **9.9.1**)

Where the design provided does not include construction details for ameliorating the negative effects of thermal bridges, it is recommended that the installer obtain confirmation from the design source that this was intentional and that no such detail is required.

[1)] **thermal bridge**, (alternatively: cold bridge) area of a building construction having significantly higher heat transfer characteristics than the surrounding materials.

Annex B (normative)
BFM energy efficiency measures

B.1 Measure BFM.1 Cavity wall insulation including that installed in party walls

B1.1 Additional installation requirements

When installing cavity wall insulation, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B1-I1** of **Table B.1.**

B1.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the cavity wall insulation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B1-I2** of **Table B.1**

B1.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of cavity wall insulation, the installer shall employ or contract only an inspector meeting the competence requirements of **B1-I3** of **Table B.1**.

B1.4 Operative competence

When installing cavity wall insulation, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B1-I4** of **Table B.1**), with competence currency specified in **B1-I5** of **Table B1** at the competency ratio specified in **B1-I6** of **Table B.1**.

B1.5 Provision of information in respect of cavity wall insulation

At the time of handover of the cavity wall insulation to the customer, the installer shall ensure that the information identified at **B1-I7** of **Table B.1** is provided to the customer as part of the handover process required in **5.8**.

Table B.1 – Measure specific requirements for cavity wall insulation (BFM.1)

Measure description		Cavity Wall Insulation including that installed in party walls.
Measure type		As measure description (no sub-division)
B1-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The installer shall ensure that the methods used for the installation of cavity wall insulation (CWI) products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, and incorporated in the installation method statement (**5.1**). The installer responsibilities include preparation of the site and finishing work, incorporating: • identification of essential ventilation openings that require sleeving or safeguarding before installation; • the position of all flues whether or not they are in service and measures that must be taken to safeguard their proper functioning; • ensuring that upon completion of the installation or at the end of each working day, if the installation takes longer than one day, the operatives investigate and confirm the proper functioning of all ventilation openings and flues. ***NOTE 1*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied. The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier may be necessary before an application for assessment/certification is made to a certification body.* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all cavity wall insulation installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, compliance in relation to the following aspects is highlighted: fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.* ***NOTE 3*** *Where the installation is to include party walls, the Installer should confirm with the design source that any necessary notice of work to be undertaken has been issued (e.g. any notice required under the Party Wall etc. Act).* ***NOTE 4*** *Additional assistance can be obtained from the NIA Building Fabric Assessment and Cavity Wall Insulation Remedial Work Scheme.*

Table B.1 – *continued*

B1-I2	**Pre-installation building inspection requirements**	As a minimum the pre-installation building inspection shall:
		• investigate and assess if the CWI installation work will:
		  • result in non-compliance with the Building Regulations, e.g. in relation to workmanship; materials; structural stability; fire safety; resistance to moisture;
		  • result in unsafe operation of a combustion appliances;
		  • compromise the functionality of existing ventilation ducts/systems;
		  • compromise the functionality and/or safety of existing services (gas, electric, water, telephone, etc.);
		• identify:
		  • if the proposed installation would be non-compliant with any requirements stated by the supplier;
		  • if the type and condition of the building structure is suitable for the works to commence;
		  • the extent of the cavity to be filled;
		  • if the site layout or conditions will impair the execution of the works;
		  • if relevant checks have been undertaken to determine if asbestos containing materials are present.
		• be accompanied by evidence that the findings of the pre-installation building inspection have been independently checked by an appropriately qualified person (see **B1-I3**) prior to commencement of installation, with at least a randomly selected 1 in 10 of those checks (minimum of 1) including physical inspection of the building by an appropriately qualified person.
		NOTE *PAS 2031* ***Certification of energy efficiency measure (EEM) in existing buildings*** *now includes provision for certification bodies to check installer compliance with pre-installation building inspection requirements as part of the required installation evaluation inspections.*

Table B.1 – *continued*

		Competence required	Route(s) to competence
B1-I3	**Building Inspector competence requirements**	The requirements as defined in Common Minimum Technical Competence Annex CWI 1 – Determine the Suitability of a Building for Cavity Wall Insulation Work (including knowledge of the building type and construction concerned) and, where relevant, any specific competence requirements specified by the supplier.	**England, Wales and Scotland** As defined within Common Minimum Technical Competence Annex CWI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications or qualification units and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
			4) demonstrable knowledge and experience in relation to the competence in Annex CWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work;
			and evidence of product or system supplier surveyor approval, where relevant.

Table B.1 – *continued*

B1-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR 641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Relevant QCF/SCQF/FRQ & QIW qualification unit that covers the competence requirements in COSVR 641.
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable experience in relation to the competence in COSVR 641 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
	Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
		The knowledge requirements (including knowledge of the building type and construction concerned) as defined in the following Common Minimum Technical Competence Annex CWI 2 Installation of Cavity Wall Insulation. Annex CWI 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR 450 – *Install cavity wall insulation*. and, in addition, where relevant, specific training and/or competence requirements specified by the supplier.	**England, Wales and Scotland** As defined within Common Minimum Technical Competence Annexes CWI 2 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
			4) demonstrable knowledge and experience in relation to the competence in Annex CWI 2 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work;
			and evidence of product or system supplier approval, where relevant

Table B.1 – *continued*

B1-I5	**Current competency**	To be verified by the installer in accordance with **B1-I4** of **Table B1** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B1-I4** of **Table B1**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *Initial and ongoing office and at location surveillance to be carried out by UKAS accredited inspection bodies to ensure the requirements of the designer/supplier are met with regard to regulatory compliance. Inspection frequency shall be at least 1% of all site work undertaken* ***NOTE 2*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*
B1-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one carded operative that meets the operative competence requirements in full as specified in **B4-I1** of **Table B1**. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location. ***NOTE*** *The carded operative must hold a document that shows the identity, currency of competence and authorisation of the operative for production upon request.*
B1-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• Details of safe use and maintenance of the cavity wall insulation system, as specified by the supplier. • Any relevant product warranty information and guarantees. • Building Regulations compliance certificate where appropriate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days).

B2 Measure BFM.2 Draught proofing

B2.1 Additional installation requirements

When installing draught proofing, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS the installer shall also work to any standards, specifications, instructions or guidance identified in **B2-I1** of **Table 2.**

B2.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the draught proofing at location the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B2-I2** of **Table B2**.

B2.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of draught proofing, the installer shall employ or contract only an inspector meeting the competence requirements of **B2-I3** of **Table B2**.

B2.4 Operative competence

When installing draught proofing, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes **(B2-I4** of **Table B2**), with competence currency specified in **B2-I5** of **Table B2** at the competency ratio specified in **B2-I6** of **Table B2**.

B2.5 Provision of information in respect of draught proofing

At the time of handover of the draught proofing to the customer, the installer shall ensure that the information identified at **B2-I7** of **Table B2** is provided to the customer as part of the handover process required in **5.8.**

Table B.2 – Measure-specific requirements for draught proofing (BFM.2)

Measure description		Draught Proofing
Measure type		As measure (no sub-division)
B2-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The installer shall ensure that the methods used for the installation of draught proofing products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, and incorporated in the installation method statement (**5.1**). The installer responsibilities include preparation of the site and finishing work. When fitting draughtstripping products as a retrofit measure to hinged doors in wood, sliding windows in wood, hinged windows in wood and steel and domestic loft hatches, in houses that were not originally designed to incorporate draughtstripping, installers shall use products meeting the requirements of BS 7386 *Draughtstrips for the draught control of existing doors and windows in housing (including test methods)* working to the recommendations of BS 7880 *Draught control of existing doors and windows in housing using draught strips.* ***NOTE 1*** *The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier may be necessary before an application for assessment/certification is made to a certification body.* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all draught proofing installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, compliance in relation to the following aspects is highlighted:fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.*

Table B.2 – *continued*

B2-I2	**Pre-installation building inspection requirements**	As a minimum the pre-installation building inspection shall investigate and determine as far as practicable:
		• pre-existing damage to the areas that will be accessed by the installation operatives;
		• the extent of the area and elements to be draught-proofed;
		• if relevant checks have been undertaken to determine if asbestos-containing materials are present;
		• if the condition of the elements to be draught-proofed is suitable for the works to commence in relation to:
		  • timbers free from rot and/or infestation;
		  • metal components being free from visible signs of corrosion;
		  • the surfaces that will receive draught-proofing materials being free from grease, etc.;
		• if the proposed installation would:
		  • be non-compliant with any requirements stated by the design source;
		  • compromise the functionality of existing ventilation systems in relation to air movement within the building;
		  • result in unsafe operation of combustion appliances (combustion ventilation and or cooling ventilation);
		• if the site layout or conditions will impair the execution of the works in relation to appropriate access to the property and to the elements to be draught-proofed.
		• If the installation to be undertaken will result in non-compliance with the Building Regulations, e.g. in relation to workmanship; materials; structural stability; fire safety; resistance to moisture;

Table B.2 – *continued*

B2-l3	**Building Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		The requirements as defined in Common Minimum Technical Competence Annex DP 1 – Determine the Suitability of a Building for Draught Proofing Work.	**England and Wales** As defined within Common Minimum Technical Competence Annex DP 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*;
			3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
			4) demonstrable knowledge and experience in relation to the competence in Annex DP 1 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
			Scotland As defined within Common Minimum Technical Competence Annex DP 1 to include the following route options: 1) relevant QCF/SCQF qualifications/qualification units and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) demonstrable knowledge in relation to the competence in Annex DP 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work.

Table B.2 – *continued*

B2-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR 641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification unit that covers the competence requirements in COSVR 641.
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by UKAS accredited certification body and at location inspection of work.
	Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
		The requirements as defined in Common Minimum Technical Competence Annex DP 2 – Installation of Draught Proofing to Doors, Windows and Access Hatches. Annex DP 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR452 – *Install draught proofing to openings*.	**England and Wales** As defined within Common Minimum Technical Competence Annexes DP 2 to include the following route options: 1) achievement of the relevant QCF/SCQF/FRQ & QIW qualification/qualification unit and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
			4) demonstrable knowledge and experience in relation to the competence in Annex DP 2 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.

Table B.2 – *continued*

		Scotland As defined within Common Minimum Technical Competence Annexes DP 2 to include the following route options: 1) achievement of the relevant QCF/SCQF/FRQ & QIW qualification/qualification unit and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) demonstrable knowledge and experience in relation to the competence in Annex DP 2 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
B2-I5	**Current competency**	To be verified by the installer, in accordance with **B2-I4** of **Table B2** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B2-I4** of **Table B2,** including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *Initial and ongoing office and at location surveillance to be carried out by UKAS accredited inspection bodies to ensure the requirements of the designer/supplier are met with regard to regulatory compliance. Inspection frequency shall be at least 1% of all site work undertaken* ***NOTE 2*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*
B2-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.
B2-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• Any relevant product warranty information and guarantees.

B3 Measure BFM.3 – Energy efficient glazing and doors including replacement Insulating Glass Units (IGU)

B3.1 Additional installation requirements

When installing energy efficient glazing and doors, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B3-I1** of **Table B3**.

B3.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the energy efficient glazing and doors at location, the installer shall undertake a pre-installation buiding inspection in accordance, as a minimum, with the requirements set out in **B3-I2** of **Table B3.**

B3.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of energy efficient glazing and doors, the installer shall employ or contract only an inspector meeting the competence requirements of **B3-I3** of **Table B3**.

B3.4 Operative competence

When installing energy efficient glazing and doors, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B3-I4** of **Table B3**), with competence currency specified in **B3-I5** of **Table B3** at the competency ratio specified in **B3-I6** of **Table B3**.

B3.5 Provision of information in respect of energy efficient glazing and doors

At the time of handover of the energy efficient glazing and doors to the customer, the installer shall ensure that the information identified at **B3-I7** of **Table B3** is provided to the customer as part of the handover process required in **5.8**.

Table B.3 – Measure-specific requirements for energy efficient glazing and doors (BFM.3)

Measure description		Energy Efficient Glazing and Doors including replacement insulating glass units (IGU)
Measure type		As measure description (no sub-division)
B3-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 7)**	Where relevant to the work to be undertaken, installers shall take account of the guidance and information provided by **BS 8213-4,** *Code of practice for the survey and installation of windows and external door sets* or *A good practice guide: Installation of replacement windows and doors; and the guidance provided by GGF.* **BS 6262-2,** *Glazing for buildings- Part 2:Code of practice for energy light and sound* **BS 6262-3,** *Glazing for buildings- Part 3:Code of practice for fire security and wind loading* **BS 6262-4,** *Glazing for buildings- Part 4:Code of practice for safety related to human impact* **BS 6262-6,** *Glazing for buildings- Part 6:Code of practice for special applications* **BS 6262-7,** *Glazing for buildings- Part 7:Code of practice for the provision of information* **BS 8000-7** *Workmanship on building sites- Part 7:code of practice for glazing* ***NOTE*** *Attention is drawn to the need for all energy efficient glazing and doors work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation; conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.* ***NOTE*** *For IGU replacements only safety glazing requirements are applicable*

Table B.3 – *continued*

B3-I2	**Pre-installation building inspection requirements**	1 As a minimum the pre-installation building inspection shall include: • review of contract; • measurement check, include fire egress*; • assessment of structure*; • check for asbestos*; • safety glazing requirements; • requirements relating to fire-resistant glazing; • ventilation requirements • check render and decorations condition* • user access requirements (e.g. disabled access); • specialist access equipment; • explanation to building owner. ***NOTE*** *Not applicable to IGU replacement.* 2 The pre-installation building inspection shall investigate and assess if the installation to be undertaken will result in non-compliance with the Building Regulations, e.g. in relation to workmanship, materials, structural stability, fire safety, resistance to moisture.

Table B.3 – *continued*

		Competence required	Route(s) to competence
B3-I3	**Pre-installation building inspector competence requirements**	Competence in relation to pre-installation building inspection requirements listed in **B3-I2** of **Table B3** in accordance with CMTC Annex *Fenestration surveying (Windows and Doors*	**England and Wales** To include the following route options 1) Achievement of the relevant Level 3 NVQ qualification/ qualification units **and** evidence of work carried out that demonstrates practical competence; 2) Completion of other independently verified aligned assessment **and** certification and evidence of work carried out that demonstrates practical competence; 3) QCF/SCQF qualification/ qualification units in Fenestration Installation & Surveying awarded within 5 years of date of application for certification **and** assessment for knowledge of and compliance with, current Building Regulations **and** completion of any independently verified, aligned assessment upgrade in NVQ qualification units **and** evidence of work carried out that demonstrates practical competence. 4) Surveyor MTC Card in Fenestration Installation & Surveying, awarded within three years of date of application for certification **and** assessment for knowledge of compliance with current Building Regulations **and** completion of any independently verified, aligned assessment upgrade in NVQ qualification units and evidence of work carried out that demonstrates practical competence. 5) Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex for which assessment of competence has been aligned with this Annex, and at location inspection of work Alignment of courses shall be on the basis of mapping to the relevant Qualification units and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible..* **Scotland** 1) Achievement of the relevant NVQ qualification/ qualification units **and** evidence of work carried out that demonstrates practical competence; 2) Completion of other aligned training and certification and evidence of work carried out that demonstrates practical competence 3) QCF/ SCQF qualification/ qualification units in Fenestration Installation & Surveying awarded within 5 years of date of application for certification **and** assessment for knowledge of and compliance with, current Building Regulations **and** evidence of work carried out that demonstrates practical competence.

Table B.3 – *continued*

			Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
B3-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Competence in accordance with CMTC Annex *Fenestration installation (Windows and Doors)*	**England and Wales** 1) Achievement of the relevant Level 2 NVQ qualification/ qualification units **and** evidence of work carried out that demonstrates practical competence;
			2) Completion of other independently verified, aligned training **and** certification and evidence of work carried out that demonstrates practical competence.
			3) QCF/SCQF qualification/ qualification units in Fenestration Installation & Surveying awarded within 5 years of date of application for certification **and** assessment for knowledge of and compliance with, current Building Regulations **and** completion of any independently verified, aligned assessment upgrade
			4) Installer MTC Card in Fenestration Installation & Surveying, awarded within three years of date of application for certification **and** assessment for knowledge of compliance with current Building Regulations **and** completion of any independently verified, aligned assessment upgrade in NVQ qualification units and evidence of work carried out that demonstrates practical competence.
			5) Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex for which assessment of competence has been aligned with this Annex, and at location inspection of work
			Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*

Table B.3 – *continued*

			Scotland 1) Achievement of the relevant NVQ qualification/ qualification units and evidence of work carried out that demonstrates practical competence; 2) Completion of other independently verified, aligned training and certification **and** evidence of work carried out that demonstrates practical competence. 3) QCF/ SCQF qualification/ qualification units in Fenestration Installation & Surveying awarded within 5 years of date of application for certification **and** assessment for knowledge of and compliance with, current Building Regulations **and** completion of any independently verified, aligned assessment upgrade in NVQ qualification units **and** evidence of work carried out that demonstrates practical competence. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
	Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
		Competence as specified for threshold operatives with no additional requirements.	As identified for threshold operatives.
B3-I5	**Current competency**	The installer entity shall demonstrate at no greater than 12-monthly intervals to a certification body competence in accordance with **B3-I3** and **B3-I4** of **Table B3** of their operatives by sample at location inspection.	
B3-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.	
B3-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days). • Relevant operating, maintenance, safety and security documentation relevant to the installation. • Any relevant product warranty information and guarantees.	

B4 Measure BFM.4 – External wall insulation

B4.1 Additional installation requirements

When installing external wall insulation, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B4-l1** of **Table B4.**

B4.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the external wall insulation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B4-l2** of **Table B4.**

B4.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of external wall insulation, the installer shall employ or contract only an inspector meeting the competence requirements of **B4-l3** of **Table B4**.

B4.4 Operative competence

When installing external wall insulation, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B4-l4** of **Table B4**), with competence currency specified in **B4-l5** of **Table B4,** at the competency ratio specified in **B4-l6** of **Table B4.**

B4.5 Provision of information in respect of external wall insulation

At the time of handover of the external wall insulation to the customer, the installer shall ensure that the information identified at **B4-l7** of **Table B4** is provided to the customer as part of the handover process required in **5.8**.

Table B.4 – Measure-specific requirements for external wall insulation (BFM.4)

Measure description		External Wall Insulation
Measure type		BFM.4.1 Site rendered external wall insulation systems
		BFM.4.2 Pre-finished external wall insulation systems
B4-l1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The installer shall ensure that the methods used for the installation of external wall insulation (EWI) products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, and incorporated in the installation method statement (**5.1**). In undertaking the installation, the installers responsibilities shall include: a) Before installation starts, confirming that the EEM specification has made provision for ensuring that: • the EWI system provided for installation is that recommended by the pre design building survey and specified by the EEM design source; • all essential ventilation openings that require sleeving or safeguarding before installation are located and identified; • the position of all flues whether or not they are in service is determined and the measures that must be taken to safeguard their proper functioning is determined; • any existing cables, pipework, ducting etc that require it are removed or repositioned as/where necessary to accommodate the planned EWI system, with authorization from the relevant responsible body (where required) and undertaken by a person competent to undertake such work. • other areas of the building and surrounding area that could be at risk during installation are adequately protected to ensure they are not damaged. and in the event that any of these aspects is not adequately covered, liaising with the design source to provide for their undertaking. b) During installation, ensuring that: • All work is carried out in accordance with the site specific EEM specification, drawings and method statement and that work is not permitted to progress unless copies of the site specific specification documentation are accessible at location and all operatives are aware of the content and requirements relevant to their designated activities.

Table B.4 – *continued*

	• The system and all detailed interfaces with other parts of the building or other planned EEM's to be undertaken in a manner and sequenced such, that all measures are fully effective, with optimised performance and junctions that are safe, durable and fully weatherproof for all expected exposure conditions. E.g. interface between EWI system and planned replacement windows. • whether or not specifically required by the EEM specification, the items listed in i to vii below are given particular attention with regard to the efficacy and durability of the detail especially concerning the management and exclusion of moisture and/or the risk of surface/ interstitial condensation or rising damp. Mastic sealants shall always be supported by a secondary seal and all details shall be fully weatherproof i. System base detail (including below dpc) ii. Window/door reveals/heads iii. System/cill interfaces (incl. overhang requirements/weepholes/thermal movement) iv. Surface fixtures (structurally sound) v. Penetrations through the system vi. Interfaces with roof soffits, flat roofs, conservatory roofs etc vii. Detailing and sealing around vents/flues, meters and other heating related structures/pipework. • All weatherseals at the interface between EWI systems and other structures/finishes are installed with particular attention given to the soundness/cleanliness of contact surfaces, continuity and effectiveness around corners, bond to surfaces and the durability of the water seal. • All details are installed to minimise the risks of cold bridging, removing/relocating/extending to allow continuity of insulation in all cases where feasible e.g. rooflines, meter boxes, pipework, flues, ducts. • Photographic evidence of key stages of the installation is prepared and retained, including close up photographs of representative examples of all moisture and thermally sensitive details. • Installations are undertaken in accordance with the *specification for the installation of external wall insulation ensuring the safety and operation of fuel burning appliances,* taking account of the recommendations provided in the document *External wall insulation thermal bridging detailing* (see **9.9.1**). • Ventilation of the building is no worse following the installation of the measure than prior to the installation of the measure This may require additional ventilation. (see also **A.5**) • Upon completion of the installation or at the end of each working day, if the installation takes longer than one day, the Operatives investigate and confirm the proper functioning of all ventilation openings and flues. ***NOTE 1*** *The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier may be necessary before an application for assessment/certification is made to a certification body.* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all external wall insulation installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non domestic Technical Handbook.*

B4-I2	**Measure specific pre-installation building inspection requirements supplementary to those in the core of this PAS (Clause 6.2)**	1. In meeting the requirements specified in Clause **6.2** of this PAS, the designated competent person shall confirm that: a) a full and detailed pre-design building survey had been undertaken by a competent person (see **B7-I3** of this Table), prior to the EEM design being undertaken; b) the EEM design relevant to the installation under inspection has been produced in accordance with Clause **4** of this PAS taking full account of the findings and recommendations of the pre-design building survey, including: • thermal performance calculations, • condensation risk analysis • ventilation requirements and standard/bespoke drawing details • the main components of the system including the fixing type/method, the insulation type and thickness, the reinforcing coat and type of reinforcement and the finish; • the proposed details for the main interfaces; (thermal bridging, meter boxes, reveals, roofline joists, party walls, base detail with particular reference to below dpc, base/floor details, seals at windows/doors, seals to penetrations, light fittings, sockets, fixing and sealing of surface mounted structures, interfaces with ceilings, interfaces with roof, junctions between the system and other finishes and/or other EEM) clearly demonstrate how the installation will avoid condensation risk particularly at moisture sensitive locations such as timber joist ends and within the wall structure (interstitial/surface condensation). • the installation to the EEM specification is practical and achievable given the particular EWI system chosen for the project and the specific building construction, site conditions and other EEM's planned for the property. (See also Measures interaction matrix Figures **A1** and **A2**). 2. As a minimum the pre-installation building inspection shall investigate and assess if the EWI installation work will: • result in non-compliance with the Building Regulations, e.g. in relation to workmanship, materials, structural stability, fire safety; • provide resistance to moisture. Where possible, any areas of non-compliance shall be rectified by selection of another solution/detail, which shall be documented in the pre-installation building inspection and all contract documentation amended accordingly i.e. specification, drawings, method statement; • result in avoidable thermal bridging; where thermal bridging is avoidable by adaptation of the detail, such measures shall be taken and the contract documents amended to suit. Design details shall be such they incorporate additional capacity, that for example, will provide water management within the system should surface or interstitial condensation occur; • result in unsafe operation of combustion appliances; unless an alternative safe detail can be found, EWI works shall not progress in the area causing the unsafe operation; • compromise the functionality of existing ventilation ducts/systems; unless an alternative safe detail can be found, EWI works shall not progress in the area causing the unsafe operation; • compromise the functionality and/or safety of existing services (gas, electric, water, telephone, etc.); unless an alternative safe detail can be found, EWI works shall not progress in the area causing the unsafe operation; • result in the proposed installation being non-compliant with any requirements of the EEM supplier or of the design source. 3. The pre-installation building inspection shall include confirmation that the condition of the substrate is suitable for the works to commence and where all or any of the substrate does not fulfil the requirements for installation, preparation of proposals for adaptations to be made or additional preparation undertaken that will be necessary in order that works can commence. 4. All instances of potential non-compliance identified in the pre-installation building inspection shall be documented and referred to the design source for resolution. Any design adjustments, special adaptations and/or additional preparation requirements shall be confirmed as acceptable in writing, by the system supplier and/or design source. 5. The EEM design documentation shall be amended to include any specified changes to the installation, the installation method statement modified accordingly and the pre-installation building inspection records updated to provide documentary evidence that the intended modified installation will address all the issues identified in the pre-installation building inspection and meets the requirements of all parties. ***NOTE 1*** *In undertaking pre-installation building inspections it is recommended that installers consider using an industry recommended checklist e.g. the External Wall Insulation pre-installation building inspection checklist (see **9.9.1**).* ***NOTE 2*** *PAS 2031* ***Certification of energy efficiency measure (EEM) in existing buildings*** *now includes provision for certification bodies to check installer compliance with pre-installation building requirements, as part of the required installation evaluation inspections.*

B4-I3	**Pre-installation building inspector competence requirements**	**Competence Required**	**Route to competence**
		The requirements (including knowledge of the building type and construction concerned) as defined in Common Minimum Technical Competence Annex EWI 1 – Determine the Suitability of a Building for External Wall Insulation Work and, where relevant, any specific competence requirements specified by the EEM supplier.	**England and Wales** As defined within Common Minimum Technical Competence Annex EWI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units. and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) demonstrable knowledge and experience in relation to the competence in Annex EWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work; and evidence of product or system supplier surveyor approval, where relevant. **Scotland** As defined within Common Minimum Technical Competence Annex EWI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units. and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) demonstrable knowledge and experience in relation to the competence in Annex EWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work; and evidence of product or system supplier approval, where relevant.

Table B.4 – *continued*

B4-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification unit that covers the competence requirements in COSVR461.
			Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work.
	Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
		The knowledge requirements (including knowledge of the building type and construction concerned) as defined in the following Common Minimum Technical Competence Annexes where applicable to the scope of work undertaken: Annex EWI 2 – Installation of External Wall Insulation Work. Annex EWI 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR448 – *Install external wall insulation*	**England and Wales** As defined within Common Minimum Technical Competence Annexes EWI 2 and EWI 3 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;
			Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;

Table B.4 – *continued*

		Annex EWI 3 – Applying Surface Finishes to External Wall Insulation. Annex EWI 3 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR449 – *Apply surface finishes to external wall insulation*. In addition, where relevant, specific training and/or competence requirements specified by the supplier	4) demonstrable knowledge and experience in relation to the competence in Annexes EWI 2 and EWI 3 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work; and evidence of product or system supplier approval, where relevant. **Scotland** As defined within Common Minimum Technical Competence Annexes EWI 2 and EWI 3 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) demonstrable knowledge and experience in relation to the competence in Annexes EWI 2 and EWI 3 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work; and evidence of product or system supplier approval, where relevant.
B4-I5	**Current competency**	To be verified by the installer, in accordance with **B4-I4** of **Table B4** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B4-I4** of **Table B4**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *Initial and on-going office and at location surveillance will be undertaken as specified in PAS 2031* ***Certification of energy efficiency measure (EEM) in existing buildings****.*	
B4-I6	**Competence ratio**	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, as specified in **B4-I4 (specialist)** of **Table B4**. For one off buildings, the Supervisor for each installation may be mobile (i.e. covering more than one building) but shall visit each building at least once a day. For each installation location, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken at the specified installation location; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. but shall not be less than one carded operative per team of 4 (1 to 3), at the specified installation location at any time.	

Table B.4 – *continued*

B4-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• As a minimum the user manual shall include details on fixing to the system, drilling or cutting the system, repairs to damaged areas, avoiding damage (e.g. ladders), cleaning recommendations, importance of weather seals, name/contact details of both the installer and system certificate holder, materials specification (name, colours etc) and guidance on living in a highly insulated property, including the need for appropriate ventilation. The contents of the manual should be explained to the customer (not just left with them) • Where end-user maintenance possible, details of how to undertake the maintenance including frequency and any product or tools that must be used and where to obtain the required products and tools. • Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days). • It should be explained to the customer that repairs should be carried out by a competent person, but that maintenance is their responsibility. • Any relevant product warranty information and guarantees.

B5 Measure BFM.5 Flat roof insulation

B5.1 Additional installation requirements

When installing flat roof insulation, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B5-I1** of **Table B5.**

B5.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the flat roof insulation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B5-I2** of **Table B5**

B5.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of flat roof insulation, the installer shall employ or contract only an inspector meeting the competence requirements of **B5-I3** of **Table B5**.

B5.4 Operative competence

When installing flat roof insulation, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B5-I4** of **Table B5**), with competence currency specified in **B5-I5** of **Table B5** at the competency ratio specified in **B5-I6** of **Table B5**.

B5.5 Provision of information in respect of flat roof insulation

At the time of handover of the flat roof insulation to the customer, the installer shall ensure that the information identified at **B5-I7** of **Table B5** is provided to the customer as part of the handover process required in **5.8**.

Table B.5 – Measure-specific requirements for flat roof insulation (BFM.5)

Measure description		Flat Roof Insulation
Measure type		As measure description (no sub-divisions)
B5-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The installer shall ensure that the methods used for the installation of flat roof insulation products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, and incorporated in the installation method statement (**5.1**). The installer responsibilities include preparation of the site and finishing work incorporating: • identification of essential ventilation openings that require sleeving or safeguarding before installation; • the position of all flues whether or not they are in service and measures that must be taken to safeguard their proper functioning and to prevent combustion of all newly installed adjacent materials; • ensuring that upon completion of the installation or at the end of each working day, if the installation takes longer than one day, the operatives investigate and confirm the proper functioning of all ventilation openings and flues. ***NOTE 1*** *The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier of the insulation and where applicable the waterproofing products may be necessary before an application for assessment/certification is made to a certification body.* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all flat roof insulation installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7: Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.*

Table B.5 – *continued*

B5-I2	**Pre-installation building inspection requirements**	As a minimum the pre-installation building inspection shall investigate and determine as far as practicable:
		• pre-existing damage to the areas that will be accessed by the installation operatives;
		• the extent of the area and elements to be insulated;
		• if relevant checks have been undertaken to determine if asbestos-containing materials are present;
		• if the condition of the roof is suitable for the works to commence in relation to:
		  • existence of appropriate roof internal ventilation arrangements;
		  • the roof build up being free from rodents/pests and protected species, e.g. bats;
		  • timbers free from rot and/or infestation;
		  • the condition of the ceiling (if applicable);
		  • metal structural roof members being free from visible signs of corrosion;
		  • electrical wiring is free from visible defects, e.g. damaged cables, trailing cables, exposed conductors;
		  • no visible signs of water penetration;
		  • no visible signs of leakage from water system components, e.g. pipework;
		• If the proposed installation would:
		  • be non-compliant with any requirements stated by the designer/ specifier;
		  • compromise the functionality of existing air supply/extract ventilation ducts/systems;
		  • result in unsafe operation of a combustion appliances;
		• if the site layout or conditions will impair the execution of the works in relation to appropriate access to the property and to the elements to be insulated.
		• If the installation to be undertaken will result in non-compliance with the Building Regulations, e.g. in relation to workmanship; materials; structural stability; fire safety; resistance to moisture;

Table B.5 – *continued*

B5-I3	**Building inspector competence requirements**	**Competence required**	**Route(s) to competence**
		The requirements as defined in Common Minimum Technical Competence Annex INS 1 – Determine the Suitability of a Building for Roof, Loft or Floor Insulation Work.	**England and Wales** As defined within Common Minimum Technical Competence Annex INS 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
			4) demonstrable knowledge and experience in relation to the competence in Annex INS 1 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
			Scotland As defined within Common Minimum Technical Competence Annex INS 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) demonstrable knowledge and experience in relation to the competence in Annex INS 1 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.

Table B.5 – *continued*

B5-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR 641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification unit that covers the competence requirements in COSVR 641.
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
	Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
		The requirements as defined in Common Minimum Technical Competence Annex INS 2 – Installation of Insulation to Framed Sections of Buildings and Internal Walls. Annex INS 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR645 – *Install insulation to framed sections of buildings*.	**England and Wales** As defined within Common Minimum Technical Competence Annexes INS 2 to include the following route options: 1) achievement of the relevant QCF/SCQF/FRQ & QIW qualifications/qualification unit and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*

Table B.5 – *continued*

		3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
		4) demonstrable knowledge and experience in relation to the competence in Annex INS 2 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
		Scotland As defined within Common Minimum Technical Competence Annexes INS 2 to include the following route options: 1) achievement of the relevant QCF/SCQF/FRQ & QIW qualifications/qualification unit and at location inspection of work;
		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) demonstrable knowledge and experience in relation to the competence in Annex INS 2 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
B5-I5	**Current competency**	To be verified by the installer, in accordance with **B5-I4** of **Table B5** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B5-I4** of **Table B5,** including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *Initial and ongoing office and at location surveillance to be carried out by UKAS accredited inspection bodies to ensure the requirements of the designer/supplier are met with regard to regulatory compliance. Inspection frequency shall be at least 1% of all site work undertaken* ***NOTE 2*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*

Table B.5 – *continued*

B5-l6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.
B5-l7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days). • Any relevant product warranty information and guarantees.

B6 Measure BFM.6 Floor insulation

B6.1 Additional installation requirements

When installing floor insulation, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B6-I1** of **Table B6**.

B6.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the floor insulation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B6-I2** of **Table B6**.

B6.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of floor insulation, the installer shall employ or contract only an inspector meeting the competence requirements of **B6-I3** of **Table B6**.

B6.4 Operative competence

When installing floor insulation, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B6.I4** of **Table B6**), with competence currency specified in **B6-I5** of **Table B6** at the competency ratio specified in **B6-I6** of **Table B6.**

B6.5 Provision of information in respect of floor insulation

At the time of handover of the floor insulation to the customer, the installer shall ensure that the information identified at **B6-I7** of **Table B6** is provided to the customer as part of the handover process required in **5.8**.

Table B.6 – Measure-specific requirements for floor insulation (BFM.6)

Measure description		Floor Insulation
Measure type		As measure description (no sub-division)
B6-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The installer shall ensure that the methods used for the installation of floor insulation products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, and incorporated in the installation method statement (**5.1**). ***NOTE 1*** *The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier may be necessary before an application for assessment/certification is made to a certification body.* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all floor insulation installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, compliance in relation to the following aspects is highlighted:fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.*

Table B.6 – continued

B6-I2	**Pre-installation building inspection requirements**	As a minimum the pre-installation building inspection shall investigate and determine as far as practicable:
		• pre-existing damage to the areas that will be accessed by the installation operatives;
		• the extent of the area and elements to be insulated;
		• if relevant checks have been undertaken to determine if asbestos-containing materials are present;
		• if the condition of the floor structure and the sub- floor void is suitable for the works to commence in relation to:
		  • existence of appropriate floor void ventilation arrangements;
		  • the under floor area being free from rodents/pests;
		  • timbers free from rot and/or infestation;
		  • metal structural floor support members being free from visible signs of corrosion;
		  • electrical wiring is free from visible defects, e.g. damaged cables, trailing cables, exposed conductors;
		  • no visible signs of water penetration or water accumulation in the under-floor area;
		  • no visible signs of leakage from water system components, e.g. pipework;
		• if the proposed installation would:
		  • be non-compliant with any requirements stated by the designer/specifier;
		  • compromise the functionality of existing air supply/extract ventilation ducts/systems;
		  • result in unsafe operation of a combustion appliances (floor vents, etc.);
		• if the site layout or conditions will impair the execution of the works in relation to:
		  • appropriate access to the property and to the floor to be insulated;
		  • the room being free from stored items, floor coverings, etc.
		• If the installation to be undertaken will result in non-compliance with the Building Regulations, e.g. in relation to workmanship; materials; structural stability; fire safety; resistance to moisture;

Table B.6 – continued

		Competence required	Route(s) to competence
B6-I3	**Inspector competence requirements**	The requirements as defined in Common Minimum Technical Competence Annex IWI 1 – Determine the Suitability of a Building for Internal Wall Insulation Work.	**England and Wales** As defined within Common Minimum Technical Competence Annex IWI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work. 4) demonstrable knowledge in relation to the competence in Annex IWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work. **Scotland** As defined within Common Minimum Technical Competence Annex IWI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) demonstrable knowledge and experience in relation to the competence in Annex IWI 1 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.

Table B.6 – continued

B6-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR 641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification unit that covers the competence requirements in COSVR 641.
			2) Completion of other aligned training and certification and at location inspection of work Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
	Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
		The requirements as defined in Common Minimum Technical Competence Annex INS 2 – Installation of Insulation to Framed Sections of Buildings and Internal Walls. Annex INS 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR 645 – *Install insulation to framed sections of buildings*.	**England and Wales** As defined within Common Minimum Technical Competence Annexes INS 2 to include the following route options: 1) achievement of the relevant QCF/SCQF/FRQ & QIW qualification/qualification unit and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*

Table B.6 – continued

		3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
		4) demonstrable knowledge and experience in relation to the competence in Annex INS 2 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
		Scotland As defined within Common Minimum Technical Competence Annexes INS 2 to include the following route options: 1) achievement of the relevant QCF/SCQF/FRQ & QIW qualification/qualification unit and at location inspection of work;
		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) demonstrable knowledge and experience in relation to the competence in Annex INS 2 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
B6-I5	**Current competency**	To be verified by the installer, in accordance with **B6-I4** of **Table B6** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B6-I4** of **Table B6,** including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*

Table B.6 – continued

B6-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.
B6-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days) • Any relevant product warranty information and guarantees.

B7 Measure BFM 7 Hybrid wall insulation

B7.1 Additional installation requirements

When installing hybrid wall insulation, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B7-I1** of **Table B7**.

B7.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the hybrid wall insulation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B7-I2** of **Table B7**

B7.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of hybrid wall insulation, the installer shall employ or contract only an inspector meeting the competence requirements of **B7-I3** of **Table B7**.

B7.4 Operative competence

When installing hybrid wall insulation, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B7-I4** of **Table B7**), with competence currency specified in **B7-I5** of **Table B7** at the competency ratio specified in **B7-I6** in **Table B7**.

B7.5 Provision of information in respect of hybrid wall insulation

At the time of handover of hybrid wall insulation to the customer, the installer shall ensure that the information identified at **B7-I7** of **Table B7** is provided to the customer as part of the handover process required in **5.8**.

Table B.7 – Measure-specific requirements for hybrid wall insulation (BFM.7)

Measure description		Hybrid Wall Insulation
Measure type		As measure description (no sub-division)
B7-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The installer shall ensure that the methods used for the installation of hybrid wall insulation (HWI) products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, and incorporated in the installation method statement (**5.1**). In undertaking the installation, the installers responsibilities shall include: a) Before installation starts, confirming that the EEM specification has made provision for ensuring that: • the HWI system provided for installation is that recommended in the pre-design building survey and specified by the EEM design source • all essential ventilation openings that require sleeving or safeguarding before installation are located and identified; • the position of all flues whether or not they are in service is determined and the measures that must be taken to safeguard their proper functioning is determined; • any existing cables, pipework, ducting etc that require it are removed or repositioned as/where necessary to accommodate the planned EWI system, with authorization from the relevant responsible body (where required) and undertaken by a person competent to undertake such work. • other areas of the building and surrounding area that could be at risk during installation are adequately protected to ensure they are not damaged. • and in the event that any of these aspects is not adequately covered, liaising with the design source to provide for their undertaking.

Table B.7 – *continued*

	b) During installation, ensuring that: • All work is carried out in accordance with the site specific EEM specification, drawings and method statement and that work is not permitted to progress unless copies of the site specific specification documentation are accessible at location and all operatives are aware of the content and requirements relevant to their designated activities. • The system and all detailed interfaces with other parts of the building or other planned EEM's to be undertaken in a manner and sequenced such, that all measures are fully effective, with optimised performance and junctions that are safe, durable and fully weatherproof for all expected exposure conditions. E.g. interface between EWI/IWI system and planned replacement windows. • whether or not specifically required by the EEM specification, the items listed in **i** to **vii** below are given particular attention with regard to the efficacy and durability of the detail especially concerning the management and exclusion of moisture and/or the risk of surface/interstitial condensation or rising damp. Mastic sealants shall always be supported by a secondary seal and all details shall be fully weatherproof I. System base detail (including below dpc) II. Window/door reveals/heads III. System/cill interfaces (incl. overhang requirements/weepholes/thermal movement) IV. Surface fixtures (structurally sound) V. Penetrations through the system VI. Interfaces with roof soffits, flat roofs, conservatory roofs etc VII. Detailing and sealing around vents/flues, meters and other heating related structures/pipework. • All weatherseals at the interface between HWI systems and other structures/finishes are installed with particular attention given to the soundness/cleanliness of contact surfaces, continuity and effectiveness around corners, bond to surfaces and the durability of the water seal. • All details are installed to minimise the risks of cold bridging, removing/relocating/extending to allow continuity of insulation in all cases where feasible e.g. rooflines, meter boxes, pipework, flues, ducts. • Photographic evidence of key stages of the installation is prepared and retained, including close up photographs of representative examples of all moisture and thermally sensitive details. • All installations are in accordance with industry good practice. Where conflict with the requirements of this PAS exists, this PAS takes precedence. • Ventilation of the building is no worse following the installation of the measure than prior to the installation of the measure (This may require additional ventilation see also **A.5**).

Table B.7 – *continued*

		• Upon completion of the installation or at the end of each working day, if the installation takes longer than one day, the Operatives investigate and confirm the proper functioning of all ventilation openings and flues. ***NOTE 1*** *The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier may be necessary before an application for assessment/certification is made to a certification body.* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all hybrid wall insulation installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.*
B7-I2	**Measure specific pre-installation building inspection requirements supplementary to those in the c ore of this PAS (Clause 6.2)**	1. In meeting the requirements specified in Clause **6.2** of this PAS, the designated competent person shall confirm that: a) a full and detailed pre-design building survey had been undertaken by a competent person (see **B7-I3** of this Table), prior to the EEM design being undertaken,. b) the EEM design relevant to the installation under inspection has been produced in accordance with Clause **4** of this PAS taking full account of the findings and recommendations of the pre-design building survey, including: • thermal performance calculations, • condensation risk analysis • ventilation requirements and standard/bespoke drawing details • the main components of the system including the fixing type/method, the insulation type and thickness, the reinforcing coat and type of reinforcement and the finish; • the proposed details for the main interfaces; (thermal bridging, meter boxes, reveals, roofline joists, party walls, base detail with particular reference to below dpc, base/floor details, seals at windows/doors, seals to penetrations, light fittings, sockets, fixing and sealing of surface mounted structures, interfaces with ceilings, interfaces with roof, junctions between the system and other finishes and/or other EEM) clearly demonstrate how the installation will avoid condensation risk particularly at moisture sensitive locations such as timber joist ends and within the wall structure (interstitial/surface condensation). • the installation to the EEM specification is practical and achievable given the particular HWI system chosen for the project and the specific building construction, site conditions and other EEM's planned for the property. (See also Measures interaction matrix Figures **A1** and **A2**). 2. As a minimum the pre-installation building inspection shall investigate and assess if the HWI installation work will: • result in non-compliance with the Building Regulations, e.g. in relation to workmanship, materials, structural stability, fire safety; • provide resistance to moisture. Where possible, any areas of non-compliance shall be rectified by selection of another solution/detail, which shall be documented in the pre-installation building inspection and all contract documentation amended accordingly i.e. specification, drawings, method statement;

Table B.7 – *continued*

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result in avoidable thermal bridging; where thermal bridging is avoidable by adaptation of the detail, such measures shall be taken and the contract documents amended to suit. Design details shall be such they incorporate additional capacity, that for example, will provide water management within the system should surface or interstitial condensation occur;
result in unsafe operation of combustion appliances; unless an alternative safe detail can be found, HWI works shall not progress in the area causing the unsafe operation;
compromise the functionality of existing ventilation ducts/systems; unless an alternative safe detail can be found, HWI works shall not progress in the area causing the unsafe operation;
compromise the functionality and/or safety of existing services (gas, electric, water, telephone, etc.); unless an alternative safe detail can be found, HWI works shall not progress in the area causing the unsafe operation;
result in the proposed installation being non-compliant with any requirements of the EEM supplier or of the design source.

3. The pre-installation building inspection shall include confirmation that the condition of the substrate is suitable for the works to commence and where all or any of the substrate does not fulfil the requirements for installation, preparation of proposals for adaptations to be made or additional preparation undertaken that will be necessary in order that works can commence.
4. All instances of potential non-compliance identified in the pre-installation building inspection shall be documented and referred to the design source for resolution. Any design adjustments, special adaptations and/or additional preparation requirements shall be confirmed as acceptable in writing, by the system supplier and/or design source.
5. The EEM design documentation shall be amended to include any specified changes to the installation, the installation method statement modified accordingly and the pre-installation building inspection records updated to provide documentary evidence that the intended modified installation will address all the issues identified in the pre-installation building inspection and meets the requirements of all parties.
NOTE *PAS 2031* ***Certification of energy efficiency measure (EEM) in existing buildings*** *now includes provision for certification bodies to check installer compliance with pre-installation building inspection requirements, as part of the required installation evaluation inspections.*</td></tr>
<tr><td>B7-I3</td><td>Building Inspector competence requirements</td><td>Competence Required</td><td>Route to competence</td></tr>
<tr><td colspan="2"></td><td rowspan="4">The requirements (including knowledge of the building type and construction concerned) as defined in Common Minimum Technical Competence Annex IWI 1 – Determine the Suitability of a Building for Hybrid Wall Insulation Work and, where relevant, any specific competence requirements specified by the EEM supplier</td><td>England and Wales
As defined within Common Minimum Technical Competence Annexes IWI 1 and EWI 1 to include the following route options:
1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;</td></tr>
<tr><td colspan="2"></td><td>2) Completion of other aligned training and certification and at location inspection of work.
Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery.
NOTE *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*</td></tr>
<tr><td colspan="2"></td><td>3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;</td></tr>
</table>

Table B.7 – *continued*

		4) demonstrable knowledge and experience in relation to the competence in Annexes IWI 1 and EWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work;
		and evidence of product or system supplier surveyor approval, where relevant.
		Scotland As defined within Common Minimum Technical Competence Annexes IWI 1 and EWI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units. and at location inspection of work;
		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) demonstrable knowledge and experience in relation to the competence in Annexes IWI 1 and EWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work;
		and evidence of product or system supplier approval, where relevant.

Table B.7 – *continued*

B7-l4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification unit that covers the competence requirements in COSVR461.
			Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work.
	Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
		The knowledge requirements (including knowledge of the building type and construction concerned) as defined in the following Common Minimum Technical Competence Annexes where applicable to the scope of work undertaken: Annex EWI 2 – Installation of External Wall Insulation Work. Annex EWI 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR448 – *Install external wall insulation.*	**England and Wales** As defined within Common Minimum Technical Competence Annexes INS 2, EWI 2 and EWI 3 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;
			Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
			4) demonstrable knowledge and experience in relation to the competence in Annexes INS 2, EWI 2 and EWI 3 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work;

Table B.7 – *continued*

		Annex EWI 3 – Applying Surface Finishes to External Wall Insulation. Annex EWI 3 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR449 – *Apply surface finishes to external wall insulation*. In addition, where relevant, specific training and/ or competence requirements specified by the supplier	and evidence of product or system supplier approval, where relevant. **Scotland** As defined within Common Minimum Technical Competence Annexes INS 2, EWI 2 and EWI 3 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) demonstrable knowledge and experience in relation to the competence in Annexes INS 2, EWI 2 and EWI 3 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work; and evidence of product or system supplier approval, where relevant.
B7-I5	**Current competency**	To be verified by the installer, in accordance with **B7-I4** of **Table B7** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B7-I4** of **Table B7**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *Initial and on-going office and at location surveillance will be undertaken as specified in PAS 2031* ***Certification of energy efficiency measure (EEM) in existing buildings****.*	
B7-I6	**Competence ratio**	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, as specified in **B7-I4 (specialist)** of **Table B7**. For one off buildings, the Supervisor for each installation may be mobile (i.e. covering more than one building) but shall visit each building at least once a day. For each installation location, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: b) range, scale, geographical spread and complexity of the work being undertaken at the specified installation location; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. but shall not be less than one carded operative per team of 4 (1 to 3), at the specified installation location at any time.	

Table B.7 – *continued*

B7-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• As a minimum the user manual shall include details on fixing to the system, drilling or cutting the system, repairs to damaged areas, avoiding damage (e.g. ladders), cleaning recommendations, importance of weather seals, name/contact details of both the installer and system certificate holder, materials specification (name, colours etc) and guidance on living in a highly insulated property, including the need for appropriate ventilation. The contents of the manual should be explained to the customer (not just left with them) • Where end-user maintenance possible, details of how to undertake the maintenance including frequency and any product or tools that must be used and where to obtain the required products and tools • Any relevant product warranty information and guarantees.. • Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days). • It should be explained to the customer that repairs should be carried out by a competent person, but that maintenance is their responsibility.

B8 Measure BFM.8 Internal wall insulation

B8.1 Additional installation requirements

When installing internal wall insulation, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B8-I1** of **Table B8.**

B8.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the internal wall insulation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B8-I2** of **Table B8**

B8.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of internal wall insulation, the installer shall employ or contract only an inspector meeting the competence requirements of **B8-I3** of **Table B8**.

B8.4 Operative competence

When installing internal wall insulation, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B8-I4** of **Table B8**) with the competence currency specified in **B8-I5** of **Table B8**, at the competency ratio specified in **B8-I6** of **Table B8**.

B8.5 Provision of information in respect of internal wall insulation

At the time of handover of the internal wall insulation to the customer, the installer shall ensure that the information identified at **B8-I7** of **Table B8** is provided to the customer as part of the handover process required in **5.8**.

Table B.8 – Measure-specific requirements for internal wall insulation (BFM.8)

Measure description		Internal Wall Insulation
Measure type		As measure description (no sub-division)
B8-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The installer shall ensure that the methods used for the installation of internal wall insulation (IWI) products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM design, and incorporated in the installation method statement (**5.1**). In undertaking the installation, the installers responsibilities shall include: a) Before installation starts, confirming that the EEM specification has made provision for ensuring that: • the IWI system provided for installation is that recommended in the pre-design building survey and specified by the EEM design source • all essential ventilation openings that require sleeving or safeguarding before installation are located and identified; • the position of all flues whether or not they are in service is determined and the measures that must be taken to safeguard their proper functioning is determined; • any existing cables, pipework, ducting etc that require it are removed or repositioned as/where necessary to accommodate the planned IWI system, with authorization from the relevant responsible body (where required) and undertaken by a person competent to undertake such work. • other areas of the building and surrounding area that could be at risk during installation are adequately protected to ensure they are not damaged. and in the event that any of these aspects is not adequately covered, liaising with the design source to provide for their undertaking.

Table B.8 – *continued*

b) During installation, ensuring that:

- All work is carried out in accordance with the site specific EEM specification, drawings and method statement and that work is not permitted to progress unless copies of the site specific specification documentation are accessible at location and all operatives are aware of the content and requirements relevant to their designated activities.
- The system and all detailed interfaces with other parts of the building or other planned EEM's to be undertaken in a manner and sequenced such, that all measures are fully effective, with optimised performance and junctions that are safe and durable for all expected conditions. Particular attention shall be given to the need to control moisture and prevent the risk of surface or interstitial condensation.
- whether or not specifically required by the EEM specification, the items listed in **i** to **vi** below are given particular attention with regard to the efficacy and durability of the detail especially concerning the management and exclusion of moisture and/or the risk of surface/ interstitial condensation or rising damp. System floor detail
  - i. Window/door reveals/heads
  - ii. System/cill interfaces
  - iii. Surface fixtures (structurally sound)
  - iv. Penetrations through the system
  - v. Interfaces with ceilings
  - vi. Detailing and sealing around vents/flues, meters and other heating related structures/pipework.
- All details are installed to minimise the risks of cold bridging, removing/relocating/extending to allow continuity of insulation in all cases where feasible e.g. pipework, flues, ducts, switches, sockets, radiators etc.
- Photographic evidence of key stages of the installation is prepared and retained, including close up photographs of representative examples of all moisture and thermally sensitive details.
- All installations are in accordance with industry best practice. Where conflict with the requirements of this PAS exists, this PAS takes precedence.
- Ventilation of the building is no worse following the installation of the measure than prior to the installation of the measure (This may require additional ventilation see also **A.5**)
- Upon completion of the installation or at the end of each working day, if the installation takes longer than one day, the Operatives investigate and confirm the proper functioning of all ventilation openings and flues.

NOTE 1 *The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier may be necessary before an application for assessment/certification is made to a certification body.*

NOTE 2 *Attention is drawn to the need, where relevant, for all internal wall insulation installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.*

Table B.8 – *continued*

B8-I2	**Measure specific pre-installation building inspection requirements supplementary to those in the core of this PAS (Clause 6.2)**	1. In meeting the requirements specified in Clause **6.2** of this PAS, the designated competent person shall confirm that: a) a full and detailed pre-design building survey had been undertaken by a competent person (see **B7-I3** of this Table), prior to the EEM design being undertaken,. b) the EEM design relevant to the installation under inspection has been produced in accordance with Clause **4** of this PAS taking full account of the findings and recommendations of the pre-design building survey, including: • thermal performance calculations, • condensation risk analysis; • ventilation requirements and standard/bespoke drawing details • the main components of the system including the fixing type/method, the insulation type and thickness, the reinforcing coat and type of reinforcement and the finish; • the proposed details for the main interfaces; (thermal bridging, meter boxes, reveals, roofline joists, party walls, base detail with particular reference to below dpc, base/floor details, seals at windows/doors, seals to penetrations, light fittings, sockets, fixing and sealing of surface mounted structures, interfaces with ceilings, interfaces with roof, junctions between the system and other finishes and/or other EEM) clearly demonstrate how the installation will avoid condensation risk particularly at moisture sensitive locations such as timber joist ends and within the wall structure (interstitial/surface condensation). • the installation to the EEM specification is practical and achievable given the particular IWI system chosen for the project and the specific building construction, site conditions and other EEM's planned for the property. (See also Measures interaction matrix Figures **A1** and **A2**). 2. As a minimum the pre-installation building inspection shall investigate and assess if the IWI installation work will: • result in non-compliance with the Building Regulations, e.g. in relation to workmanship, materials, structural stability, fire safety; • provide resistance to moisture. Where possible, any areas of non-compliance shall be rectified by selection of another solution/ detail, which shall be documented in the pre-installation building inspection and all contract documentation amended accordingly i.e. specification, drawings, method statement; • result in avoidable thermal bridging; where thermal bridging is avoidable by adaptation of the detail, such measures shall be taken and the contract documents amended to suit. Design details shall be such they incorporate additional capacity, that for example, will provide water management within the system should surface or interstitial condensation occur; • result in unsafe operation of combustion appliances; unless an alternative safe detail can be found, IWI works shall not progress in the area causing the unsafe operation; • compromise the functionality of existing ventilation ducts/systems; unless an alternative safe detail can be found, IWI works shall not progress in the area causing the unsafe operation; • compromise the functionality and/or safety of existing services (gas, electric, water, telephone, etc.); unless an alternative safe detail can be found, IWI works shall not progress in the area causing the unsafe operation; • result in the proposed installation being non-compliant with any requirements of the EEM supplier or of the design source.

Table B.8 – *continued*

		3. The pre-installation building inspection shall include confirmation that the condition of the substrate is suitable for the works to commence and where all or any of the substrate does not fulfil the requirements for installation, preparation of proposals for adaptations to be made or additional preparation undertaken that will be necessary in order that works can commence. 4. All instances of potential non-compliance identified in the pre-installation building inspection shall be documented and referred to the design source for resolution. Any design adjustments, special adaptations and/or additional preparation requirements shall be confirmed as acceptable in writing, by the system supplier and/or design source. 5. The EEM design documentation shall be amended to include any specified changes to the installation, the installation method statement modified accordingly and the pre-installation building inspection records updated to provide documentary evidence that the intended modified installation will address all the issues identified in the pre-installation building inspection and meets the requirements of all parties. ***NOTE*** *PAS 2031* ***Certification of energy efficiency measure (EEM) in existing buildings*** *now includes provision for certification bodies to check installer compliance with pre-installation building inspection requirements, as part of the required installation evaluation inspections.*	
B8-I3	**Building inspector competence requirements**	**Competence Required**	**Route to competence**
		The requirements (including knowledge of the building type and construction concerned) as defined in Common Minimum Technical Competence Annex IWI 1 – Determine the Suitability of a Building for Internal Wall Insulation Work and, where relevant, any specific competence requirements specified by the EEM supplier	**England and Wales** As defined within Common Minimum Technical Competence Annex IWI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units. and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) demonstrable knowledge and experience in relation to the competence in Annex IWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work;

Table B.8 – *continued*

			and evidence of product or system supplier surveyor approval, where relevant.
			Scotland As defined within Common Minimum Technical Competence Annex IWI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units. and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) demonstrable knowledge and experience in relation to the competence in Annex IWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work;
			and evidence of product or system supplier approval, where relevant.
B8-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification unit that covers the competence requirements in COSVR461.
			Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work.

Table B.8 – *continued*

	Competence required	Route(s) to competence
Operative specialist competence requirements	The requirements as defined in Common Minimum Technical Competence Annex INS 2 – Installation of Insulation to Framed Sections of Buildings and Internal Walls. Annex INS 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR 644 – *Install internal insulation to walls, floors or ceilings* and if involving timber framed construction COSR 645 *Install insulation to framed sections of buildings.*	**England and Wales** As defined within Common Minimum Technical Competence Annexes INS 2 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work; Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) demonstrable knowledge and experience in relation to the competence in Annexes INS 2 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work; and evidence of product or system supplier approval, where relevant. **Scotland** As defined within Common Minimum Technical Competence Annexes INS 2 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) demonstrable knowledge and experience in relation to the competence in Annexes EWI 2 and EWI 3 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work; and evidence of product or system supplier approval, where relevant.

Table B.8 – *continued*

B8-I5	**Current competency**	To be verified by the installer, in accordance with **B8-I4** of **Table B8** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B8-I4** of **Table B8**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *Initial and ongoing office and at location surveillance will be undertaken as specified in PAS 2031* ***Certification of energy efficiency measure (EEM) in existing buildings***
B8-I6	**Competence ratio**	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, as specified in **B8-I4 (specialist)** of **Table B8**. For one off buildings, the Supervisor for each installation may be mobile (i.e. covering more than one building) but shall visit each building at least once a day. For each installation location, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: c) range, scale, geographical spread and complexity of the work being undertaken at the specified installation location; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. but shall not be less than one carded operative per team of 4 (1 to 3), at the specified installation location at any time.
B8-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• As a minimum the user manual shall include details on fixing to the system, drilling or cutting the system, repairs to damaged areas, avoiding damage, cleaning recommendations, name/contact details of both the installer and system certificate holder, materials specification (name, colours etc) and guidance on living in a highly insulated property, including the need for appropriate ventilation. The contents of the manual should be explained to the customer (not just left with them) • Where end-user maintenance possible, details of how to undertake the maintenance including frequency and any product or tools that must be used and where to obtain the required products and tools. • Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days). • It shall be explained to the customer that repairs should be carried out by a competent person, but that maintenance is their responsibility. • Any relevant product warranty information and guarantees.

B9 Measure BFM.9 Loft insulation

B9.1 Additional installation requirements

When installing loft insulation, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B9-I1** of **Table B9**.

B9.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the loft insulation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B9-I2** of **Table B9**

B9.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of loft insulation, the installer shall employ or contract only an inspector meeting the competence requirements of **B9-I3** of **Table B9**

B9.4 Operative competence

When installing loft insulation, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B9-I4** of **Table B9**), with competence currency specified in **B9-I5** of **Table B9** at the competency ratio specified in **B9-I6** of **Table B9**.

B9.5 Provision of information in respect of loft insulation

At the time of handover of the loft insulation to the customer, the installer shall ensure that the information identified at **B9-I7** of **Table B9** is provided to the customer as part of the handover process required in **5.8**.

Table B.9 – Measure specific requirements for loft insulation (BFM.9)

Measure description		Loft Insulation	
Measure type		BFM.9.1	Roll insulation
		BFM.9.2	Blown insulation
B9-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The installer shall ensure that the methods used for the installation of loft insulation products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, and incorporated in the installation method statement (**5.1**). Where relevant to the type of installation being undertaken, the requirements or guidance given in *General requirements and guidance for the installation of cold roof loft insulation (see **9.9.2**)* shall be taken into account. The installer responsibilities include preparation of the site and finishing work, incorporating: • identification of essential ventilation openings; • ensuring that upon completion of the installation or at the end of each working day, if the installation takes longer than one day, the operatives investigate and confirm the proper functioning of all ventilation openings. ***NOTE 1*** *The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier may be necessary before an application for assessment/certification is made to a certification body.* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all loft insulation installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-Domestic Technical Handbook.*	

Table B.9 – *continued*

B9-I2	**Pre-installation building inspection requirements**	As a minimum the pre-installation building inspection shall investigate and determine as far as practicable:
		• pre-existing damage to the areas that will be accessed by the installation operatives;
		• the extent of the area and elements to be insulated;
		• if relevant checks have been undertaken to determine if asbestos containing materials are present;
		• if the condition of the roof space is suitable for the works to commence in relation to:
		  • existence of appropriate roof space ventilation arrangements;
		  • the roof space being free from rodents/pests and protected species, e.g. bats;
		  • timbers free from rot and/or infestation;
		  • the condition of the ceiling;
		  • metal structural roof members being free from visible signs of corrosion;
		  • electrical wiring is free from visible defects, e.g. damaged cables, trailing cables, exposed conductors;
		  • no visible signs of water penetration;
		  • no visible signs of leakage from water system components, e.g. pipework, cisterns, tanks, etc.
		• If the proposed installation would:
		  • be non-compliant with any requirements stated by the designer/specifier;
		  • compromise the functionality of existing air supply/extract ventilation ducts/systems;
		  • result in unsafe operation of a combustion appliances.
		• If the site layout or conditions will impair the execution of the works in relation to:
		  • appropriate access to the property and to the roof space;
		  • the roof space being free from stored items, boarding etc.
		• If the installation to be undertaken will result in non-compliance with the Building Regulations, e.g. in relation to workmanship; materials; structural stability; fire safety; resistance to moisture;

Table B.9 – *continued*

		Competence required	Route(s) to competence
B9-I3	**Inspector competence requirements**	The requirements as defined in Common Minimum Technical Competence Annex INS 1 – Determine the Suitability of a Building for Roof, Loft or Floor Insulation Work.	**England, Wales and Scotland** As defined within Common Minimum Technical Competence Annex INS 1 to include the following route options: 1) relevant QCF/ FRQ & QIW qualifications/qualification units and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) demonstrable knowledge and experience in relation to the competence in Annex INS 1 gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.
B9-I4	**Operative threshold competence requirements**	Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR 641– *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF qualification unit F/600/7138 that covers the competence requirements in COSVR 641. 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.

Table B.9 – *continued*

		Competence required	Route(s) to competence
	Operative specialist competence requirements	The requirements as defined in Common Minimum Technical Competence Annex LFT 1 – Installation of Loft Insulation. Annex LFT 1 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR451 – *Install loft insulation*.	**England, Wales and Scotland** As defined within Common Minimum Technical Competence Annexes LFT 1 to include the following route options: 1) achievement of the relevant QCF qualifications/qualification unit J/600/8145 and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) demonstrable knowledge and experience in relation to the competence in Annex LFT 1 gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.
B9-I5	**Current competency**	To be verified by the installer, in accordance with **B9-I4** of **Table B9** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety critical or technical critical revisions are made to the competency requirements in **B9-I4** of **Table B9**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. Installers shall maintain a register of all trained specialist operative loft insulation fitters in their employment ***NOTE*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*	
B9-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.	

Table B.9 – *continued*

B9-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• Building Regulations compliance certificate where appropriate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days). • Any relevant product warranty information and guarantees.

B10 Measure BFM.10 Pitched roof insulation

B10.1 Additional installation requirements

When installing pitched roof insulation, in addition to meeting the core requirements set out in Clauses **4** to **8**, of this PAS the installer shall also work to any standards, specifications, instructions or guidance identified in **B10-I1** of **Table B10**.

B10.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the pitched roof insulation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B10-I2** of **Table B10**

B10.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of pitched roof insulation, the installer shall employ or contract only an inspector meeting the competence requirements of **B10-I3** of **Table B10**.

B10.4 Operative competence

When installing pitched roof insulation, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B10-I4** of **Table B10**), with competence currency specified in **B10-I5** of **Table B10** at the competency ratio specified in **B10-I6** of **Table B10**.

B10.5 Provision of information in respect of pitched roof insulation

At the time of handover of the pitched roof insulation to the customer, the installer shall ensure that the information identified at **B10-I7** of **Table B10** is provided to the customer as part of the handover process required in **5.8**.

Table B.10 – Measure-specific requirements for pitched roof insulation (BFM.10)

Measure description		Pitched Roof Insulation
Measure type		As measure description (no sub-division)
B10-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The installer shall ensure that the methods used for the installation of pitched roof insulation products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, and incorporated in the installation method statement (**5.1**). The installer responsibilities include preparation of the site and finishing work incorporating: • identification of essential ventilation openings; • ensuring that upon completion of the installation or at the end of each working day, if the installation takes longer than one day, the operatives investigate and confirm the proper functioning of all ventilation openings. ***NOTE 1*** *The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier may be necessary before an application for assessment/certification is made to a certification body.* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all pitched roof insulation installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.* ***NOTE 3*** *Where third party accreditation exists to support it, non-vented roofs may be acceptable when using certain air and/or vapour permeable underlays.*

Table B.10 – *continued*

<table>
<tr><td>B10-I2</td><td>Pre-installation building inspection requirements</td><td colspan="2">As a minimum the pre-installation building inspection shall investigate and determine as far as practicable:
• pre-existing damage to the areas that will be accessed by the installation operatives;
• the extent of the area and elements to be insulated;
• if relevant checks have been undertaken to determine if asbestos-containing materials are present;
• if the condition of the roof space is suitable for the works to commence in relation to:
  • existence of appropriate roof space ventilation arrangements where required (NOTE 3 to B10-I1);
  • the roof space being free from rodents/pests and protected species, e.g. bats;
  • timbers being free from rot and/or infestation;
  • metal structural roof members being free from visible signs of corrosion;
  • electrical wiring is free from visible defects, e.g. damaged cables, trailing cables, exposed conductors;
  • no visible signs of water penetration;
  • no visible signs of leakage from water system components, e.g. pipework, cisterns, tanks, etc.;
• if the proposed installation would:
  • be non-compliant with any requirements stated by the designer/specifier;
  • compromise the functionality of existing air supply/extract ventilation ducts/systems;
  • result in unsafe operation of a combustion appliances;
• if the site layout or conditions will impair the execution of the works in relation to:
  • appropriate access to the property and to the roof space;
  • the roof space being free from stored items, boarding, etc.
• If the installation to be undertaken will result in non-compliance with the Building Regulations, e.g. in relation to workmanship; materials; structural stability; fire safety; resistance to moisture;</td></tr>
<tr><td>B10-I3</td><td>Inspector competence requirements</td><td>Competence required</td><td>Route(s) to competence</td></tr>
<tr><td></td><td></td><td rowspan="2">The requirements as defined in Common Minimum Technical Competence Annex INS 1 – Determine the Suitability of a Building for Roof, Loft or Floor Insulation Work.</td><td>England and Wales
As defined within Common Minimum Technical Competence Annex INS 1 to include the following route options:
1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;</td></tr>
<tr><td></td><td></td><td>2) Completion of other aligned training and certification and at location inspection of work.
Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery;
NOTE Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.</td></tr>
</table>

Table B.10 – *continued*

			3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
			4) demonstrable knowledge and experience in relation to the competence in Annex INS 1 gained through industry experience and verified by a UKAS accredited certification body at location inspection of work.
			Scotland As defined within Common Minimum Technical Competence Annex INS 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) demonstrable knowledge and experience in relation to the competence in Annex INS 1 gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.
B10-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR 641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF/SCQF qualification unit that covers the competence requirements in COSVR 641.
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.

Table B.10 – *continued*

	Competence required	Route(s) to competence
Operative specialist competence requirements	The requirements as defined in Common Minimum Technical Competence Annex INS 2 – Installation of Insulation to Framed Sections of Buildings and Internal Walls. Annex INS 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR645 – *Install insulation to framed sections of buildings*.	**England and Wales** As defined within Common Minimum Technical Competence Annexes INS 2 to include the following route options: 1) achievement of the relevant QCF/SCQF qualifications/qualification unit and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) demonstrable knowledge and experience in relation to the competence in Annex INS 2 gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work. **Scotland** As defined within Common Minimum Technical Competence Annex INS 1 to include the following route options: 1) achievement of the relevant QCF/SCQF qualifications/qualification unit and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) demonstrable knowledge and experience in relation to the competence in Annex INS 2 gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.

Table B.10 – *continued*

B10-I5	**Current competency**	To be verified by the installer, in accordance with **B10-I4** of **Table B10** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B10-I4** of **Table B10**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *Initial and ongoing office and at location surveillance to be carried out by UKAS accredited inspection bodies to ensure the requirements of the designer/supplier are met with regard to regulatory compliance. Inspection frequency shall be at least 1% of all site work undertaken.* ***NOTE 2*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*
B10-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.
B10-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days). • Any relevant product warranty information and guarantees.

B11 Measure BFM.11:Solar Blinds, Shutters and Shading Devices (internal and external)

B11.1 Additional installation requirements

When installing solar blinds, shutters or shading devices, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B11-l1** of **Table B11**.

B11.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the solar blinds, shutters or shading devices at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B11-l2** of **Table B11**

B11.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of solar blinds, shutters or shading devices, the installer shall employ or contract only an inspector meeting the competence requirements of **B11-l3** of **Table B11**.

B11.4 Operative competence

When installing solar blinds, shutters or shading devices, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B11-l.4** of **Table B11**), with competence currency specified in **B11-l5** of **Table B11** at the competency ratio specified in **B11-l6** of **Table B11**.

B11.5 Provision of information in respect of solar blinds, shutters and shading devices

At the time of handover of solar blinds, shutters or shading devices to the customer, the installer shall ensure that the information identified at **B11-l7** of **Table B11** is provided to the customer as part of the handover process required in **5.8.**

Table B.11 – Solar Blinds, Shutters and Shading Devices (BFM.11)

Measure description		Solar Blinds, Shutters and Shading Devices (Internal and External)
Measure type	BFM11.1	Solar Blinds, Shutters and Shading Devices for internal or external use, mechanical or manually operated
	BFM11.2	Solar Blinds, Shutters and Shading Devices for internal or external use, electrically operated
B11-l1 **Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**		The installer shall ensure that the methods used for the installation of solar blinds, shutters or shading devices products or systems are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, and incorporated in the installation method statement (**5.1**). a) BS EN 13120:*Internal blinds – Performance requirements including safety.* b) BS EN 13561:*External blinds – Performance requirements including safety* c) BS EN 13659:*Shutters – Performance requirements including safety.* ***NOTE 1*** *Attention is drawn to the need, where relevant, for all electrically operated solar blind, shutter and shading devices installation work to comply with the current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671).* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all solar blind, shutter and shading devices installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: workmanship; materials; structural stability; fire safety; and conservation of fuel and power and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7: Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.*

Table B.11 – *continued*

B11-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and determine if: • the condition of the building fabric is satisfactory in relation to the proposed work; • the customer has been provided with the guidance to low energy shading; • the energy saving calculations of the installation are conducted in accordance with EN shading performance standards and are correct for the site dimensions and the glazing installed; • any required planning or listed building related consents have been obtained; • the installation work will result in non-compliance with the building regulations in relation to workmanship; materials; structural stability and fire safety. • the proposed installation will be compliant with any requirements stated by the manufacturer; • the site layout or conditions will impair the execution of the works; • the proposed installation will not compromise or impede the operation of the fenestration; • specialist access equipment is required; • child safety measures are required for internal window coverings; • relevant checks have been undertaken to determine if asbestos containing materials are present. the installation to be undertaken will result in non-compliance with the Building Regulations, e.g. in relation to workmanship; materials; structural stability; fire safety; resistance to moisture;	
B11-I3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		The competence required under **BII-I4** of **Table B11**	As defined under **BII-I4** of **Table B11**

Table B.11 – *continued*

		Competence required	Route(s) to competence
B11-I4	**Operative threshold competence requirements**	Where applicable to the scope of work to be undertaken, the competencies specified in the Common Minimum Technical Competence Annex BSS 1* are required, together with any product related competence requirements specified by the product manufacturer/ supplier.	**England and Wales** 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification units defined in the Common Minimum Technical competence Annexes referred to in the adjacent column
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) member of a Competent Person Scheme, meeting the minimum technical competencies for the sector and at location inspection of work.
			4) demonstrable knowledge and experience in relation to the competence in Common Minimum Technical Competence Annex BSS 1 gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.
			Scotland 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification units defined in the Common Minimum Technical competence Annex referred to in the adjacent column.
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) demonstrable knowledge and experience in relation to the competence in Common Minimum Technical Competence Annex BSS 1 gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.

Table B.11 – *continued*

		Competence required	Route(s) to competence
	Operative specialist competence requirements	For all electrical work associated with the installation of electrically powered solar blind, shutter and shading devices, competence as follows: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	For domestic work 1) To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2) To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3) To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1) To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2) To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3) To be registered with a certification body that is UKAS accredited (to BS EN ISO/IEC 17065:2012) 4) To issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*
B11-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **B11-I4** in Table **B11** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B11-I4** in **Table B11**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*	

Table B.11 – *continued*

B11-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

B11-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Relevant operating, maintenance, safety and security documentation relevant to the installation
		NOTE *See also*
		BS EN 13120:Internal blinds – Performance requirements including safety.
		BS EN 13561:External blinds – Performance requirements including safety c) BS EN 13659:2004 Shutters – Performance requirements including safety.
		• Product warranty information and guarantees.
		• Product manufacturer installation and servicing instructions.
		• Electrical certification, if relevant.
		• Child safety information, if relevant.
		• Maintenance and cleaning recommendations (if any).
		• Guidance to Low Energy Shading.
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance of the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• *Demonstration of:*
		  • Product operation especially with relevance to best practice for energy saving
		  • Child safety components, if relevant
		  • What to do in the case of an emergency or perceived emergency.

B12 Measure-specific requirements for BFM.12:Room in roof insulation

B12.1 Additional installation requirements

When installing insulation to a room constructed in the roof space of an existing building. in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **B12-I1** of **Table B12.**

B12.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of room-in-roof insulation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **B12-I2** of **Table B12.**

B12.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of room-in-roof insulation the installer shall employ or contract only an inspector meeting the competence requirements of **B12-I3** of **Table B12**.

B12.4 Operative competence

When installing room-in-roof insulation the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**B12-I4** of **Table B12**), with competence currency specified in **B12-I5** of **Table B12** at the competency ratio specified in **B12-I6** of **Table B12**.

B12.5 Provision of information in respect of room-in-roof insulation

At the time of handover of installed room-in-roof insulation to the customer, the installer shall ensure that the information identified at **B12-I7** of **Table B12** is provided to the customer as part of the handover process required in **5.8.**

Table B.12 – Room-in-roof insulation (BFM12)

Measure description		Room in Roof Insulation (RIRI)
Measure type		As measure description (no sub-division)
B12-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The installer shall ensure that the methods used for the installation of insulation products or systems in a room in roof, are as specified by the system supplier (where provided) and in accordance with the relevant EEM specification, as incorporated in the installation method statement (**5.1**). In undertaking the installation, installers shall comply with all requirements set out in **I1** of the measure specific annexes of this PAS that are relevant to the insulation types to be installed. It is recommended that installers take account of the guidance provided in *A guide to retrofit room-in-roof insulation* (see **9.9.3**).
B12-I2	**Measure specific pre-installation building inspection requirements supplementary to those in the core of this PAS (Clause 6.2)**	Installers shall ensure that the pre-installation building inspection of a room in roof prior to the installation of insulation, is undertaken in accordance with all requirements set out in I2 of the measure specific annexes of this PAS that are relevant to the insulation types to be installed and in addition that a) the ventilation to spaces within the roof void and not included in the Room-in-Roof space, are checked and assessed to ensure that adequate ventilation is provided and maintained (see **A.5**); and b) there is no requirement for thermal bridging to be addressed at the ridge or other connections with the main structure (**A.6**) ***NOTE 1*** *In undertaking pre-installation building inspections it is recommended that installers consider using an industry recommended checklist e.g. the Room-in-Roof insulation pre-installation building inspection checklist (see **9.9.3**).* ***NOTE 2*** *It is expected that the EEM design will provide detailed instruction for addressing both a) and b). Where the pre-installation building inspection identifies ventilation or thermal bridging issues that are perceived not to have been adequately provided for, the installer is required to refer these to the design source (**4.2.4** and **4.2.5**).*

Table B.12 – *continued*

		Competence Required	Route to competence
B12-I3	**Pre-installation inspector competence requirements**	The requirements (including knowledge of the building type and construction concerned) as defined in Common Minimum Technical Competence Annex IWI 1 – *Determine the Suitability of a Building for Hybrid Wall Insulation Work* **and** Common Minimum Technical Competence Annex INS 1 *Determine the Suitability of a Building for Roof Loft or Floor Insulation Work*, **and** where relevant, any specific competence requirements specified by the suppliers of insulation types to be installed	**England and Wales** As defined within Common Minimum Technical Competence Annexes INS 1, IWI 1 and EWI 1 to include the following route options: 1) relevant RQF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work relevant to the insulation types to be included under the scope of this Annex and at location inspection of work; 4) demonstrable knowledge and experience in relation to the competence in Annexes INS 1, IWI 1 and EWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work; and evidence of product or system supplier surveyor approval, where relevant and available. **Scotland** As defined within Common Minimum Technical Competence Annexes INS 1, IWI 1 and EWI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units. and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) demonstrable knowledge and experience in relation to the competence in Annexes INS 1, IWI 1 and EWI 1 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work; and evidence of product or system supplier approval, where relevant and available.

Table B.12 – *continued*

		Competence Required	Route to competence
B12-l4	**Operative threshold competence requirements**	Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification unit that covers the competence requirements in COSVR461.
			Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work.

Table B.12 – *continued*

	Competence Required	Route to competence
Operative specialist competence requirements	The knowledge requirements (including knowledge of the building type and construction concerned) as defined in the following Common Minimum Technical Competence Annexes where applicable to the scope of work undertaken: Annex EWI 2 – Installation of External Wall Insulation Work. Annex EWI 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR448 – *Install external wall insulation* Annex EWI 3 – Applying Surface Finishes to External Wall Insulation. Annex EWI 3 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR449 – *Apply surface finishes to external wall insulation*. Annex INS 2 – Install Insulation to Framed Sections of Buildings In addition, where relevant, specific training and/or competence requirements specified by the suppliers of insulation types to be installed	**England and Wales** As defined within Common Minimum Technical Competence Annexes INS 2, EWI 2 and EWI 3 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work; Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work relevant to the insulation types to be included under the scope of this Annex and at location inspection of work; 4) demonstrable knowledge and experience in relation to the competence in Annexes INS 2, EWI 2 and EWI 3 gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work; and evidence of product or system supplier approval, where relevant. **Scotland** As defined within Common Minimum Technical Competence Annexes INS 2, EWI 2 and EWI 3 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*

Table B.12 – *continued*

		3) demonstrable knowledge and experience in relation to the competence in Annexes INS 2, EWI 2 and EWI 3 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work; and
		evidence of product or system supplier approval, where relevant.
B12-l5	**Current competency**	To be verified by the installer, in accordance with **B12-l4** of **Table B12** at no greater than 12-monthly intervals through examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **B12-l4** of **Table B12**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *Initial and ongoing office and at location surveillance will be undertaken as specified in PAS 2031* ***Certification of energy efficiency measure (EEM) in existing buildings****.*
B12-l6	**Competence ratio**	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, as specified in **B12-l4 (specialist)** of **Table B12**. For one off buildings, the Supervisor for each installation may be mobile (i.e. covering more than one building) but shall visit each building at least once a day. For each installation location, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: d) range, scale, geographical spread and complexity of the work being undertaken at the specified installation location; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. but shall not be less than one specialist operative (carded) operative per team of 4 (1 to 3), at the specified installation location at any time.
B12-l7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• Installers shall ensure that the information provided to the customer at handover of an insulated room in roof is in accordance with all requirements set out in l7 of the measure specific annexes of this PAS that are relevant to the EEM installation types that have been installed including that related to any relevant product warranty information and guarantees.

Annex C (normative)
BSM energy efficiency measures (normative)

C1 Measure BSM.1 Chillers

C1.1 Additional installation requirements

When installing a chiller unit, in addition to meeting the core requirements set out in Clauses **5** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C1-I1** of **Table C1**.

C1.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the chiller unit at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C1-I2** of **Table C1.**

C1.3 inspector competence

When undertaking a pre-installation building inspection in respect of the installation of a chiller unit, the installer shall employ or contract only an inspector meeting the competence requirements of **C1-I3** of **Table C1**.

C1.4 Operative competence

When installing a chiller unit, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C1-I4** of **Table C1**), at the competency ratio specified in **C1-I6** of **Table C1**.

C1.5 Provision of information in respect of chiller units

At the time of handover of a chiller unit to the client/customer, the installer shall ensure that the information identified at **C1-I7** of **Table C1** is provided to the client/customer as part of the handover process required in **5.8.**

Table C.1 – Measure-specific requirements for chiller units (BSM.1)

Measure description		Chillers (non-domestic)
Measure type		As measure description (no subdivision)
C1-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The requirements or guidance given in product manufacturer's instructions. Where applicable BS EN 378-3:Refrigerating systems and heat pumps. Safety and environmental requirements. Installation location and personal protection. ***NOTES*** *Attention is drawn to the need, where relevant, for all chiller unit installation work to comply with:* 1. *the current F gas Regulations that apply in all EU countries or locality in which the installation is being carried out. The Regulations have requirements relating to businesses and persons who install, service or maintain systems that contain or are designed to contain refrigerant gases. The Regulations set both the technical standards for the Business and the qualifications and supervision of persons carrying out work;* 2. *the current Building Regulations are those that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation, hot water safety, combustion appliances, conservation of fuel and power and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7: Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-Domestic Technical Handbook;* 3. *the current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671).*
C1-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and determine if: • the condition of the building fabric is satisfactory in relation to the proposed work; • Condition of the existing electrical installation is satisfactory in relation to the proposed work; • the installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation; heat producing appliances, conservation of fuel and power; • the proposed installation will be compliant with any requirements stated by the equipment manufacturers; • The Asbestos register for the building has been reviewed and relevant checks have been undertaken to determine if any asbestos containing materials are present in the areas where work is to be carried out.
C1-I3	**Inspector competence requirements**	**Competence required**: As defined under **C1-I4** of **Table C1.** **Route(s) to competence**: As defined under **C1-I4** of **Table C1.**

Table C.1 – *continued*

		Competence required	Route(s) to competence
C1-I4	**Operative threshold competence requirements**	Where applicable to the scope of work undertaken the competences in the following Common Minimum Technical Competence Annexes are required: 2A – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Domestic); 2B – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Non-domestic); 2C – Minimum Competency for Common Processes (Compressed Gas Welded Pipework Installation); 2D – Minimum Competency for Common Processes (Manual Arc Welded Pipework Installation); 6A – Backflow Prevention (Plumbing and Heating Systems); 16A – Air conditioning installation The relevant National Occupational Standards for Mechanical Engineering Services apply (see **9.8.2**): ***NOTE*** *The Gas Safety (Installation and Use) Regulations (see **C2-I1** of **Table C.2**) include requirements relating to qualification and supervision of persons carrying out gas work. These requirements are not repeated here; however, installers are reminded of the legal obligation to meet the requirements.*	**England and Wales** 1) Achievement of the relevant RQF/SCQF/FRQ & QIW qualifications/ qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column. 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) Member of a Competent Person Scheme, meeting the minimum technical competencies for the sector and at location inspection of work; 4) Demonstrable knowledge and experience in relation to the competence specified in the SummitSkills National Occupational Standards for Mechanical Engineering Services referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.

Table C.1 – *continued*

		Scotland 1) A current SNIJIB Registration card at Plumber, Advanced or Technician Plumber or Gasfitter, Advanced or Technician Gasfitter grade or be eligible to hold such a card and hold a current Water Byelaws/Regulations qualification.
		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.
		4) To be registered with a certification body that is UKAS accredited (to BS EN 17065) to issue certification for non-domestic electrical work.

Table C.1 – *continued*

	Competence required	Route(s) to competence
Operative specialist competence requirements	All chiller unit installation related electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to BS EN 17065) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. 3) To be registered with a certification body that is UKAS accredited (to BS EN 17065) to issue certification for non-domestic electrical work ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*

Table C.1 – *continued*

C1-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **C1-I4** in **Table C1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C1-I4** in **Table C1**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*
C1-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

C1-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Product manufacturer installation and servicing instructions.
		• Product manufacturer user manuals/guides.
		• Product warranty information and guarantees.
		• Revisions to the building health and safety file.
		• Revisions to the building log book
		• A commissioning certificate that meets the requirements of the Building Regulations.
		• A user guide that meets the requirements of the Building Regulations.
		• Installer details (if not included in the commissioning certificate), e.g. mechanical, electrical.
		• Evidence that the installation has been notified to Building Control.
		• A copy of any electrical inspection and testing certificates that have completed to meet the requirements the current version of BS 7671 (IET Wiring Regulations).
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• Demonstration of:
		  • how to set user controls for maximum efficiency;
		  • any safety checks that the system user should undertake;
		  • what to do in the case of an emergency or perceived emergency.

C2 Measure BSM.2 Condensing boilers, natural gas-fired and liquefied petroleum gas-fired (domestic and non-domestic)

C2.1 Additional installation requirements

When installing a gas-fired condensing boiler, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C2-I1** of **Table C2.**

C2.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the gas-fired condensing boiler at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C2-I2** of **Table C2**

C2.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of a gas-fired condensing boiler, the installer shall employ or contract only an inspector meeting the competence requirements of **C2-I3** of **Table C2**.

C2.4 Operative competence

When installing a gas-fired condensing boiler, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C2-I4** of **Table C2**), at the competency ratio specified in **C2-I6** of **Table C2**.

C2.5 Provision of information in respect of gas-fired condensing boilers

At the time of handover of a gas-fired condensing boiler to the customer, the installer shall ensure that the information identified at **C2-I7** of **Table C2** is provided to the customer as part of the handover process required in **5.8.**

Table C.2 – Measure-specific requirements for gas-fired condensing boilers (BSM.2)

Measure description		Condensing Boilers, Natural Gas-fired and Liquefied Petroleum Gas-fired (Domestic and Non-domestic)
Measure type		As measure description (no sub-division)
C2-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The requirements or guidance given in product manufacturer's instructions. Where relevant to the type of installation being undertaken, the requirements or guidance given in: I. BS 6798 *Specification for installation and maintenance of gas-fired boilers of rated input not exceeding 70 kW net*; II. BS 6644, *Specification for installation of gas-fired boilers of rated inputs between70 kW (net) and 1.8 MW (net) (2nd and 3rd family gases)*; III. BS 6891, *Installation of low pressure gas pipework of up to 35 mm (R1 1/4) in domestic premises (2nd family gas). Specification;* IV. BS 5440-1 *Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases) – Part 1: Specification for installation of gas appliances to chimneys and for maintenance of chimneys*. V. BS 5440-2 *Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases) – Part 2: Specification for the installation and maintenance of ventilation provision for gas appliances*; VI. BS 7593 *Code of practice for treatment of water in domestic hot water central heating systems.* VII. IGEM/UP/2, Edition 2, *Installation of pipework on industrial and commercial premises*. VIII. UKLPG, *Code of practice 22, LPG Piping System design and installation*; IX. BS 5482-1, *Code of practice for domestic butane and propane gas burning installations – Part 1: Permanent dwellings.* X. IGEM UP/10, Edition 3, *Installation of flued gas appliances in industrial and commercial premises incorporating specific requirements for appliances fired by bio-fuels*;

Table C.2 – *continued*

		XI. IGEM UP/1, 1A & 1B, *Strength testing, tightness testing and direct purging each standard covers industrial commercial and domestic testing and purging requirements*; XII. Both the domestic and non-domestic Building Services Compliance Guides (published by DCLG). ***NOTES*** *Attention is drawn to the need, where relevant, for all gas-fired condensing boiler installation work to comply with:* *a) the current Gas Safety (Installation and Use) Regulations that apply in the UK country or locality in which the installation is being carried out. The Gas Safety (Installation and Use) Regulations have requirements relating to both technical gas safety standards and qualification and supervision of persons carrying out gas work;* *b) the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, compliance in relation to the following aspects is highlighted:workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation, hot water safety, combustion appliances, conservation of fuel and power and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-Domestic Technical Handbook;* *c) the current Water Supply (Water Fittings) Regulations or Water Byelaws that apply in the UK country in which the installation is being carried out;* *d) the current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671).*
C2-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and determine if: • the condition of the building fabric is satisfactory in relation to the proposed work; • Condition of the existing electrical installation is satisfactory in relation to the proposed work; • the installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; resistance to moisture; heat-producing appliances; conservation of fuel and power; • the installation work will result in non-compliance with relevant gas safety regulations; • the proposed installation will be compliant with any requirements stated by the boiler manufacturer; • the proposed installation may or will result in a plume nuisance situation; • any special condensate disposal arrangements are required; • the building is located in a hard water area (above 200 ppm); • water conditioning arrangements are required in relation to the water hardness; • relevant checks have been undertaken to determine if asbestos containing materials are present.
C2-I3	**Inspector competence requirements**	**Competence required** / **Route(s) to competence** As defined under **C2-I4** of **Table C2**. / As defined under **C2-I4** of **Table C2**.

Table C.2 – *continued*

		Competence required	Route(s) to competence
C2-I4	**Operative threshold competence requirements**	Where applicable to the scope of work undertaken the competences in the following Common Minimum Technical Competence Annexes are required: 2A – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Domestic); 2B – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Non-domestic); 2C – Minimum Competency for Common Processes (Compressed Gas Welded Pipework Installation); 2D – Minimum Competency for Common Processes (Manual Arc Welded Pipework Installation); 6A – Backflow Prevention (Plumbing and Heating Systems); 9A – Hot Water System Installation (Domestic); 9B – Hot Water System Installation (Unvented); 9C – Hot Water System Installation (Non-domestic); 10A – 'Wet' Central Heating Systems Installation (Domestic); 10B – Wet' Central Heating Systems Installation (Under-floor); 10C – 'Wet' Central Heating Systems Installation (Non-domestic); 13A – Energy Efficiency for Domestic Heating and Hot Water; 13B – Energy Efficiency for Non-domestic Heating and Hot Water. Common Minimum Technical Competences Annexes 2A, 2B, 2C, 2D, 6A, 9A, 9B, 9C, 10A, 10B, 10C, 13A and 13B have been derived from, and are cross-referenced to, the relevant National Occupational Standards for Mechanical Engineering Services (see **9.8.2**): ***NOTE*** *As stated under Section A.1 of Table A.1, the Gas Safety (Installation and Use) Regulations have requirements relating to qualification and supervision of persons carrying out gas work. These requirements are not repeated here; however, installers are reminded of the legal obligation to meet the requirements.*	**England and Wales** 1) Achievement of the relevant RQF/ FRQ & QIW qualifications/ qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) Registration with the approved gas safety scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work. **Scotland** For mechanical installation activities to hold or be eligible to hold a current CSCS affiliated advanced or technician registration card as appropriate to the scope of measure BSM.2 and where relevant hold a current Water Byelaws/Regulations qualification, and unvented qualification.

Table C.2 – *continued*

Operative specialist competence requirements	Competence required	Route(s) to competence
	All gas-fired condensing boiler related electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**)	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to BS EN 17065) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/

Table C.2 – *continued*

		Scotland 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. 3) To be registered with a certification body that is UKAS accredited (to BS EN 17065) to issue certification for non-domestic electrical work ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*
C2-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **C2-I4** in **Table C2** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C2-I4** in **Table C2**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.* ***NOTE 2*** *The currency of competency requirements stated above relate only to the competence requirements stated within this Annex and do not relate to or replace the qualification and supervision requirements stated within the Gas Safety (Installation and Use) Regulations.*
C2-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

Table C.2 – *continued*

C2-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Product manufacturer installation and servicing instructions.
		• Product manufacturer user manuals/guides.
		• Product warranty information and guarantees.
		• Benchmark commissioning certificate of other commissioning certificate that meets the requirements of the Building Regulations.
		• System cleaning and water treatment record (if not included in the commissioning certificate).
		• Installer details (if not included in the commissioning certificate), e.g. mechanical, electrical.
		• Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days).
		• A copy of any electrical inspection and testing certificates that have completed to meet the requirements of Building Regulations and/or the current version of BS 7671 (IET Wiring Regulations).
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• Demonstration of:
		  • how to set user controls for maximum efficiency;
		  • any safety checks that the system user should undertake;
		  • what to do in the case of an emergency or perceived emergency.

C3 Measure BSM.3 oil-fired condensing boilers

C3.1 Additional installation requirements

When installing oil-fired condensing boilers, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C3-I1** of **Table C3**.

C3.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the oil-fired condensing boiler at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C3-I2** of **Table C3**.

C3.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of oil-fired condensing boilers, the installer shall employ or contract only an inspector meeting the competence requirements of **C3-I3** of **Table C3**.

C3.4 Operative competence

When installing oil-fired condensing boilers, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C3-I4** of **Table C3**), at the competency ratio specified in **C3-I6** of **Table C3**.

C3.5 Provision of information in respect of oil-fired condensing boilers

At the time of handover of the oil-fired condensing boiler to the customer, the installer shall ensure that the information identified at **C3-I7** of **Table C3** is provided to the customer as part of the handover process required in **5.8**.

Table C.3 – Measure-specific requirements for oil-fired condensing boilers (BSM.3)

Measure description		Condensing Boilers, Oil-fired (Domestic and Non-domestic)
Measure type		Oil-fired Condensing Boilers
C3-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The requirements or guidance given in product manufacturer's instructions. Where relevant to the type of installation being undertaken, the requirements or guidance given in: a) BS 5410-1, *Code of practice for oil firing – Part 1:Installations up to 45 kW output capacity for space heating and hot water supply purposes*; b) BS 5410-2, *Code of practice for oil firing – Part 2:Installations of 45 kW and above output capacity for space heating, hot water and steam supply service*; c) BS 7593, *Code of practice for treatment of water in domestic hot water central heating systems.* ***NOTES*** *Attention is drawn to the need, where relevant, for all oil-firing condensing boiler installation work to comply with:* *a) the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, compliance in relation to the following aspects is highlighted:workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation; hot water safety; combustion appliances; conservation of fuel; and power and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook;* *b) the current Water Supply (Water Fittings) Regulations or Water Byelaws that apply in the UK country in which the installation is being carried out;* *c) the current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671).*

Table C.3 – *continued*

C3-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and determine if: • the condition of the building fabric is satisfactory in relation to the proposed work; • Condition of the existing electrical installation is satisfactory in relation to the proposed work; • the installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; resistance to moisture; heat-producing appliances; conservation of fuel and power; • the installation work will result in non-compliance with relevant safety regulations; • the proposed installation will be compliant with any requirements stated by the boiler manufacturer; • the actual or proposed fuel storage arrangements are compliant with regulatory requirements/recognised industry standards; • the proposed installation may or will result in a plume nuisance situation; • any special condensate disposal arrangements are required; • the building is located in a hard water area (above 200 ppm); • water conditioning arrangements are required in relation to the water hardness; • relevant checks have been undertaken to determine if asbestos containing materials are present.	
C3-I3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As defined under **C3-I4** of **Table C3**.	As defined under **C3-I4** of **Table C3**

Table C.3 – *continued*

		Competence required	Route(s) to competence
C3-I4	**Operative threshold competence requirements**	Where applicable to the scope of work undertake the competences in the following Common Minimum Technical Competence Annexes are required: 2A – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Domestic); 2B – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Non-Domestic); 2C – Minimum Competency for Common Processes (Compressed Gas Welded Pipework Installation); 2D – Minimum Competency for Common Processes (Manual Arc Welded Pipework Installation); 4A – Oil-fired Combustion Appliance Installation (Domestic); 4B – Oil-fired Combustion Appliance Installation (Non-domestic); 4C – Oil Storage Tank and Associated Pipework Installation. 6A – Backflow Prevention (Plumbing and Heating Systems); 9A – Hot Water System Installation (Domestic); 9B – Hot Water System Installation (Unvented); 9C – Hot Water System Installation (Non-domestic); 10A – 'Wet' Central Heating Systems Installation (Domestic); 10B – Wet' Central Heating Systems Installation (Under-floor); 10C – 'Wet' Central Heating Systems Installation (Non-domestic); 13A – Energy Efficiency for Domestic Heating and Hot Water; 13B – Energy Efficiency for Non-domestic Heating and Hot Water. Common Minimum Technical Competences Annexes 2A, 2B, 2C, 2D,4A, 4B, 4C, 6A, 9A, 9B, 9C, 10A, 10B, 10C, 13A and 13B have been derived from, and are cross-referenced to, the relevant National Occupational Standards for Mechanical Engineering Services (see **9.8.2**)	**England and Wales** 1) Achievement of the relevant RQF qualifications/qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work. **Scotland** For mechanical installation activities to hold or be eligible to hold a current CSCS affiliated advanced or technician registration card as appropriate to the scope of measure BSM.3 and where relevant hold a current Water Byelaws/Regulations qualification, and unvented qualification.

Table C.3 – *continued*

Operative specialist competence requirements	Competence required	Route(s) to competence
	All oil-firing condensing boiler related electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to BS EN 17065) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. 3) To be registered with a certification body that is UKAS accredited (to BS EN 17065) to issue certification for non-domestic electrical work ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*

Table C.3 – *continued*

C3-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **C3-I4** in **Table C3** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C3-I4** in **Table C3**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.* ***NOTE 2*** *The Common Minimum Technical Competency* ***Annexes 4A, 4B*** *and* ***4C*** *require renewal of qualifications/certifications at five-yearly intervals.*
C3-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

C3-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Product manufacturer's installation and servicing instructions.
		• Product manufacturer's user manuals/guides.
		• Product warranty information and guarantees.
		• Commissioning certificate that meets the requirements of the Building Regulations.
		• System cleaning and water treatment record (if not included in the commissioning certificate).
		• Installer details (if not included in the commissioning certificate):
		  • mechanical;
		  • electrical.
		• Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days).
		• A copy of any electrical inspection and testing certificates that have been completed to meet the requirements of Building Regulations and/or the current version of BS 7671 (IET Wiring Regulations).
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance of the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• Demonstration of:
		  • how to set user controls for maximum efficiency;
		  • any safety checks that the system user should undertake;
		  • what to do in the case of an emergency or perceived emergency.

C4 Measure BSM.4 Flue-gas heat recovery devices

C4.1 Additional installation requirements

When installing flue-gas recovery devices, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C4-I1** of **Table C4**

C4.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the gas-fired condensing boiler at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C4-I2** of **Table C4**.

C4.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of flue-gas recovery devices, the installer shall employ or contract only an inspector meeting the competence requirements of **C4-I3** of **Table C4**.

C4.4 Operative competence

When installing flue-gas recovery devices, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C4-I4** of **Table C4**), at the competency ratio specified in **C4-I6** of **Table C4.**

C4.5 Provision of information in respect of flue-gas recovery devices

At the time of handover of the flue-gas recovery device to the customer, the installer shall ensure that the information identified at **C4-I7** of **Table C4** is provided to the customer as part of the handover process required in **5.8.**

Table C.4 – Measure-specific requirements for flue-gas recovery devices (BSM.4)

Measure description		Flue-gas Heat Recovery Devices for use with gas-fired condensing boilers (domestic scale)
Measure type		As measure description (no sub-division)
C4-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The requirements or guidance given in product manufacturer's instructions. Where relevant to the type of installation being undertaken, the requirements or guidance given in: • BS 5440-1, *Flueing and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd,3rd family gases) – Part 1: Specification for installation of gas appliances to chimneys and for maintenance of chimneys*; • BS 5440-2, *Flueing and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd,3rd family gases) – Part 2: Specification for the installation and maintenance of ventilation for gas appliances.* ***NOTES** Attention is drawn to the need, where relevant, for all flue-gas recovery device installation work to comply with:* *a) the current Gas Safety (Installation and Use) Regulations that apply in the UK country or locality in which the installation is being carried out. The Gas Safety (Installation and Use) Regulations have requirements relating to both technical gas safety standards and qualification and supervision of persons carrying out gas work and work on gas appliances;* *b) the current Building Regulations that apply in the UK country in which the installation is being carried out. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook;* *c) the current Water Supply (Water Fittings) Regulations or Water Byelaws that apply in the UK country in which the installation is being carried out;* *d) the current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671).*
C4-I2	**Pre-installation building inspection requirements**	As a minimum the pre-installation building inspection shall investigate and determine if the: • condition of the building fabric is satisfactory in relation to the proposed work; • installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; heat-producing appliances; • proposed installation will be compliant with any requirements stated by the flue-recovery devices product manufacturer; • relevant checks have been undertaken to determine if asbestos-containing materials are present.

Table C.4 – *continued*

C4-I3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As defined under **C4-I4** of **Table C4**.	As defined under **C4-I4** of **Table C4**.
C4-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Where applicable to the scope of work undertaken, the competences in the following Common Minimum Technical Competence Annexes are required: 2A – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Domestic); 6A – Backflow Prevention (Plumbing and Heating Systems); 9A – Hot Water System Installation (Domestic); 9B – Hot Water System Installation (Unvented). Common Minimum Technical Competences Annexes 2A, 6A, 9A and 9B have been derived from, and are cross-referenced to, the relevant National Occupational Standards for Mechanical Engineering Services (see **9.8.2**): ***NOTE*** *The Gas Safety (Installation and Use) Regulations (see **C4-I1** of **Table C.4**) include requirements relating to qualification and supervision of persons carrying out gas work. These requirements are not repeated here; however, installers are reminded of the legal obligation to meet the requirements.*	**England and Wales** 1) Achievement of the relevant QCF/ FRQ & QIW qualifications/ qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column; 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work. **Scotland** A current SNIJIB Registration card at Plumber, Advanced or Technician Plumber or Gasfitter, Advanced or Technician Gasfitter grade or be eligible to hold such a card and hold a current Water Byelaws/Regulations qualification, and, where relevant, unvented qualification.

Table C.4 – *continued*

	Competence required	Route(s) to competence
Operative specialist competence requirements	All flue as heat recovery related electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**)	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*

Table C.4 – *continued*

C4-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **C4-I4** in **Table C4** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety critical or technical critical revisions are made to the competency requirements in **C4-I4** of **Table C4**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.* ***NOTE 2*** *The currency of competency requirements stated above relate only to the competence requirements stated within this Annex and do not relate to, or replace, the qualification and supervision requirements stated within Gas Safety (Installation and Use) Regulations.*
C4-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

C4-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Product manufacturer's installation and servicing instructions.
		• Product warranty information and guarantees.
		• Benchmark commissioning certificate of other commissioning certificate that meets the requirements of the Building Regulations.
		• Installer details:
		  • mechanical;
		  • electrical.
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance of the written information provided.

C5 Measure BSM.5:Heating system insulation (ducting, pipes and cylinders)

C5.1 Additional installation requirements

When installing heating system insulation (ducting, pipes and cylinders), in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C5-I1** of **Table C5**.

C5.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the heating system insulation (ducting, pipes and cylinders) at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C5-I2** of **Table C5**.

C5.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of heating system insulation (ducting, pipes and cylinders), the installer shall employ or contract only an inspector meeting the competence requirements of **C5-I3** of **Table C5**.

C5.4 Operative competence

When installing heating system insulation (ducting, pipes and cylinders), the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C5-I4** of **Table C5**), at the competency ratio specified in **C5-I6** of **Table C5**.

C5.5 Provision of information in respect of heating system insulation (pipes and cylinders)

At the time of handover of the heating system insulation (ducting, pipes and cylinders) to the customer, the installer shall ensure that the information identified at **C5-I7** of **Table C5** is provided to the customer as part of the handover process required in **5.8**.

Table C.5 – Measure-specific requirements for heating system insulation (including ducting, pipes and cylinders) (BSM.5)

Measure description		Heating System Insulation (ducting, pipes and cylinders) including retro-fitting of insulation to existing ducting and pipework or cylinders to refurbish or enhance the system.
Measure type		As measure description (no subdivision).
C5-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	Where relevant to the type of installation being undertaken, the requirement or guidance given in: BS 5970 *Code of practice for thermal insulation of pipework and equipment in the temperature range of -100°C to +870°C,* shall be applied. ***NOTE 1*** *The relevant installation methods will have been included under current certification issued by a product certification body, with respect to the product/system to be installed, against UK requirements and regulation and the installer should be aware that training from the supplier or training acceptable to the supplier may be necessary before an application for assessment/certification is made to a certification body.* ***NOTE 2*** *Attention is drawn to the need, where relevant, for all heating system insulation installation work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, compliance in relation to the following aspects is highlighted:fire safety; resistance to moisture; ventilation; and conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.*

Table C.5 – *continued*

<table>
<tr><td>C5-I2</td><td>Pre-installation building inspection requirements</td><td colspan="2">As a minimum the pre-installationbuilding inspection shall investigate and determine as far as practicable:
• if the proposed heating system insulation work will be compliant with the requirements of the Building Regulations relating to conservation of fuel and power/energy;
• pre-existing damage to the areas that will be accessed by the installation operatives;
• the extent of the heating system elements to be insulated;
• if relevant checks have been undertaken to determine if asbestos-containing materials are present;
• if the proposed installation would be non-compliant with any requirements stated by the designer/specifier;
• if the site layout or conditions will impair the execution of the works in relation to appropriate access to the property and to the heating system elements to be insulated.</td></tr>
<tr><td rowspan="5">C5-I3</td><td rowspan="5">Inspector competence requirements</td><td>Competence required</td><td>Route(s) to competence</td></tr>
<tr><td rowspan="4">The requirements as defined in Common Minimum Technical Competence Annex HSI 1 – Determine the Suitability of a Building for Heating System Insulation (Pipes and Cylinders) Work.</td><td>England and Wales
As defined within Common Minimum Technical Competence Annex HSI 1 to include the following route options:
1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;</td></tr>
<tr><td>2) Completion of other aligned training and certification and at location inspection of work.
Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery;
NOTE Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.</td></tr>
<tr><td>3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;</td></tr>
<tr><td>4) demonstrable knowledge and experience in relation to the competence in Annex HSI 1 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.</td></tr>
</table>

Table C.5 – *continued*

			Scotland As defined within Common Minimum Technical Competence Annex HSI 1 to include the following route options: 1) relevant QCF/SCQF/FRQ & QIW qualifications/qualification units and at location inspection of work;
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) demonstrable knowledge and experience in relation to the competence in Annex HSI 1 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
C5-I.4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Health and safety competence in accordance with CITB National Occupational Standard Unit COSVR 641 – *Conform to general workplace health, safety and welfare*.	**England, Wales and Scotland** 1) Achievement of the relevant QCF/SCQF/FRQ & QIW qualification unit that covers the competence requirements in COSVR 641.
			2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) Demonstrable knowledge and experience in relation to the competence in COSVR 641 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.

Table C.5 – *continued*

Operative specialist competence requirements	Competence required	Route(s) to competence
	The requirements as defined in Common Minimum Technical Competence Annex HSI 2 – Installation of Insulation to Heating System Pipes and Cylinders. Annex HSI 2 is derived from, and is cross-referenced to, the following CITB National Occupational Standard Unit COSVR322 – *Apply insulation and finishes to cylindrical and flat surfaces.*	**England and Wales** As defined within Common Minimum Technical Competence Annexes HSI 2 to include the following route options: 1) achievement of the relevant QCF/SCQF/ FRQ & QIW qualification/qualification unit and at location inspection of work.
		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.;*
		3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
		4) demonstrable knowledge and experience in relation to the competence in Annex HSI 2 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.
		Scotland As defined within Common Minimum Technical Competence Annexes HSI 2 to include the following route options: 1) achievement of the relevant QCF/SCQF/ FRQ & QIW qualification/qualification unit and at location inspection of work.
		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) demonstrable knowledge in relation to the competence in Annex HSI 2 gained through industry experience and verified by UKAS accredited certification body through at location inspection of work.

Table C.5 – *continued*

C5-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **C5-I4** in **Table C5** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety critical or technical critical revisions are made to the competency requirements in **C5-I4** of **Table C5**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *Initial and ongoing office and at location surveillance to be carried out by UKAS accredited inspection bodies to ensure the requirements of the designer/supplier are met with regard to regulatory compliance. Inspection frequency shall be at least 1% of all site work undertaken* ***NOTE 2*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*
C5-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.
C5-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	Any relevant product warranty information and guarantees.

C6 Measure BSM.6 Heating, hot water system, air conditioning or ventilation controls and components

C6.1 Additional installation requirements

When installing controls and/ or components for heating, hot water system, air conditioning or ventilation, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C6-I1** of **Table C6.**

C6.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of controls and/ or components for heating, hot water system, air conditioning or ventilation at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C6-I2** of **Table C6**

C6.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of controls and/ or components for heating, hot water system, air conditioning or ventilation, the installer shall employ or contract only an inspector meeting the competence requirements of **C6-I3** of **Table C6**.

C6.4 Operative competence

When installing controls and/ or components for heating, hot water system, air conditioning or ventilation, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C6-I4** of **Table C6**), at the competency ratio specified in **C6-I6** of **Table C6**.

C6.5 Provision of information in respect of heating and hot water controls

At the time of handover of controls and/ or components for heating, hot water system, air conditioning or ventilation to the customer, the installer shall ensure that the information identified at **C6-I7** of **Table C6** is provided to the customer as part of the handover process required in **5.8.**

Table C.6 – Measure-specific requirements for Heating, hot water system, air conditioning or ventilation controls and components (BSM.6)

Measure description	Heating, hot water system, air conditioning or ventilation, controls and components.	
Measure type	BSM.6.1	Heating and hot water system controls (domestic)
	BSM.6.2	Heating and hot water system controls (non-domestic)
	BSM.6.3	Air conditioning controls
	BSM.6.4	Ventilation controls
	BSM.6.5	Low energy circulator pumps
	BSM.6.6	Low temperature radiators and fan convectors

Table C.6 – *continued*

C6-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	As applicable: BS EN 378-1 *Refrigerating systems and heat pumps. Safety and environmental requirements. Basic requirements, definitions, classification and selection criteria* BS EN 378-3 *Refrigerating systems and heat pumps. Safety and environmental requirements. Installatiat location and personal protection.* BS EN 378-4 *Refrigerating systems and heat pumps. Safety and environmental requirements. Operation, maintenance, repair and recovery.* BS EN 14336 *Heating systems in buildings – Installation and commissioning of water based heating systems* BS EN 16484-1 *Building automation and control systems (BACS). Project specification and implementation* The requirements or guidance given in product manufacturer's instructions. ***NOTE** Attention is drawn to the need, where relevant, for all heating hot water air conditioning and ventilation controls installation work to comply with:* *a) the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation; hot water safety; combustion appliances; conservation of fuel; and power and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook;* *b) the current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671).* *c) the current F gas Regulations that apply in all EU countries or locality in which the installation is being carried out. The Regulations have requirements relating to businesses and persons who install, service or maintain systems that contain or are designed to contain refrigerant gases. The Regulations set both the technical standards for the Business and the qualifications and supervision of persons carrying out work.* *d) For the installation of Low-Temperature Heating Systems, information contained in the publication* 'Design of low temperature domestic heating systems – A guide for system designers and installers' *published by BRE Trust, could be of assistance.*
C6-I2	**Pre-installation building inspection requirements**	As a minimum the pre-installation building inspection shall investigate and determine if the: • proposed control arrangement is compatible with any existing controls for heating, hot water system, ventilation or air conditioning; • installation work will result in non-compliance with the Building Regulations. • proposed installation will be compliant with any requirements stated by the heating controls product manufacturer; • relevant checks have been undertaken to determine if asbestos containing materials are present.
C6-I3	**Inspector competence requirements**	**Competence required** / **Route(s) to competence** As defined under Section **C6-I4** of **Table C.6**. / As defined under **C6-I4** of **Table C6**

Table C.6 – *continued*

		Competence required	Route(s) to competence
C6-I4	**Operative, threshold competence requirements**	Where applicable to the scope of work undertake the competences in the following Common Minimum Technical Competence Annexes are required: 2A – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Domestic); 2B - Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Non-Domestic); 2C - Minimum Competency for Common Processes (Compressed Gas Welded Pipework Installation); 2D - Minimum Competency for Common Processes (Manual Arc Welded Pipework Installation); 6A – Backflow Prevention (Plumbing and Heating Systems); 9A – Hot Water System Installation (Domestic); 9B – Hot Water System Installation (Unvented); 9C – Hot Water System Installation (Non-domestic); 10A – 'Wet' Central Heating Systems Installation (Domestic); 10B – 'Wet' Central Heating Systems Installation (under-floor); 10C – 'Wet' Central Heating Systems Installation (Non-domestic); 13A – Energy Efficiency for Domestic Heating and Hot Water; 13B – Energy Efficiency for Non-domestic Heating and Hot Water. 15A – Domestic Ventilation Systems Installation 15B – Mechanical Ventilation Systems Installation 16A – Air Conditioning Installation Common Minimum Technical Competences Annexes 2A, 2B, 2C, 2D, 6A, 9A, 9B, 9C, 10A, 10B, 10C, 13A and 13B have been derived from, and are cross-referenced to, the relevant National Occupational Standards for Mechanical Engineering Services (see **9.8.2**)	**England and Wales** 1) Achievement of the relevant QCF/ FRQ & QIW qualifications/ qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column. 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work. **Scotland** 1) For mechanical installation activities to hold or be eligible to hold a current CSCS affiliated advanced or technician registration card as appropriate to the scope of measures BSM.6.1-BSM.6.4, and where relevant hold a current Water Byelaws/Regulations qualification, and unvented qualification.

Table C.6 – *continued*

		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body by at location inspection of work.

Table C.6 – *continued*

Operative, specialist competence requirements	Competence required	Route(s) to competence
	All heating controls installation electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*

Table C.6 – *continued*

C6-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **D1-I4** in **Table D1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C6-I4** in **Table C6**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*
C6-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

C6-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Product manufacturer installation and servicing instructions.
		• Product manufacturer user manuals/guides.
		• Product warranty information and guarantees.
		• Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days), where required.
		• A copy of any electrical inspection and testing certificates that have completed to meet the requirements of Building Regulations and/or the current version of BS 7671 (IET Wiring Regulations).
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance of the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• Demonstration of:
		  • how to set user controls for maximum efficiency;
		  • any safety checks that the system user should undertake.

C7 Measure BSM.7 Hot water systems

C7.1 Additional installation requirements

When installing a hot water system, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C7-I1** of **Table C7**.

C7.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the hot water system at location, the installer shall undertake a pre-installationbuilding inspection in accordance, as a minimum, with the requirements set out in **C7-I2** of **Table C7**

C7.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of a hot water system, the installer shall employ or contract only an inspector meeting the competence requirements of **C7-I.3** of **Table C7**.

C7.4 Operative competence

When installing a hot water system, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C7-I4** of **Table C7**), at the competency ratio specified in **C7-I6** of **Table C7**.

C7.5 Provision of information in respect of hot water systems.

At the time of handover of a hot water system to the client/customer, the installer shall ensure that the information identified at **C7-I7** of **Table C7** is provided to the client/customer as part of the handover process required in **5.8.**

Table C.7 – Measure-specific requirements for hot water systems (BSM.7)

Measure description		Hot water systems including hot water systems with heat recovery.	
Measure type		BSM.7.1	Hot water system (domestic)
		BSM.7.2	Hot water system (non-domestic)
C7-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	As applicable, BS EN 806-1 *Specifications for installations inside buildings conveying water for human consumption. General* BS EN 806-4 *Specifications for installations inside buildings conveying water for human consumption. Installation* BS EN 806-5 *Specifications for installations inside buildings conveying water for human consumption. Operation and maintenance* BS 8558 *Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings* The requirements or guidance given in product manufacturer's instructions. ***NOTES:** Attention is drawn to the need, where relevant, for all hot water system installation work to comply with:* 1. *The current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, compliance in relation to the following aspects is highlighted:workmanship; materials; structural stability; fire safety; resistance to moisture; hot water safety, combustion appliances and fuel storage systems, conservation of fuel and power and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7: Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-Domestic Technical Handbook;* 2. *The current Water Supply (Water Fittings) regulations or Water Byelaws that apply in the UK country in which the installation is being carried out;* *Particular guidance can be found in the following:* 3. *The current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671)*	

Table C.7 – *continued*

C7-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and determine if: • the condition of the building fabric is satisfactory in relation to the proposed work; • proposed hot water system arrangement is compatible with the existing heating and hot water system installation and fittings; • the installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; resistance to moisture; hot water safety; combustion appliances and fuel storage systems,conservation of fuel and power; electrical safety • the proposed installation will be compliant with any requirements stated by the hot water system product manufacturers; • The asbestos register for the building has been reviewed and relevant checks have been undertaken to determine if any asbestos containing materials are present in the areas where work is to be carried out.	
C7-I3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As defined under **C7-I4** of **Table C7.**	As defined under **C7-I4** of **Table C7**.

Table C.7 – *continued*

		Competence required	Route(s) to competence
C7-I4	**Operative threshold competence requirements**	Where applicable to the scope of work undertaken the competences in the following Common Minimum Technical Competence Annexes are required: 2A – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Domestic); 2B – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Non-domestic); 2C – Minimum Competency for Common Processes (Compressed Gas Welded Pipework Installation); 2D – Minimum Competency for Common Processes (Manual Arc Welded Pipework Installation); 6A – Backflow Prevention (Plumbing and Heating Systems); 9A – Hot Water System Installation (Domestic); 9B – Hot Water System Installation (Unvented); 9C – Common Minimum Technical Competency Requirements for Hot Water Systems Installation Work (Non-Domestic) 10A – 'Wet' Central Heating Systems Installation (Domestic); 10B – Wet' Central Heating Systems Installation (Under-floor); 10C – 'Wet' Central Heating Systems Installation (Non-domestic); 13A – Energy Efficiency for Domestic Heating and Hot Water; 13B – Energy Efficiency for Non-domestic Heating and Hot Water. Common Minimum Technical Competences Annexes 2B, 2C, 2D, 6A, 9B, 9C, 10A, 10B, 10C, 13A, 13B and 15A have been derived from and are cross-referenced to, the relevant National Occupational Standards for Mechanical Engineering Services (see **9.8.2**). ***NOTE*** *As stated under* ***C7-I1*** *of* ***Table C7****, the Gas Safety (Installation and Use) Regulations have requirements relating to qualification and supervision of persons carrying out gas work. These requirements are not repeated here; however, installers are reminded of the legal obligation to meet the requirements.*	**England and Wales** 1) Achievement of the relevant QCF/SCQF/ FRQ & QIW qualifications/ qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column. 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work. **Scotland** 1) For mechanical installation activities to hold or be eligible to hold a current CSCS affiliated advanced or technician registration card as appropriate to the scope of measure BSM.7.1 and BSM.7.2 and where relevant hold a current Water Byelaws/Regulations qualification, and unvented qualification.

Table C.7 – *continued*

		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.
Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
	All hot water system electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme.

Table C.7 – *continued*

			For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*
C7-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **D1-I4** in **Table D1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C7-I.4** in **Table C7**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.* ***NOTE 2*** *The currency of competency requirements stated above relate only to the competence requirements stated within this Annex and do not relate to or replace the qualification and supervision requirements stated within the Gas Safety (Installation and Use) Regulations.*	

Table C.7 – *continued*

C7-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

C7-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information, as applicable**
		• Product manufacturer installation and servicing instructions.
		• Product manufacturer user manuals/guides.
		• Product warranty information and guarantees.
		• Revisions to the building Health and Safety file.
		• Revisions to the building log book
		• A commissioning certificate that meets the requirements of the Building Regulations.
		• A user guide that meets the requirements of the Building Regulations.
		• Building regulations compliance certificate or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days, where required.
		• A copy of any electrical inspection and testing certificates that have been completed to meet the requirements the current version of BS 7671 (IET Wiring Regulations).
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• Demonstration of:
		  • how to set user controls for maximum efficiency;
		  • any safety checks that the system user should undertake;
		  • any maintenance activity that the system user should undertake
		  • what to do in the case of an emergency or perceived emergency.

C8 BSM.8 Mechanical Ventilation and Heat Recovery

C8.1 Additional installation requirements

When installing a mechanical ventilation and heat recovery system, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C8-I1** of **Table C8**.

C8.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the mechanical ventilation and heat recovery system at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C8-I2** of **Table C8**

C8.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of a mechanical ventilation and heat recovery system, the installer shall employ or contract only an inspector meeting the competence requirements of **C8-I3** of **Table C8**.

C8.4 Operative competence

When installing a mechanical ventilation and heat recovery system, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C8-I4** of **Table C8**), at the competency ratio specified in **C8-I6** of **Table C8.**

C8.5 Provision of information in respect of Mechanical Ventilation and Heat Recovery systems

At the time of handover of a mechanical ventilation and heat recovery system to the client/customer, the installer shall ensure that the information identified at **C8-I7** of **Table C8** is provided to the client/customer as part of the handover process required in **5.8.**

Table C.8 – Measure-specific requirements for Mechanical Ventilation and Heat Recovery (BSM.8)

Measure description		Mechanical Ventilation and Heat Recovery
Measure type		As measure description (no sub-division)
C8-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The requirements or guidance given in product manufacturer's instructions. ***NOTE*** *Attention is drawn to the need, where relevant, for all Mechanical Ventilation and Heat Recovery installation work to comply with:* 1. *the current Building Regulations are those that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation, conservation of fuel and power and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-Domestic Technical Handbook;* 2. *the current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671).*
C8-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and determine if: • the condition of the building fabric is satisfactory in relation to the proposed work; • the installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation; conservation of fuel and power; • the proposed duct work (routing) is appropriate • the proposed installation will be compliant with any requirements stated by the equipment manufacturers; • The Asbestos register for the building has been reviewed and relevant checks have been undertaken to determine if any asbestos containing materials are present in the areas where work is to be carried out.

Table C.8 – *continued*

C8.3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As defined under **C8-I4** of **Table C8**	As defined under **C8-I4** of **Table C8**.
C8-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Where applicable to the scope of work undertaken the competences in the following Common Minimum Technical Competence Annexes are required: Annex 15a – Ventilation Systems Installation Work (Domestic) Annex 15b – Mechanical Ventilation Systems Installation (Non domestic) Annex 15c – Air handling unit (Non domestic) Annex 15d – Plastic ductwork systems (Non domestic) Annex 15e – Fire-rated ductwork systems (Non domestic) Common Minimum Technical Competences Annexes 15b, 15c, 15d and 15e have been derived from, and are cross-referenced to, the relevant National Occupational Standards for Mechanical Engineering Services (see **9.8.2**).	**England and Wales** 1) Achievement of the relevant QCF/SCQF/ FRQ & QIW qualifications/qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column. 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*

Table C.8 – *continued*

		3 Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
		4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.
		Scotland 1) For mechanical installation activities to hold or be eligible to hold a current CSCS affiliated advanced or technician registration card as appropriate to the scope of measure BSM.8 and where relevant hold a current Water Byelaws/Regulations qualification, and unvented qualification.
		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.

Table C.8 – *continued*

	Competence required	Route(s) to competence
Operative specialist competence requirements	All mechanical ventilation with heat recovery installation related electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*

Table C.8 – *continued*

C8-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **D1-I4** in **Table D1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C8-I4** in **Table C8,** including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.* ***NOTE 2*** *The currency of competency requirements stated above relate only to the competence requirements stated within this Annex and do not relate to or replace the qualification and supervision requirements stated within the Gas Safety (Installation and Use) Regulations.*
C8-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

Table C.8 – *continued*

C8-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Product manufacturer installation and servicing instructions.
		• Product manufacturer user manuals/guides.
		• Product warranty information and guarantees.
		• Revisions to the building Health and Safety file.
		• Revisions to the Building log book
		• A commissioning certificate that meets the requirements of the Building Regulations.
		• A user guide that meets the requirements of the Building Regulations.
		• Installer details (if not included in the commissioning certificate), e.g. mechanical, electrical.
		• Evidence that the installation has been notified to Building Control.
		• A copy of any electrical inspection and testing certificates that have completed to meet the requirements the current version of BS 7671 (IET Wiring Regulations).
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• Demonstration of:
		  • how to set user controls for maximum efficiency;
		  • any safety checks that the system user should undertake;
		  • what to do in the case of an emergency or perceived emergency.

C9 Measure BSM.9 Radiant heating (non-domestic)

C9.1 Additional installation requirements

When installing a radiant heating system, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C9-I1** of **Table C9**.

C9.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the radiant heating system at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C9-I2** of **Table C9**

C9.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of a radiant heating system, the installer shall employ or contract only an inspector meeting the competence requirements of **C9-I3** of **Table C9**.

C9.4 Operative competence

When installing a radiant heating system, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C9.4** of **Table C9**), at the competency ratio specified in **C9-I6** of **Table C9**.

C9.5 Provision of information in respect of Radiant heating.

At the time of handover of a radiant heating system to the client/customer, the installer shall ensure that the information identified at Section **C9-I7** of **Table C9** is provided to the client/customer as part of the handover process required in **4.12.**

Table C.9 – Measure-specific requirements for Radiant heating (BSM.9)

Measure		Radiant heating
Product category		Radiant heating
C9-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	1. As applicable: 2. BS EN 15316-4-8- *Heating systems in buildings.* 3. BS 6896 *Specification for installation and maintenance of gas-fired overhead radiant heaters for industrial and commercial heating (2nd and 3rd family gases).* 4. BS EN 13410 *Gas-fired overhead radiant heaters. Ventilation requirements for non-domestic premises* 5. IGEM UP/10, Edition 3, *Installation of flued gas appliances in industrial and commercial premises incorporating specific requirements for appliances fired by bio-fuels*; 6. IGEM UP/1, 1A & 1B, *Strength testing, tightness testing and direct purging each standard covers industrial commercial and domestic testing and purging requirements*; The requirements or guidance given in product manufacturer's instructions. ***NOTES*** *Attention is drawn to the need, where relevant, for all Radiant heating installation work to comply with:* *a) the current Gas Safety (Installation and Use) Regulations that apply in the UK country or locality in which the installation is being carried out. The Gas Safety (Installation and Use) Regulations have requirements relating to both technical gas safety standards and qualification and supervision of persons carrying out gas work;* *b) the current Building Regulations are those that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: workmanship; materials; structural stability; fire safety; resistance to moisture; combustion appliances and fuel storage systems, conservation of fuel and power and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-Domestic Technical Handbook. The following may be found to be particularly relevant* *c) The current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671)*

Table C.9 – *continued*

C9-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and determine if: • the condition of the building fabric is satisfactory in relation to the proposed work; • the installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation; combustion appliances and fuel storage systems, conservation of fuel and power; • the proposed installation will be compliant with any requirements stated by the equipment manufacturers; • relevant checks have been undertaken to review the Asbestos register for the building and to determine if any asbestos containing materials are present in the areas where work is to be carried out.	
C9-I3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As defined under **C9-I4** of **Table C9.**	As defined under **C9-I4** of **Table C9.**
C9-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		Where applicable to the scope of work undertaken the competences in the following Common Minimum Technical Competence Annexes are required: 2B – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Non-Domestic); 2C – Minimum Competency for Common Processes (Compressed Gas Welded Pipework Installation); 2D – Minimum Competency for Common Processes (Manual Arc Welded Pipework Installation); ***NOTE*** *CMTC Annex 2B is considered relevant because its content covers the basic processes required to fix and run pipework to a radiant heater. Some selectivity may however be required in the application of the overall competence requirements of the CMTC Annex to the installation of radiant heaters.* The relevant National Occupational Standards for Mechanical Engineering Services apply (see **9.8.2**).	**England and Wales** 1) Achievement of the relevant QCF/SCQF/ FRQ & QIW qualifications/qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column. 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.

Table C.9 – *continued*

		Scotland 1) A current SNIJIB Registration card at Plumber, Advanced or Technician Plumber or Gasfitter, Advanced or Technician Gasfitter grade or be eligible to hold such a card and hold a current Water Byelaws/Regulations qualification., and, where relevant, unvented qualification.
		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.

Table C.9 – *continued*

	Competence required	Route(s) to competence
Operative specialist competence requirements	All radiant heating installation related electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*

Table C.9 – *continued*

C9-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **D1-I4** in **Table D1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C9-I4** in **Table C9**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.* ***NOTE 2*** *The currency of competency requirements stated above relate only to the competence requirements stated within this Annex and do not relate to or replace the qualification and supervision requirements stated within the Gas Safety (Installation and Use) Regulations.*
C9-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

C9-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Product manufacturer installation and servicing instructions.
		• Product manufacturer user manuals/guides.
		• Product warranty information and guarantees.
		• Revisions to the building Health and Safety file.
		• Revisions to the Building log book
		• A commissioning certificate that meets the requirements of the Building Regulations.
		• A user guide that meets the requirements of the Building Regulations.
		• Installer details (if not included in the commissioning certificate), e.g. mechanical, electrical.
		• Evidence that the installation has been notified to Building Control.
		• A copy of any electrical inspection and testing certificates that have been completed to meet the requirements the current version of BS 7671 (IET Wiring Regulations).
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• Demonstration of:
		  • how to set user controls for maximum efficiency;
		  • any safety checks that the system user should undertake;
		  • what to do in the case of an emergency or perceived emergency.

C10 Measure BSM.10 Under-floor heating

C10.1 Additional installation requirements

When installing under-floor heating, in addition to meeting the core requirements set out in Clauses **4** to **8,** of this PAS the installer shall also work to any standards, specifications, instructions or guidance identified in **C10-I1** of **Table C10**.

C10.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the under-floor heating at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C10-I2** of **Table C10**.

C10.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of under-floor heating, the installer shall employ or contract only an inspector meeting the competence requirements of **C10-I3** of **Table C10**.

C10.4 Operative competence

When installing under-floor heating, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C10-I4** of **Table C10**), at the competency ratio specified in **C10-I6** of **Table C10**.

C10.5 Provision of information in respect of under-floor heating

At the time of handover of under-floor heating, the installer shall ensure that the information identified at **C10-I7** of **Table C10** is provided to the customer as part of the handover process required in **5.8.**

Table C.10 – Measure-specific requirements for under-floor heating (BSM.10)

Measure description		Under-floor Heating (wet systems)
Measure type		As measure description (no sub-division)
C10-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The requirements or guidance given in product manufacturer's instructions. The requirements stated in BS EN 1264-4, *Water based surface embedded heating and cooling systems – Part 4: Installation*. ***NOTES*** *Attention is drawn to the need, where relevant, for all under-floor heating system work to comply with:* *a) the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation; sanitation; hot water safety; water efficiency; conservation of fuel; and power and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook;* *b) the current Water Supply (Water Fittings) Regulations or Water Byelaws that apply in the UK country in which the installation is being carried out. In particular, compliance in relation to the following aspects is highlighted: prevention of contamination of the wholesome water supply, energy conservation, safe operation, testing and commissioning;* *c) the current edition of the Institution of Engineeing and Technology (IET) Wiring Regulations (BS 7671).*

Table C.10 – *continued*

C10-l2	**Pre-installation building inspection requirements**	As a minimum the pre-installation building inspection shall investigate and determine if the: • structural pre-condition requirements to enable the installation to proceed have been met; • pipe circuit lengths are broadly appropriate in relation to room area and pipe spacing; • the under-floor heating layout design has taken account of the location of all fixtures to avoid overheating issues; • proposed location of the under-floor heating manifold(s) is appropriate; • installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; resistance to moisture; conservation of fuel and power; • proposed installation will be compliant with any requirements stated by the under-floor heating product manufacturer; • relevant checks have been undertaken to determine if asbestos-containing materials are present.	
C10-l3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As defined under **C10-l4** of **Table C10**.	As defined under **C10-l4** of **Table C10**.

Table C.10 – *continued*

		Competence required	Route(s) to competence
C10-I4	**Operative threshold competence requirements**	Where applicable to the scope of work undertaken, the competences in the following Common Minimum Technical Competence Annexes are required: 2A – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Domestic); 2B – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Non-Domestic). 10B – Minimum Competency for 'Wet' Central Heating Systems Installation Work (Under-floor Heating). Common Minimum Technical Competence Annex 2A and 2B have been derived from, and are cross-referenced to, the relevant National Occupational Standards (see **9.8.2**).	**England and Wales** 1) Achievement of the relevant QCF/ FRQ & QIW qualifications/qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column. 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work. **Scotland** For mechanical installation activities to hold or be eligible to hold a current CSCS affiliated advanced or technician registration card as appropriate to the scope of measure BSM.10 and where relevant hold a current Water Byelaws/Regulations qualification, and unvented qualification.

Table C.10 – *continued*

	Competence required	Route(s) to competence
Operative specialist competence requirements	All under-floor heating installation related electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*

Table C.10 – *continued*

C10-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **D1-I4** in **Table D1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C10-I4** in **Table C10,** including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*
C10-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

C10-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Product manufacturer's user manuals/guides and guarantee documents.
		• Testing and commissioning certificates.
		• Water treatment records.
		• Electrical certification, if relevant.
		• Building Regulations Compliance Certificate.
		• Installer details:
		  • mechanical;
		  • electrical.
		Diagrammatic information
		• Hydraulic schematic.
		• Wiring schematic.
		Verbal information/demonstration
		• Setting of controls.
		• Awareness of the effect that changing to a different type of floor covering may have on system output.
		• Awareness of which system components should only be adjusted by a competent engineer.

C11 Measure BSM.11 Warm-air heating systems (domestic and non-domestic)

C11.1 Additional installation requirements

When installing gas and /or oil-fired warm-air heating systems (domestic and non-domestic), in addition to meeting the core requirements set out in clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C11-1** of Table **C11.**

C11.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the gas and /or oil-fired warm-air heating systems (domestic and non-domestic) at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C11-l2** of **Table C11**

C11.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of gas and /or oil-fired warm-air heating systems (domestic and non-domestic), the installer shall employ or contract only an inspector meeting the competence requirements of **C11-l3** of **Table C11**.

C11.4 Operative competence

When installing gas and /or oil-fired warm-air heating systems (domestic and non-domestic), the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C11-l4** of **Table C11**), at the competency ratio specified in **C11-l6** of **Table C11**

C11.5 Provision of information in respect of gas-fired warm-air heating systems

At the time of handover of the gas and /or oil-fired warm-air heating system (domestic and non-domestic), the installer shall ensure that the information identified at **C11-l7** of **Table C11** is provided to the customer as part of the handover process required in **5.8**.

Table C.11 – Measure-specific requirements for gas and /or oil-fired warm-air heating systems (domestic and non-domestic) (BSM.11)

Measure description	Gas and /or oil-fired warm-air Heating Systems (Domestic and Non-domestic)	
Measure type	BSM.11.1	Natural gas-fired and liquefied petroleum gas-fired warm air heating systems
	BSM.11.2	Oil-fired warm air heating systems
	NOTE *Electric warm air heating systems are provided for under measure BSE.1 Electric storage heaters*	

Table C.11 – *continued*

C11-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	The requirements or guidance given in product manufacturer's instructions. Where relevant to the type of installation being undertaken, the requirements or guidance given in: a) BS 5410-1 *Code of practice for oil firing. Installations up to 45 kW output capacity for space heating and hot water supply purposes* b) BS 5410-2 *Code of practice for oil firing. Installation of 45kW and above output capacity for space heating, hot water and steam supply services for commercial md industrial premises.* c) BS 5440-1, *Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases) – Part 1:Specification for installation of gas appliances to chimneys and for maintenance of chimneys*; d) BS 5440-2, *Flueing and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases) – Part 2:Specification for the installation and maintenance of ventilation provision for gas appliances*; e) BS 5864, *Installation and maintenance of gas-fired ducted air heaters of rated heat input not exceeding 70 kW net (2nd and 3rd family gases). Specification*; f) BS 6891, *Installation of low pressure gas pipework of up to 35 mm (R1 1/4) in domestic premises (2nd family gas). Specification*; g) IGEM/UP/2, Edition 2, *Installation of pipework on industrial and commercial premises*; h) IGEM/UP/7, Edition 2, *Gas installations in timber-framed and light steel buildings*; i) UKLPG, *Code of Practice 22, LPG Piping System Design and Installation*; j) IGEM UP/1, 1A & 1B, *Strength testing, tightness testing and direct purging each standard covers industrial commercial and domestic testing and purging requirements*; k) Both the domestic and non-domestic Building Services Compliance Guides (published by DCLG). ***NOTES*** *Attention is drawn to the need, where relevant, for all gas-fired warm air heating system installation work to comply with:* *a) the current Gas Safety (Installation and Use) Regulations that apply in the UK country or locality in which the installation is being carried out. The Gas Safety (Installation and Use) Regulations have requirements relating to both technical gas safety standards and qualification and supervision of persons carrying out gas work and work on gas appliances;* *b) the current Building Regulations that apply in the UK country in which the installation is being carried out. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-Domestic Technical Handbook;* *c) the current Water Supply (Water Fittings) Regulations or Water Byelaws that apply in the UK country in which the installation is being carried out;* *d) the current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671)*

Table C.11 – *continued*

C11-l2	**Pre-installation building inspection requirements**	As a minimum the pre-installation building inspection shall investigate and determine if the: • the condition of the building fabric is satisfactory in relation to the proposed work; • the installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; resistance to moisture; heat producing appliances; conservation of fuel and power; • where applicable, the installation work will result in non-compliance with relevant gas safety regulations; • the proposed installation will be compliant with any requirements stated by the gas and/or oil-fired warm-air heating systems product manufacturer; • the proposed installation may or will result in a plume nuisance situation; • any special condensate disposal arrangements are required; • relevant checks have been undertaken to determine if asbestos-containing materials are present.	
C11-l3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As defined under **C11-l4** of **Table C11**.	As defined under **C11-l4** of **Table C11.**

Table C.11 – *continued*

		Competence required	Route(s) to competence
C11-I4	**Operative threshold competence requirements**	Where applicable to the scope of work undertaken, the competences in the following Common Minimum Technical Competence Annexes are required: 2A – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Domestic); 2B - Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Non-Domestic); 4A Oil Appliance Installation (Domestic) 4B Oil Appliance Installation (Non-domestic) 4C Oil Storage and Tank Systems 6A – Backflow Prevention (Plumbing and Heating Systems); 9A – Hot Water System Installation (Domestic); 10D – Warm Air Heating Systems Installation (Domestic); 10E – Warm Air Heating System Installation (Non-domestic). Common Minimum Technical Competences Annexes 2A, 2B, 6A, 9A, 10D and 10E have been derived from, and are cross-referenced to, the relevant National Occupational Standards for Mechanical Engineering Services (see **9.8.2**). ***NOTE*** *The Gas Safety (Installation and Use) Regulations (see **C4-I1** of **Table C.4**) include requirements relating to qualification and supervision of persons carrying out gas work. These requirements are not repeated here; however, installers are reminded of the legal obligation to meet the requirements.*	**England and Wales** 1) Achievement of the relevant QCF/ FRQ & QIW qualifications/qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column. 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.* 3) Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work; 4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work. **Scotland** For installations up to 70kW heat input a current SNIJIB Registration card at Plumber, Advanced or Technician Plumber or Gasfitter, Advanced or Technician Gasfitter or be eligible to hold such a card or SVQ Level 3 Heating and Ventilating Industrial and Commercial Installation (SQA G9X8 23) and hold a current Water Byelaws/Regulations qualification, and, where relevant, unvented qualification.

Table C.11 – *continued*

	Competence required	Route(s) to competence
Operative specialist competence requirements	All warm air heating system installation related electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*

Table C.11 – *continued*

C11-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **C11-I4** in **Table C11** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C11-I4** of **Table C11**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.* ***NOTE 2*** *The currency of competency requirements stated above relate only to the competence requirements stated within this Annex and do not relate to or replace the qualification and supervision requirements stated within Gas Safety (Installation and Use) Regulations.*
C11-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.

C11-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information**
		• Product manufacturer's installation and servicing instructions.
		• Product manufacturer's user manuals/guides.
		• Product warranty information and guarantees.
		• Commissioning certificate that meets the requirements of the Building Regulations.
		• Installer details (if not included in the commissioning certificate):
		  • mechanical;
		  • electrical.
		• Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days).
		• A copy of any electrical inspection and testing certificates that have completed to meet the requirements of Building Regulations and/or the current version of BS 7671 (IET Wiring Regulations).
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• Demonstration of:
		  • how to set user controls for maximum efficiency;
		  • any safety checks that the system user should undertake;
		  • what to do in the case of an emergency or perceived emergency.

C12 BSM12 Water efficient taps and showers

C12.1 Additional installation requirements

When installing water efficient taps and showers, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **C12-l1** of **Table C12**

C12.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the water efficient taps and showers at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **C12-l2** of **Table C12**

C12.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of water efficient taps and showers, the installer shall employ or contract only an inspector meeting the competence requirements of **C12-l3** of **Table C12**

C12.4 Operative competence

When installing water efficient taps and showers, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**C12-l4** of **Table C12**), at the competency ratio specified in **C12-l.6** of **Table C12.**

C12.5 Provision of information in respect of Water efficient taps and showers

At the time of handover of water efficient taps and showers to the customer, the installer shall ensure that the information identified at **C12-l7** of **Table C12** is provided to the customer as part of the handover process required in **5.8.**

Table C.12 – Water efficient taps and showers (BSM.12)

Measure description		Water efficient taps and showers excluding taps for cold water only (Sanitary tapware e.g. showers, pillar taps, mixing taps etc)
Measure type		As measure description (no subdivision)
C12-l1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The requirements or guidance given in product manufacturer's instructions. ***NOTES:*** *Attention is drawn to the need, where relevant, for all hot water system installation work to comply with:* 1. *The current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, compliance in relation to the following aspects is highlighted:workmanship; materials; resistance to moisture; hot water safety and electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-Domestic Technical Handbook;* 2. *The current Water Supply (Water Fittings) regulations or Water Byelaws that apply in the UK country in which the installation is being carried out. Particular guidance can be found in WRAS water regulations guide.* 3. *The current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671)*

Table C.12 – *continued*

C12-l2	**Pre-installation building inspection requirements**	*As a minimum, the pre-installation building inspection shall investigate and assess if the:* • condition of the existing water supply and sanitary tapware installation is satisfactory in relation to the proposed work; • condition of the building fabric is satisfactory in relation to the proposed work; • the existing or proposed water supply system is compatible with the sanitary tapware to be installed; • sanitary tapware installation work will result in non-compliance with the building regulations in relation to workmanship; materials and sanitation, hot water safety and water efficiency • sanitary tapware installation work will result in non-compliance with the water regulations in relation to waste, misuse, undue consumption or contamination or erroneous measurement of the water supplied; • proposed installation will be compliant with any requirements stated by the sanitary tapware product manufacturer;
C12-l3	**Inspector competence requirements**	**Competence required** / **Route(s) to competence**
		As defined under **C12-l4** of **Table C12** / As defined under section **C12-l4** of **Table C12**

Table C.12 – *continued*

		Competence required	Route(s) to competence
C12-l.4	**Operative threshold competence requirements**	Where applicable to the scope of work undertaken, the competences in the following Common Minimum Technical Competence Annexes are required: 2A – Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Domestic); 2B - Minimum Competency for Hot Water, Cold Water and 'Wet' Heating Systems Installation Work (Non-Domestic); 6A – Backflow Prevention (Plumbing and Heating Systems); 7A – Cold Water Systems (Domestic) 7B – Cold Water Systems (non-Domestic) 9A – Hot Water System Installation (Domestic); 9B – Hot Water System Installation (Unvented); 9C – Hot Water System Installation (Non-domestic); Common Minimum Technical Competences Annexes 2A, 6A, 7A, 7B, 9A, 9B and 9C have been derived from, and are cross-referenced to, the relevant National Occupational Standards for Mechanical Engineering Services (see **9.8.2**).	**England and Wales** 1) Achievement of the relevant QCF/SCQF/ FRQ & QIW qualifications/ qualification units defined in the Common Minimum Technical Competence Annexes referred to in the adjacent column and where relevant, unvented qualification. 2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*

Table C.12 – *continued*

		3) Member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex and at location inspection of work;
		4) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through a structured interview and at location inspection of work.
		Scotland 1) For mechanical installation activities to hold or be eligible to hold a current CSCS affiliated advanced or technician registration card as appropriate to the scope of measure BSM.12 and where relevant hold a current Water Byelaws/Regulations qualification, and unvented qualification..
		2) Completion of other aligned training and certification and at location inspection of work. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery; ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) Demonstrable knowledge and experience in relation to the competence specified in the Common Minimum Technical Competence Annexes referred to in the adjacent column gained through industry experience and verified by a UKAS accredited certification body through at location inspection of work.

Operative specialist competence requirements	Competence required	Route(s) to competence
	Any water efficient taps and showers related electrical work shall be undertaken by operatives who meet the following competence requirements: **For domestic electrical installation work:** The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme. For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*

Table C.12 – *continued*

C12-I.5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **D1-I4** in **Table D1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **C12-I4** of **Table C12**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced.
C12-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.
C12-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written Information** • Product manufacturer installation and servicing instructions • Product manufacturer user manuals/guides • Product warranty information and guarantees **Verbal information and/or demonstration** • An explanation of the purpose and relevance of the written information provided • An explanation of the product controls • How the controls affect the efficiency of water delivery and how in turn that impacts on the efficiency of the hot water supply • Any safety requirements that the user should regularly undertake

Annex D (normative)
BSE energy efficiency measures

D1 Measure BSE.1 Electric storage heaters (including electric warm air heating units that incorporate heat storage)

D1.1 Additional installation requirements

When installing electric storage heaters, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **D1-I1** of **Table D1**.

D1.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the electric storage heaters at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **D1-I2** of **Table D1**

D1.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of electric storage heaters, the installer shall employ or contract only an inspector meeting the competence requirements of **D1-I3** of **Table D1**

D1.4 Operative competence

When installing an electric storage heaters, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**D1-I4** of **Table D1**), at the competency ratio specified in **D1-I6** of **Table D1.**

D1.5 Provision of information in respect of electric storage heaters

At the time of handover of electric storage heaters to the client/customer, the installer shall ensure that the information identified at **D1-I7** of **Table D1** is provided to the client/customer as part of the handover process required in **5.8.**

Table D.1 – Measure-specific requirements for Electric storage heaters (BSE.1)

Measure description	Electric Storage Heaters (including electric warm air heating units that incorporate heat storage and high heat retention storage heaters)	
	BSE1.1	Domestic electric storage heaters
	BSE1.2	Non-domestic electric storage heaters
	BSE.1.3	Domestic electric storage heaters with warm air heat distribution
Measure type	BSE.1.4	Non-domestic electric storage heaters with warm air heat distribution
D1-I1 **Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The installer is responsible for: • following the requirements of guidance given in product manufacturer's instructions • ensuring all electric storage heater work complies with the current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671).	

Table D.1 – *continued*

D1-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and determine if the: • Condition of the existing electrical installation is satisfactory in relation to the proposed work; • Condition of the building fabric is satisfactory in relation to the proposed work; • Installation work will result in non-compliance with the Building Regulations in relation to workmanship, materials, structural stability, fire safety, conservation of fuel and power and electrical safety; • Storage heater installation work will result in non-compliance with the IET Wiring Regulations; • Proposed installation will be compliant with any requirements set by the storage heater product manufacturer; • Relevant checks have been undertaken to determine if asbestos containing materials are present.	
D1-I3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As specified under section **D1-I4** of **Table D1**	As defined under section **D1-I4** of **Table D1**
D1-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		For domestic electrical installation work: The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work:** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**):	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/

Table D.1 – *continued*

		Scotland 1. To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2. To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*
Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
	Where the installation of the measure involves the installation of heat distribution ducting connected to a warm air electric storage heater unit, the competencies in the following Common Minimum Technical Competence Annexes are required as applicable to the scope of the work 10D – Warm Air Heating Systems Installation (Domestic) 10E – Warm Air Heating Systems Installation (Non-domestic) Common Minimum Technical Competence Annexes 10D and 10E have been derived from the relevant National Occupational Standards for Mechanical Engineering Services (see **9.8.2**).	**England and Wales** 1) achievement of the relevant QCF/SCQF/ FRQ & QIW qualification/qualification specified in the Common Minimum Technical competence Annexes referred to in the adjacent column
		2) Completion of other aligned training and certification. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
		3) member of a Building Regulations Competent Person Scheme for the type of work included under the scope of this Annex;
		4) demonstrable knowledge in relation to the competence in the Common Minimum Technical competence Annexes referred to in the adjacent column gained through industry experience and verified by UKAS accredited certification body through a structured interview and at location inspection of work.
		Scotland 1) achievement of the relevant QCF/SCQF/ FRQ & QIW qualification/qualification specified in the Common Minimum Technical competence Annexes referred to in the adjacent column

Table D.1 – *continued*

			2) Completion of other aligned training and certification. Alignment of courses shall be on the basis of mapping to the relevant Minimum Technical Competency Annex and acceptance by the responsible Sector Skills Council (SSC) or other Standards Setting Organization (SSO), supported by periodic confirmation of delivery. ***NOTE*** *Where such mapping and acceptance processes are already established for a particular sector, they should be used. Where existing processes are not available, a training body wishing to have its courses mapped should determine in conjunction with the relevant SSC/ SSO, a means of assessing technical competence equivalent to the mapping and acceptance applied in respect of already accepted courses and then work towards the development of a formal mapping and assessment framework for the new courses, as soon as possible.*
			3) demonstrable knowledge in relation to the competence in the Common Minimum Technical competence Annexes referred to in the adjacent column gained through practical experience and verified by a UKAS accredited certification body through a structured interview and at location inspection of work.
D1-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **D1-I4** in **Table D1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **D1-I4** in **Table D1**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE 1*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*	
D1-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.	

Table D.1 – *continued*

D1-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information.**
		• Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days) as relevant to the requirements of the Building Regulations.
		• A copy of any electrical inspection and testing certificates that have completed to meet the requirements of Building Regulations and/or the current version of BS 7671 (IET Wiring Regulations).
		• Product manufacturer's installation and servicing instructions.
		• Any manufacturer or product data or information sheets.
		• Product warranty information and guarantees.
		• Commissioning certificate that meets the requirements of the Building Regulations.
		Verbal information and/or demonstration
		• An explanation of the purpose and relevance the written information provided.
		• An explanation of what controls/components should not be adjusted by the system user.
		• Demonstration of:
		  • how to set user controls for maximum efficiency;
		  • any safety checks that the system user should undertake;
		  • what to do in the case of an emergency or perceived emergency.

D2 Measure BSE2 Lighting fittings, lighting systems and lighting system controls

D2.1 Additional installation requirements

When installing lighting fittings, systems and or controls, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **D2-I1** of **Table D2**.

D2.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of lighting fittings, systems and or controls at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in Section **D2-I2** of **Table D2.**

D2.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of lighting fittings, systems and or controls, the installer shall employ or contract only an inspector meeting the competence requirements of **D2-I3** of **Table D2**.

D2.4 Operative competence

When installing lighting fittings, systems and or controls, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes **(D2-I4** of **Table D2)** at the competency ratio specified in **D2-I4** of **Table D2**.

D2-5 Provision of information in respect of lighting fittings

At the time of handover of the lighting fittings, systems and or controls to the customer, the installer shall ensure that the information identified at **D2-I7** of **Table D2** is provided to the customer as part of the handover process required in **5.8**.

Table D.2 – Measure-specific requirements for Lighting fittings, lighting systems and lighting system controls (BSE.2)

Measure description		Lighting fittings ,lighting systems and lighting system controls (domestic and non-domestic)	
Measure type		BSE2.1	Lighting fittings (domestic)
		BSE2.2	Lighting systems and Lighting system controls (non-domestic)
D2-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8)**	*Any requirements provided in the manufacturers instructions* ***NOTE 1*** *Attention is drawn to the need for all lighting fittings work to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: workmanship; materials; structural stability; fire safety; resistance to moisture; conservation of fuel and power, electrical safety. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook.* ***NOTE 2*** *Attention is drawn to the need for all work relating to non-domestic electrical work to comply with the Electricity at Work Regulations.*	
D2-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and assess if the: • condition of the existing electrical installation is satisfactory in relation to the proposed work; • condition of the building fabric is satisfactory in relation to the proposed work; • the existing or proposed lighting control arrangement is compatible with the lighting fittings, systems and or controls to be installed; • installation work will result in non-compliance with the Building Regulations in relation to workmanship; materials; structural stability; fire safety; resistance to moisture; conservation of fuel and power, electrical safety; • installation work will result in non-compliance with the IET Wiring Regulations; • proposed installation will be compliant with any requirements stated by the product or system manufacturer; • relevant checks have been undertaken to determine if asbestos-containing materials are present.	
D2-I3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As specified at **D2-I4** of **Table D2** for operative threshold competence	As specified at **D2-I4** of **Table D2** for operative threshold competence

Table D.2 – *continued*

D2-l4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		The competence requirements stated in Domestic – Level 3 NVQ Diploma in Installing and Testing Electrical Systems in Residential Properties OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment), or equivalent, and their company registered with a Competent Person Scheme under Part P of the Building Regulations for England and Wales Non-domestic – Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment), or equivalent, and their company registered with a UK recognised industry certification scheme in accordance with the Electrotechnical Assessment Specification (EAS) The above competencies are wholly derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**). Also, where applicable, any product-specific training and/or competence requirements specified by the lighting fitting manufacturer or supplier. ***NOTE** It is expected that the operative will be able to demonstrate understanding of Part L e.g. EAL/C & G of the applicable Building Regulations for Domestic Electrical Installation*	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1** For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2** For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE** For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*
	Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
		Competence as specified for threshold operatives with no additional requirements.	As defined under **D2.l4** of **Table D2**

Table D.2 – *continued*

D2-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **D1-I4** in **Table D1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **D2-I3** and **D2-I4** of **Table D2**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*
D2-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.
D2-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	**Written information** • Product manufacturer's installation and maintenance instructions. • Product warranty information and guarantees. • Building Regulations compliance certificate (or information explaining that a Building Regulations compliance certificate is required and will be provided within 30 days) as relevant to the requirements of the Building Regulations. • A copy of any electrical inspection and testing certificates that have completed to meet the requirements of Building Regulations and/or the current version of BS 7671 (IET Wiring Regulations). **Verbal information and/or demonstration** • An explanation of the purpose and relevance the written information provided. • How to set user controls for maximum efficiency • An explanation of what controls/components should not be adjusted by the system user. • Where end-user maintenance is possible, details how to undertake the maintenance including details of any product or tools that must be used and details of where to obtain the required products and tools.

D3 Measure-specific requirements for BSE.3 Variable speed drives for fans and pumps

D3.1 Additional installation requirements

When installing a variable speed drive for a fan or pump, in addition to meeting the core requirements set out in Clauses **4** to **8** of this PAS, the installer shall also work to any standards, specifications, instructions or guidance identified in **D3-I1** of **Table D3**.

D3.2 Pre-installation building inspection requirements

Prior to commencing the physical installation of the variable speed drive for a fan or pump at location, the installer shall undertake a pre-installation building inspection in accordance, as a minimum, with the requirements set out in **D3-I2** of **Table D3.**

D3.3 Inspector competence

When undertaking a pre-installation building inspection in respect of the installation of a variable speed drive for a fan or pump, the installer shall employ or contract only an inspector meeting the competence requirements of **D3-I3** of **Table D3**.

D3.4 Operative competence

When installing a variable speed drive for a fan or pump, the installer shall employ or contract only operatives with the required level of competence attained through one of the permitted routes (**D3-I4** of **Table D3**), at the competency ratio specified in **D3-I6** of **Table D3**

D3.5 Provision of information in respect of variable speed drives for fans and pumps

At the time of handover of a variable speed drive for a fan or pump to the customer, the installer shall ensure that the information identified at **D3-I7** of **Table D3** is provided to the customer as part of the handover process required in **5.8.**

Table D.3 – Variable speed drives for fans and pumps (BSE.3)

Measure description		Variable speed drive. A device which is installed between the incoming supply and the motor drive (e.g. of a fan or pump) which enables the drive speed to be varied. Control can be either manual or by means of a suitable control system dependent on the drive systems use.	
Measure type		As measure description (no sub-division)	
D3-I1	**Additional installation requirements to those in the core of this PAS (Clauses 4 to 8).**	The requirements or guidance given in product manufacturer's instructions. The current edition of the Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671). ***NOTE*** *Attention is drawn to the need for all work relating to the installation of electrical devices to comply with the current Building Regulations that apply in the UK country in which the installation is being carried out. In particular, the need for compliance in relation to the following aspects is highlighted: workmanship; materials; structural stability; fire safety; resistance to moisture; ventilation; conservation of fuel and power. Further guidance on the requirements of the Building Regulations in England and Wales is provided in Approved Documents A-P and Regulation 7:Workmanship and Materials. Further guidance on the requirements of the Building Regulations in Scotland is provided in the Domestic Technical Handbook and Non-domestic Technical Handbook. Attention is drawn to the need for all non-domestic electrical installations to comply with the Electricity at Work Regulations.*	
D3-I2	**Pre-installation building inspection requirements**	As a minimum, the pre-installation building inspection shall investigate and assess if the: • condition of the existing electrical installation is satisfactory in relation to the proposed work; • condition of the existing building fabric and building services are satisfactory in relation to the proposed work; • installation work will result in compliance with the IET Wiring Regulations; • proposed installation will be compliant with any requirements stated by the product manufacturer. • relevant checks have been undertaken to determine if asbestos-containing materials are present.	
D3-I3	**Inspector competence requirements**	**Competence required**	**Route(s) to competence**
		As specified at **D3-I4** of **Table D3** for operative threshold competence	As specified at **D3-I4** of **Table D3** for operative threshold competence

Table D.3 – *continued*

D3-I4	**Operative threshold competence requirements**	**Competence required**	**Route(s) to competence**
		For domestic electrical installation work: The competence requirements contained in the Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). **For non-domestic electrical installation work** The competence requirements contained in the Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment). The competence requirements in the Level 3 NVQs stated above are derived from the relevant National Occupational Standards for the Electrotechnical Industry (see **9.8.2**).	**England and Wales** For domestic work 1. To hold a Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical installations in Dwellings OR Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies; or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be a registered for domestic electrical work (defined or full scope as applicable) with an authorised Competent Person Self-Certification Scheme For non-domestic work 1. To hold a Level 3 NVQ Diploma in Installing Electrotechnical Systems and Equipment (building structures and the environment) or SVQ equivalent or other equivalent as defined in the current version of Electrotechnical Assessment Specification for use by Certification And Registration Bodies, or 2. To hold or be eligible to hold a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card; or 3. To be registered with a certification body that is UKAS accredited (to EN45011) to issue certification for non-domestic electrical work. ***NOTE 1*** *For details of the requirements for the issue of a current Electrotechnical Certification Scheme (ECS) Approved Electrician Grade Card visit www.ecscard.org.uk/* ***NOTE 2*** *For details of the competence requirements contained in the Level 3 NVQ certificates and diploma visit* http://register.ofqual.gov.uk/ **Scotland** 1) To hold a Level 3 SVQ Electrical Installation (or approved equivalent); or 2) To hold or be eligible to hold a current SJIB Approved Electrician Grade (ECS) Card. ***NOTE*** *For details of the requirements for the issue of a current SJIB Approved Electrician Grade (ECS) Card visit www.sjib.org.uk or www.ecscard.org.uk/*
	Operative specialist competence requirements	**Competence required**	**Route(s) to competence**
		Competence as specified for threshold operatives with no additional requirements.	As defined for threshold operatives.

Table D.3 – *continued*

D3-I5	**Current competency**	The installer shall confirm the currency of competency of all employed inspectors and operatives, in accordance with **D1-I4** in **Table D1** at intervals not exceeding 12-months. Reconfirmation of competence shall be through both examination of personnel records and inspection of work carried out at location. Where safety- or technical-critical revisions are made to the competency requirements in **D3-I3** and **D3-I4** of **Table D3**, including any revisions to the cross-referenced documents, installers shall meet the requirements of the revisions within the time period stated at the time the revisions are introduced. ***NOTE*** *The time period for meeting the requirements of the revisions should be set in consultation with the UKAS accredited certification body(ies) and take account of the nature and level of risk associated with the reason(s) for the revisions.*
D3-I6	**Competence ratio**	For each installation task to be undertaken, the installer shall employ or subcontract at the particular location, at least one operative that meets the operative competence requirements for the relevant tasks. For each installation, the competence ratio (see **3.4**) shall be determined by the installer in relation to the: a) range, scale, geographical spread and complexity of the work being undertaken; b) supervision and experience of the individual that meets the operative competence requirements for the relevant tasks and the experience of the individuals being supervised. ***NOTE*** *Where a specialist operative is new to the role, it may be appropriate for a lower competency ratio to be applied.* For each installation task to be undertaken at a particular location the individual(s) that meet(s) the specialist operative competence requirements for that task shall inspect and confirm compliance of all work undertaken in respect of that task, at that location.
D3-I7	**Measure-specific information to be handed over to the customer in addition to 5.8**	• Product manufacturer installation and operating instructions. • Installer details (if not included in the commissioning certificate), e.g. mechanical, electrical. • A copy of any electrical inspection and testing certificates that have been completed to meet the requirements of Building Regulations and/or the current version of BS 7671 (IET Wiring Regulations).

Annex E (informative)
PAS 2030:2014/PAS 2030:2017 – Substantive change

NOTE In this edition of PAS 2030, there is no reliance on or reference to, the Green Deal, the Green Deal Code of Practice, the United Kingdom Green Deal Financing Mechanism or any other legislative based scheme of similar purpose. Any requirement for the use of PAS 2030 or other relationship arising out of such schemes or programmes is the product of that legislation and is not in any way required for application of the PAS.

Table E.1 – Substantive change introduced in PAS 2030:2017

PAS 2030 Clause Reference		Nature of changes
2014	2017	
Foreword	**Foreword**	Includes information in respect of the expected implementation of this PAS. Removal of reference to BIS and Green Deal. Other minor editorial changes.
Introduction	**Introduction**	Removal of reference to BIS and Green Deal. Other minor editorial changes.
1. Scope	**1. Scope**	Modified to reflect changes to the detail and structure of the revised PAS 2030. Includes reference to the addition of EEM design/ specification, validation requirements and to the new annexes.
2. Normative references	**2. Normative references**	Use of the Green Deal Code of Practice no longer a requirement.
3. Terms and definitions	**3. Terms and definitions**	The term 'Green Deal Provider' and its related definition has been deleted. Terms relating to design and specification have been modified or added (see **3.6**, **3.7**, **3.9** and **3.15**). The definition of '(installation) method statement has been modified for clarification.
	4. Design and specification of EEM	New Clause setting out with increased specificity, the details of how installers shall undertake review and validation of the EEM design/ specification that they are required to have prior to commencement of the installation. Also provides direction on how this can be incorporated in the installation method statement that will define the installation to be undertaken, including: • how the functionality and performance different EEM installed in the same building can be mutually assured. • the nature and extent of any ventilation restoration/ enhancement that could be required in installations where one or more measures with the potential to increase building air-tightness, have been installed.
4 Installation process	**5. Installation process**	Clarification about the use of sub-contractors and some minor editorial changes (see **5.6**).
5. Installation process management	**6. Installation process management**	Changes to requirements in relation to 'business and financial probity' (**6.9**), clarifying/enhancing requirements for product liability insurance, guarantees and warranties and for clarity of contractual liability where installers are contracted on a design and build basis.
6. Service provision	**7. Service provision**	Minor editorial changes for clarification/ ease of understanding
7. Claims of conformity	**8. Claims of conformity**	Specified claim enhanced to include/ clarify responsibility for design/ specification.

Table E.1 – *continued*

8. Documents essential to the application of the annexes of this PAS	**9. Documents essential to the application of the annexes of this PAS**	Existing cross references confirmed or updated where necessary. Additional cross references added for Fenestration. Statement with regard to ongoing reliance on MTC Annexes NOS and NVQ for competence requirements. Additional cross-references to new insulation guidance documents.
Annex A Energy efficiency measures/ types with PAS references	**Annex A Measure specific Annex selection and co-installation requirements**	Annex still contains the definitive list of included measures and measure types but has been extended to include a matrix providing information about the interaction and potential conflict between measures installed in the same building and requirements in respect of the maintenance, restoration or improvement of ventilation in buildings where the installation of one or more EEM has improved the airtightness. Additional information in respect of thermal bridging now included
Annex B	**Annex B**	*Annex B1 Significant change in respect of pre-installation building inspection requirements* *Annex B3* Additional cross references added for Fenestration. Adjustment to routes to competence. *Annexes B4, B7 and B8, Significant changes, particularly with regard to Installer responsibilities in respect of design/ specification.* *Annex B12 Flexible thermal linings no longer included* *New Annex B12 Annex for Room-in Roof Insulation (RIRI) now included* *Other annexes some minor editorial changes.*
Annex C	**Annex C**	*Updating of NOS references. Some minor editorial changes.*
Annex D	**Annex D**	*Updating of NOS references Some minor editorial changes.*
	Annex E	New Annex providing comparison between PAS 2030:2014 and PAS 2030:2017 and identifying salient points of change
	Annex F	New Annex providing guidance on the application of PAS 2030:2017
Annex E	**Annex G**	Example 'installation project information collation form', modified to reflect the changes introduced by 2017 revision.

Annex F (informative)
Installer guidance on the use and application of PAS 2030:2017

F.1 Overview

In addition to setting out requirements to be met by installers in undertaking the installation of EEM in existing buildings, PAS 2030 presents a logical approach to such activity, providing a suggested sequence of actions that if followed, should enable the installer to ensure and demonstrate, that all required actions have been undertaken in compliance with the PAS requirements.

Before making use of PAS 2030, it is important that installers understand that this PAS is prepared against the assumption that a predesign building survey has already been undertaken by a competent person. It is expected that this will be used to inform the preparation of an EEM design that is not only capable of delivering specified energy efficiencies but is also functionally and environmentally, compatible with the designated building and with other EEM that are already or are about to be, installed in the same building.

It is acknowledged that in some situations, this predesign building survey and the preparation of an appropriate EEM design could be undertaken by the same organization as that undertaking the EEM installation but in other circumstances this may not be so and to accommodate this fundamental difference in approach, PAS 2030 treats the installation process as being wholly independent of those of predesign building survey and EEM design.

For this reason, the PAS 2030 installation process begins with a detailed review of the content and relevance of the EEM design as received from the design source, leading to an inspection of the designated building (the pre-installation building inspection) to enable the installer to satisfy him/ herself that what has been instructed in the EEM design is complete, appropriate for the building concerned, technically feasible and capable of delivering the intended efficiencies.

The PAS includes specific instruction that where the actual circumstances/ conditions at the building are not as provided for in the design, the installer is required to refer such matters back to the design source for resolution. It could be that the deign source seeks contribution from the installer in the determination of corrective action but this is not a requirement of PAS 2030 and any such contribution is outside of the remit of this PAS.

A.2 A staged approach to installation

The core text of PAS 2030 (Clauses **4** to **8**) are presented in the sequence recommended for their application.

Clause 4.1. Sets out the requirement for installers not only to be in possession of an EEM design from a reputable source but also to take some responsibility for ensuring that the EEM designs they are provided with are complete and appropriate for the buildings in which the EEM is to be installed (see also Clause **6**).

This does not however include any requirement or expectation that the EEM installer should be responsible for correcting or enhancing the design in the event that it is judged to be inadequate or inappropriate in relation to the criteria set out in Clause **4.2.**

PAS 2030:2017 is quite specific in requiring the installer to refer back to the design source for each particular EEM design, where any such inadequacy is identified or where the pre-installation building inspection identifies potential issues in respect of the building designated for installation or with other EEM that have been or are to be installed in the same building.

Clause 4.2 Sets out the principle EEM design elements that the installer should expect to find in the provided design and as such whilst providing the detail of what the installer is required to look for and confirm provision of, it also establishes the basis for the installer to refer back to the design source where there are concerns about the EEM design provided.

In setting out requirements against which the installers processes and procedures will be assessed, **Clause 5** together with the measure specific annexes relevant to the measures installed, also provides the installer with a route map to planning and undertaking each installation.

All stages of installation are included from planning (installation method statement Clause **5.1**), through the provision of equipment and tools (**5.2**), the checking and handling of materials (**5.3**), and the selection, training, instruction and supervision of operatives **(5.4** & **5.5).**

The PAS also addresses installer responsibilities when subcontracting all or part of an installation **(5.6**), and for commissioning and handing over installed EEM (**5.7** & **5.8**).

Finally in Clause **5.9** & **5.10,** the PAS, deals with the requirements for process control, documentation and record keeping that are so important for demonstrating good process management.

Clause 6 enlarges on the theme of installation process management, initially by providing detailed requirements for the undertaking of a pre-installation building inspection (**6.2**) that is proving to be such a significant element of good EEM installation.

This inspection is the final opportunity before installation commences, to confirm that the EEM design is appropriate for the building in which EEM are to be installed and that the installers plan for its installation has been correctly prepared, taking account not only of the details of the EEM to be installed but also of the actual condition and status of the building (including the presence of protected species) as well as the presence of other measure types that could have implications for or impact on the performance or effectiveness of the measure(s) any particular installer is to install.

This Clause also covers the installers responsibility to provide for any required intermediate inspections (**6.3**).

The remainder of Clause **6** (**6.4** to **6.9**) sets out a standard procedure for process management (along ISO 9000 lines) that is intended to ensure that the quality intentions of the installation process are not only delivered but can be audited subsequent to installation.

Installers will find that close attention to following this procedure will contribute meaningfully to the performance and reputation of their business.

Clause **7** establishes requirements for installers to have and operate a basic procedure for receiving and dealing with customer complaints and generally interacting with customers.

Finally Clause **8** sets out in precise terms, how an installer can claim compliance with PAS 2030:2017, including identification of the EEM that the installer is qualified to install, the source of the relevant EEM design and whether the claim is made on the basis of the installers own assessment or has been validated by another party, particularly by an independent third party certification body.

EEM installers can claim compliance with PAS 2030:2017 on the basis of their own assessment provided they use the correct form of declaration (**8.2.3** and **8.3.3**) and are confident that they can demonstrate such compliance through their recorded procedures, installation documentation and installation performance, if required to do so.

It is important to recognise however that terms of particular contracts or of some energy efficiency funding schemes can require that compliance with PAS 2030 be validated by an external party (**8.2.2** and **8.3.2**) and indeed for some schemes (e.g. the UK Government ECO scheme), validation by an accredited certification body is required (**8.2.1** and **8.3.1**).

Other party validation is not therefore a requirement of this PAS but the PAS is appropriate and does make provision, for all of selfassessment, other party validation and independent, third party (certified body) validation.

For all of these, use of the correct form of declaration is part of the requirement for compliance with this PAS.

Whether or not external validation is required by scheme requirements or commercial contract, installers should be aware that customers can have greater confidence in work for which the correct undertaking has been validated by another party, particularly if that other party is an organization that has itself been independently accredited as being fit to do so.

F.3 PAS 2030 Application

In choosing to work to the requirements of PAS 2030, installers can initially be driven by the need or indeed the desire, to be able to demonstrate compliance for commercial reason or for recognition purposes, i.e.to use it as a form of badging.

Those who do so have a tendency to operate their business and undertake their work in the manner that they always have, seeking to bolt on the requirements of the PAS purely for assessment / validation purposes. But In doing so, those installers are unlikely to derive the full benefit that application of a standard can bring.

By embedding PAS 2030 at the heart of their operations and building all of their processes, operational procedures and management controls around its principles, installers are likely to find that their business operates in a more coordinated and effective way, the incidence of installation failure and related complaint is significantly reduced and what is more, the looked for recognition and improved commercial return is delivered without additional, dedicated resource being required to make it so.

Annex G (informative)
Example installation project information collation form

G1 Use of this form

This form is provided to assist installers in meeting the record keeping requirements of PAS 2030. It is presented in a form that may be copied and used by installers as required.

PAS 2030 Installation Process Record

Unique reference for installation to which this record relates
It is recommended that the reference allocated here should be the primary identifier used to collate the set of information required to support each application of PAS 2030, including for the elements of the method statement.

G2 Design source

Installer provided or independent third party
If independent third party record name and contact details:

G3 Location of installation

Record full address of the building in which the specified EEM is/ are, to be installed

G4 Measure(s) to be installed

Record full address of the building in which the specified EEM is/are, to be installed

G5 Key installation dates

G5.1 EEM specification provided

G5.1 Pre-installation building inspection completed

G5.2 Installation commenced

G5.3 Installation completed

G5.4 EEM Commissioned

G5.5 EEM handover

G6 Adequacy of EEM design provided

G6.1 Information sourcing (4.2.1)
Installer assured of validity of source material: Date:

Document references:

G6.2 EEM design planning (4.2.2)
Installer assured of adequacy of specification planning: Date:

Document references:

G6.3 Suitability of specified EEM (4.2.3)
Installer assured that specification meets customer expectations and is in accordance with information provided at **G6.2**. Date:

Document references:

G6.4 Availability of required external standards/ other documents (4.2.4)
Installer has been provided with or has access to all standards or other installation related documentation included in the EEM specification.
Standard/ document reference:

Standard/ document reference:

Standard/ document reference:

G6.5 EEM inter-relationship (4.2.5)
Installer appraised of other EEM installed or to be installed in the building at which the new installation is to take place and is satisfied that the provisions made for their cooperation are appropriate and sufficient. Date:

Standard/ document reference:

G6.6 Ventilation requirements (4.2.6)
Installer assured the EEM design provided includes appropriate and sufficient provision for the maintenance/ enhancement of ventilation in the property in which the installation specified is to be undertaken. Date:

Standard/ document reference:

G6.7 Thermal bridging requirements (4.2.6)
Installer assured the EEM design provided includes appropriate and sufficient provision for addressing instances of thermal bridging in the property in which the installation specified is to be undertaken. Date:

Standard/ document reference:

G7 Products and/or system specified/to be installed

Product 1:

Available date:

Product 2:

Available date:

Product 3:

Available date:

System:

Available date:

G8 Installation process – Installation method statement

The installer is required to possess and make available when required, the information that constitutes the method statement applicable to each EEM installation, before commencement of its installation (**5.1**). Completion of the following fields could assist the creation of the required record.

G.8.1 Reference for the EEM design specification provided by the design source (5.1.1 & G6)

G8.2 Identification of the relevant measure-specific installation Annex(es) from PAS 2030 (5.1.2)

Annex(es)

G8.3 The method(s) to be used for installing the product, including all constituent tasks (5.1.3)

Enter references to all relevant methods

G8.4 Requirement for intermediate inspections

Confirmation that the installer is aware of any requirement for intermediate inspections and that the method statement includes appropriate provision for their undertaking.

Inspection required at (stage)

Anticipated date:

G9 Installation process

G9.1 Equipment and tools,

Identification/availability of the tooling and equipment required for the installation, including any requirement for calibration (**5.2**)

G9.2 Materials and Supplies

Identification/availability of product-related checking, handling and storage instructions (**5.3**)

G9.3 Operative instructions

Confirmation of provision of installation instructions to operatives (**5.4**)

G9.4 Operative selection, training and work assignment

The training and competence required of operatives by the installer to install the measure(s) in compliance with this PAS and its constituent Annexes (**5.5**). This should cross-reference relevant personnel and training records and be reflected in record G12.

G9.5 Installation supervision

G9.6 Subcontracting

Enter the identification of any subcontractors to be engaged for this installation (**5.6**) together with confirmation that the primary installer's contract with the subcontractor requires that the subcontractor will comply with all requirements of this PAS that are relevant to the installation related tasks to be undertaken and hat subcontracted operatives have the necessary skills and competence for the installation tasks subcontracted

G9.7 Commissioning

Detail of any "commissioning" action required of the installer (**5.7**)

G9.7 Commissioning

Detail of any "commissioning" action required of the installer (**5.7**)

G9.8 Handover

The information to be delivered to the customer at handover (**5.8.1**)

Identity of operatives authorized to undertake handover (**5.8.2**)

G9.9 Installation control

This will be the identification of the competent person authorized by the installer to sign off the satisfactory completion of the installation (**5.9**)

Installer signature

Date

G9.10 Documents and records

Confirmation by the competent person authorized at G9.9 that the method statement has been available to and used when required, by operatives undertaking installation tasks

Signature

Date

G10 Pre-installation building inspection

G10.1 inspection findings

Record report reference and brief description of any issues raised,, including in relation to:

- The suitability and completeness of the design specification;
- The suitability and completeness of the installation method statement;
- Confirmation that the specified EEM can be safely and effectively installed at the designated location;
- Potential for moisture build-up as a result of the installation;
- Confirmation of the adequacy of ventilation prior to and after installation;
- Potential instances of thermal bridging and planned actions for amelioration;
- Risk to functionality and/or safety of installed services;
- The status of pre-existing safety alarms and;
- The presence of protected species.

G10.2 Responses/ actions in respect of issues raised at G.10.1.

Record actions taken in response to issues raised (**G.10.1**) with confirmation that installation is clear to proceed.

G11 Checklist for information that should have accompanied the EEM design or been obtained by the installer and made known to installation supervisors/ operatives, prior to undertaking the installation.

Information required	Date of Receipt
a) Details of other EEM installed or to be installed at the same location, to provide for liaison between installers in respect of: (1) mutual efficiency and effectiveness of measures; and	
(2) working procedures and timing of measure installation.	
b) Installation instructions and requirements to be applied, including those for any required interrelationship between measures. Enter details or reference to details	
c) Customer requirements and expectations to be met by the installer, including, for example, timing, access to the premises, storage of materials and tools, and use of toilets and other facilities Enter details or reference to details	
d) Confirmation that all necessary permissions have been obtained and any constraints made known. Enter nature of constraint or permission.	
e) Information that is to be provided by the installer to the customer Enter details or reference to details	
f) Confirmation that the necessary guarantees and warranties are in place Enter details or reference to details	
g) Detail of the terms and conditions included in guarantees and warranties including any specific installation requirements or limitations that may affect their validity Enter details or reference to details	

G.12 Name(s) of operatives undertaking this installation, their competence level and briefing

Operative name:

Competence level & record reference:

Briefing given for this installation:

Date:

Operative name:

Competence level & record reference:

Briefing given for this installation:

Date:

Operative name:

Competence level & record reference:

Briefing given for this installation:

Date:

Operative name:

Competence level & record reference:

Briefing given for this installation:

Date:

Operative name:

Competence level & record reference:

Briefing given for this installation:

Date:

G13 Details of any problems encountered during installation, corrections agreed and remedial work undertaken

Please provide a brief record of the nature and extent of the problem and the method and timing of its resolution. This record should include reference to any tools or equipment requiring recalibration. Include references to any relevant documentation held separately.

G14 Customer complaints

Date complaint received:

Date acknowledged to customer:

Date certification body informed *(when requested)*

Date design source informed (where relevant):

Nature of complaint

(e.g. complaint related to: installation, installer attitude, operative behaviour, measure efficiency, measure suitability, timing, delay)

Complaint resolution

(Where complaint to be corrected or resolved by installer, record action taken and date of resolution.)

Action taken:

G15 Commissioning – EEM performance testing carried out

Record date of commissioning, tests undertaken and any adjustments made.

Date of commissioning:

Tests and adjustments:

G16 Record of information left with customer at handover

Record identity of customer actually receiving information, items of information left, any physical demonstration provided and date of handover

Customer name:

Information provided:

Date of handover:

G17 Installation sign-off

The following statement is to be signed off by a competent person authorized to do so on behalf of the installer.

The installation identified in this process record has been undertaken in accordance with PAS 2030 and is confirmed as meeting the relevant design specification.

Name of authorized signatory:

Signature:

Date

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